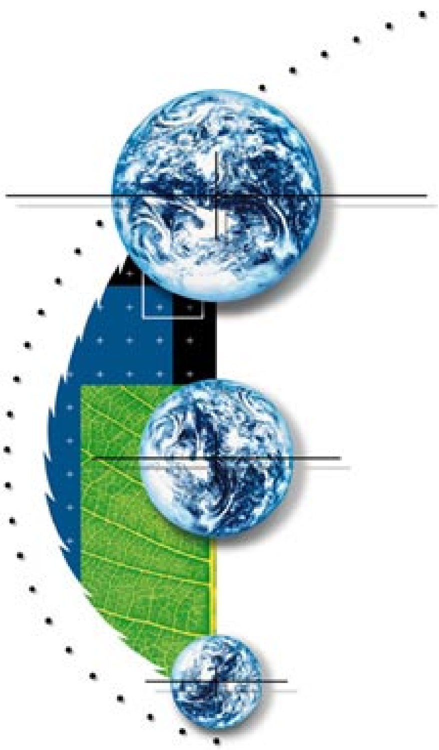
TELECOM DEVELOPMENT SUMMIT

Speakers' Book



TELECOM 99

Geneva, 10-17 October

Inter@ctive 99

International Telecommunication Union

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PALEXPO – Room A

Monday, 11 October 1999	09:00 - 10:30

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Welcome Address:	**Mr. Yoshio UTSUMI**, *Secretary General,* International Telecommunication Union (ITU)
Introductory Remarks:	**Mr. Hamadoun I. TOURÉ**, *Director*, Telecommunication Development Bureau (ITU/BDT)
Keynote Speakers:	**Mr. Tony REIS,** *CEO*, Swisscom AG (Switzerland)
	Mr. John CHAMBERS, *President & CEO*, CISCO Systems Inc. (U.S.A.)

Mr Yoshio UTSUMI
Secretary-General
(International Telecommunication Union)

DEV.1

Secretary-General

Mr Yoshio Utsumi has been in the telecoms business for over thirty years and has a proven track record of expertise at senior policy levels gained both nationally and internationally.

After earning a Bachelor degree of Law from the University of Tokyo and a Masters of Arts in Political Science from the University of Chicago, Mr Utsumi joined the Ministry of Posts and Telecommunications (MPT). In 1972, he was nominated professor of public administration at the MPT Postal College. In 1986, he led Japan's largest investment fund at the Postal Life Insurance Bureau of the MPT until 1988 when he moved to broadcasting as the Head of the General Affairs Division of MPT's Broadcasting Bureau.

For seven years, he helped shape Japan's domestic policies at the Communications Policy Bureau. His experience in international affairs includes three years in Geneva where he served as First Secretary of the Permanent Mission of Japan in charge of ITU affairs and two years as Director-General of International Affairs of the Ministry of Posts and Telecommunications. In 1994, he was elected Chairman of the ITU plenipotentiary conference. At the senior policy-making level, he served as MPT Director-General, assistant Vice-Minister and Deputy Minister until his election as Secretary-General of ITU on 20 October 1998 by the Minneapolis Plenipotentiary Conference.

Mr Utsumi is credited with having introduced the competition and liberalization policy at a time when such ideas were not widely accepted. His initiative led to Japan's first reform of its telecommunication market. He was also a major driving force in many of Japan's most important projects to develop multimedia industries. In the postal sector, he undertook a major restructuring of Japan's postal services which he carried out successfully with the cooperation of the 200 000 staff at every level which he skillfully enlisted. On the international scene, Mr Utsumi has played a very active role in many negotiations and, in particular, those leading to the historic WTO agreement on basic telecommunications.

Mr Utsumi was born on 14 August 1942. He and his wife Masako, an architect, have a son and a daughter.

Mr Hamadoun Ibrahim TOURÉ
Director
Telecommunication Development Bureau (BDT)
(International Telecommunication Union)

DEV.1

Opening session

Biography

Hamadoun I. Touré (Republic of Mali), has over 20 years of experience in the telecommunication field and has had held various management positions in leading telecommunication companies.

His professional career has covered the public sector in his native Mali, intergovernmental institutions including INTELSAT in Washington D.C., and he has also worked in the private sector with ICO Global Communications.

Hamadoun I. Touré holds a Master's Degree in Electrical Engineering from the Institute of Electronics and Telecommunications of St. Petersburg, Russia (1979).

His education also includes various courses in Management, Human Resources Development and Marketing.

Experience

At the time of his election as Director of BDT, Hamadoun I. Touré was working in the private sector as the Africa *Regional General Manager* for ICO Global Communications, a Global Mobile Personal Communications System (GMPCS).

Mr Touré was with ICO Global Communications from 4 July 1996 to January 1999 and was responsible for the company's regional operations and the marketing distribution networks across the African continent. He developed and managed the relationship with regional and national telecommunications, organizations, government departments and regulatory authorities and service distributors. He was also responsible for identifying and enhancing business opportunities for the successful commercial implementation of ICO services throughout the continent.

His main was to use a regional approach, which involved setting up joint ventures, including private and public corporations, from cellular network operators to public telecommunication corporations.

Mr Touré was also very active in pursuing all policy matters related to GMPCS implementation with Regulators in all African countries.

Prior to ICO, Hamadoun I. Touré worked for INTELSAT (from 1985 to 1996), the International Telecommunications Satellite Organization based in Washington D.C., USA, where he served in several positions. His first post there was working for the *Assistance and Development Program (IADP)*, managing regional assistance and development programs. During this time he developed plans for the implementation of regional interconnectivity projects aimed at improving direct regional links and reducing external transits.

With INTELSAT, Mr Touré subsequently became *Regional Director Africa* and *Group Director Africa and the Middle East*. His activities included the conception and implementation of regional plans including development strategies, technical implementation of new digital services, sales and marketing and training (regional and national).

As such, he spearheaded the conception of INTELSAT's incremental regional approach for RASCOM, the Regional African Satellite Organisation. As *Regional Director and Group Director*, Hamadoun Touré was closely involved in all ITU activities and participated in ITU's regional and international forums.

Mr Touré began his career in 1979 with the Office des Postes et Télécommunications (OPT) du Mali (West Africa). The turning point was his management of the *International Telecommunications Division* at the time of the merger of the international and national sectors to form SOTELMA as an offshoot of OPT.

Languages

Fluent in French, English, Russian, Mandingo and Native Songhai.

Mr. Tony REIS
Chief Executive Officer
Swisscom AG
(Switzerland)

DEV.1

Biography

Tony Reis represents a new generation of executive in Switzerland. His initials “T” and “R” could just as easily stand for “telecommunications and reconstruction”. Anyone who, like him, has made their name as the re-shaper of a company in the extremely dynamic telecoms business must display exactly these qualities: dynamism and a will to change. Qualities which not only distinguish him as CEO of the Swiss carrier Swisscom, but which also contribute to his strength as a leader.

Change is “my way of life”, he says, and he has always found well-trodden paths a little suspect. And so it was that around 30 years ago the young Tony found his native Lucerne somewhat restrictive. Curious about the world, he left Switzerland behind and set off to put the finishing touches to his commercial training, first in Paris and then in the capital on the Thames. On his travels he took with him one thing above all: an acute instinct for customers and their concerns. “Customer” was the word which was ever-present at his parents' business and which made a lasting impression on him.

In London his career took a decisive turn. Fascinated by automation, he made the decision to sign up for the “big blue”. And so, back in Switzerland, he started work as a 23 year old beginner at the IBM group in Zurich. In the years that followed he obtained ever more responsible managerial positions in Switzerland, Brussels and Paris.

His big test came in 1990. Appointed as General Manager and Chairman of IBM Switzerland, he succeeded in putting the group, which at the time had got into dire straits, back onto an even keel. First in Switzerland and then throughout Europe, as the new boss at the Paris headquarters. In addition to the Old Continent, the successful reformer was subsequently entrusted with the Middle East and Africa too.

But Tony Reis is not the kind of person to sit around twiddling his thumbs once his work has been done. Success spurs him on to new challenges. Radical changes had been announced for the then state-owned company, Swiss Telecom PTT. Liberalisation of the market and privatisation of the company - the biggest privatisation in Swiss economic history. Once more, Tony Reis was the man of the hour, responsible for change and reconstruction. As Chief Operating Officer of the new Swisscom, he continued with the Change process already begun, but in a new and livelier gear. His goal: to transform the former colossus into a dynamic, customer-oriented service company – and in particular to change the way of thinking of some 20,000 employees. Thanks to this culture change, Tony Reis, as new CEO, successfully led the company onto the stock exchange in 1998.

The free market poses a continuous challenge. This means that Tony Reis has little time for his hobbies: mountain climbing and fly-fishing. His employer comes first. But that isn't Swisscom. No, Tony Reis’ real employer is and always has been - the customer.

Mr. John T. CHAMBERS
President and Chief Executive Officer
Cisco Systems Inc.
(USA)

DEV.1

Biography

John Chambers is President and Chief Executive Officer (CEO) of Cisco Systems, the worldwide leader in networking for the Internet. He joined the company as the second in command when Cisco had $70 million in annual sales and a market cap of $600 million. During the past four years as President and CEO[1], Chambers has grown the company from $1.2 billion in annual revenues to its current run-rate of $10+ billion by establishing leadership in key technology sectors of the networking industry and aggressively pursuing new market opportunities.

Silicon Valley's hometown publication, *Upside Magazine*, recently ranked John Chambers as "the top titan of the digital world." For the second time in three years, *Business Week* has named Chambers one of the top 25 executives worldwide. Chambers was also designated "CEO of the Year" for 1997 in a poll of industry executives conducted by *Electronic Business* magazine. Widely recognized as one of the most innovative and dynamic leaders in global business today, Mr. Chambers is a member of President Clinton's Committee for Trade Policy.

At a recent White House event, President Clinton and Vice President Gore referred to Cisco as "one of the most respected companies, not only in [the networking] field, but in any field" and described Chambers as "a true leader in this industry, in America's economy and in the global economy."

Just fifteen years ago, Cisco Systems did not exist. Today, Cisco is the fastest growing company in the history of the computer industry. With a market cap of more than $160 billion after only twelve years in the business, Cisco is among the 10 highest valued companies in the world (Nasdaq - 1/6/99).

Cisco is also the best example of a company that has made the most of the Internet's vast opportunities to gain a sustainable, competitive advantage. In 1997, Cisco did one-third of the world's Internet commerce. Today, 72% of the company's orders are transacted over the Internet. In 1998, Forbes ASAP designated Cisco as the country's most dynamic company and Fortune calls Cisco one of the 25 best companies to work for in the U.S.

Through vision and innovation, Cisco and its leaders have built the Internet, and by doing so, have empowered an Internet Generation.

Chambers joined Cisco in January 1991, as Senior Vice President of Worldwide Operations. He was promoted in May of 1994 to Executive Vice President with responsibilities for R&D, Manufacturing, Worldwide Sales, Marketing and Support. Prior to joining Cisco, Chambers spent eight years at Wang Laboratories, the last two as Senior Vice President of U.S. Operations. Chambers began his career by spending six years with IBM.

Chambers holds an M.B.A. degree in finance and management from Indiana University. He received a J.D. degree and a B.S./B.A. degree in business from West Virginia University.

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[1] Mr. Chambers was named President and CEO in November 15, 1994. His position became official in January 1995.

PALEXPO – Room A **TDS.1**

Monday, 11 October 1999	**10:20 - 12:00**

TELECOM Development Symposium (TDS)

"NEW OPPORTUNITIES IN DEVELOPING COUNTRIES"

TDS.1	**Centre of Excellence Concept**

Chairperson:	**Mr. Pierre GAGNÉ,** *Chief,* Policies, Strategies and Financing (PSF) (ITU-BDT)
Moderator	**Mr. Jaime HERRERA,** *Head,* HRD/HRM (ITU/BDT)
Keynote Speakers	**H.E. Ms. Claudia de Francisco ZAMBRANO,** *Minister of Communications* (Colombia)
	Mr. David MELLOR, *President,* Telecommunication Academy (United Kingdom)
Panelists	**Mr. Istvan FODOR,** *President,* Ericsson (Hungary)
	Prof. Madhukar PITKE, *Vice Chairman,* Axes Technologies (India)
	Mr. Yoshimi FUKUHARA, *General Manager* NTT-ME Information Xing, Inc. (Japan)
	Prof. V. Kithsiri SAMARNAYAKE, *Chairman,* Computer & Information Technology (Council of Sri Lanka (CINTEC) (Sri Lanka)
Rapporteur/Right of Response	**Mr. Mario MANIEWICZ,** *Regional Officer in Human Resources Management and Development,* Americas Division (ITU/BDT)

PALEXPO – Room A

TDS.1

Monday, 11 October 1999	10:20 - 12:00

TELECOM Development Symposium (TDS)

"NEW OPPORTUNITIES IN DEVELOPING COUNTRIES"

TDS.1	Centre of Excellence Concept

The Centre of Excellence is an ITU initiative directed to the developing world but it also includes the participation of all types of partners, universities, training institutes, private companies and operators, governments, etc. – interested in participating jointly with ITU in the development process for developing countries. With the support of TELECOM surplus, the first centres were created in Dakar (Senegal) and AFRALTI in Nairobi (Kenya). Soon the ITU will also have Centres for Excellence in Latin America and Asia.

The panel will provide the opportunity to discuss the Centre of Excellence concept, as a mechanism for the provision of high-level training and assistance to senior and top authorities in all aspects of telecommunication sector reform, regulation, new technologies and new services, as well as modern management techniques. The mechanism is based on partnerships, the use of networks for working purposes and the participation of both private and public telecommunication organizations.

Mr. Pierre GAGNÉ
Chief,
Policies, Strategies and Financing (PSF)
Telecommunications Development Bureau (BDT)
(International Telecommunication Union (ITU))

TDS1

Biography

Mr. Pierre Gagné joined the ITU in April 1997. He is Administrator for the Special TELECOM Development Programme which aims to use income generated from TELECOM activities for specific telecommunications development projects in the developing world. The programme is predicated on the need to build partnerships and to attract various financial and in-kind contributions from sources outside the ITU to implement these projects.

Before joining the ITU, Mr. Gagné served for 25 years in the Department of Industry (formerly the Department of Communications) of the Canadian Government. In his capacity as Director of the International Telecommunications Policy and Coordination Branch, he was responsible for the Canadian Government's multilateral and bilateral relations in the area of telecommunications. In addition to heading a number of Canadian delegations to various international telecommunications conferences from 1989 to 1997, he served as the Canadian representative on the ITU Council from 1990 to 1997 and chaired the international Group of Experts responsible for the restructuring of Inmarsat.

Mr. Gagné is a graduate of Laurentian University and the University of Ottawa in Canada.. He speaks French and English.

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Mr. Jaime HERRERA
Head, Human Resources Development/HRM
International Telecommunication Union (ITU)

TDS.1

Biografía

Actualmente soy el Jefe de la División de Desarrollo de Recursos Humanos de la UIT (Unión Internacional de Telecomunicaciones).

He trabajado en la UIT durante los últimos 18 años, desarrollando programas en las áreas de Gestión y Desarrollo de Recursos Humanos, incluyendo Capacitación; así como en las áreas de Desarrollo Organizacional y Transformación de Organizaciones para volverlas orientadas al cliente y competitivas en un mercado liberado, en Desarrollo Gerencial y en otras áreas afines.

También suministrando asistencia técnica en estas áreas a todos los países en desarrollo del mundo.

Soy de Costa Rica, y antes de unirme a la UIT trabajé durante 23 años como ingeniero, primero en planta externa, luego en planificación de telecomunicaciones llegando a ser el Jefe de la División de Planificación, con responsabilidades técnica y financiera.

Durante esos años estuve involucrado con la Universidad de Costa Rica, como profesor y como administrador del convenio Universidad-Empresa (ICE-Telecomunicaciones); organizando los primeros programas de especialización.

En telecomunicaciones estuve involucrado en la concepción e implementación de diferentes proyectos para desarrollar el sistema de telecomunicaciones de Costa Rica, incluyendo la telefonía rural. Durante los últimos 8 años antes de unirme a la UIT tuve a mi cargo la División de Capacitación del ICE, responsable de la capacitación y el desarrollo de los recursos humanos en las áreas Técnicas de Electricidad y de Telecomunicaciones, así como en el Desarrollo Gerencial y administrativo del ICE. (La entidad suministra los servicios eléctricos y de telecomunicaciones en Costa Rica.)

Sra. Claudia de Francisco ZAMBRANO
Ministra de Comunicaciones
Ministerio de Comunicaciones (Colombia)

TDS.1

Proporcionando acceso universal a servicios compartidos de telecomunicaciones y comunicaciones

Programa de excelencia para ejecutivos de telecomunicaciones

Permítanme ante todo agradecer la honrosa invitación dirigida por el Secretario General de UIT, para intervenir en esta importante Cumbre de Desarrollo de la Octava edición de Telecom Mundial.

En esta breve exposición, me referiré al tema de la gestión del conocimiento y la importancia de su ejecución a través de los Centros de Excelencia regionales. Quiero subrayar la conveniencia del desarrollo de esta iniciativa, dentro de la concepción social del acceso universal a los servicios de telecomunicaciones y el diseño de la programación de los centros, dentro de las prioridades de la coyuntura del mercado mundial del sector. Finalmente, compartiré con ustedes algunas reflexiones sobre la aplicación del modelo para el caso americano.

Es un hecho que los países miembros de la Unión Internacional de Telecomunicaciones, coincidimos plenamente en la necesidad de proponernos como uno de los componentes esenciales de la visión de la organización, lograr que la revolución producida en los sistemas de telecomunicaciones durante las últimas dos décadas, tenga un sentido histórico y un valor trascendental en el desarrollo equitativo y justo de la humanidad.

Inspirados en este principio, me atrevo a afirmar que sólo en la medida en que las soluciones globales brindadas por los avances tecnológicos beneficien y mejoren la calidad de vida de los sectores marginados de la población, estaremos las autoridades políticas cumpliendo realmente con nuestra responsabilidad de luchar por la democratización del acceso a los servicios de telecomunicaciones.

Dentro de este contexto adquiere vital relevancia la iniciativa surgida en el seno de la UIT de crear los Centros de Excelencia, para beneficio de los actores estratégicos de la comunidad internacional de las telecomunicaciones. El objetivo central de esta iniciativa consiste en planificar una política de gestión del conocimiento, que le permita a los diseñadores de políticas públicas, a las autoridades reguladoras, a los operadores y demás instancias del sector, tener acceso a un circuito ordenado y contextualizado de información que alimente y guíe el proceso de toma de decisiones.

No hay sector de la economía mundial que refleje una dinámica de evolución tan acelerada como el de las telecomunicaciones y que a la vez esté infiltrando y potenciando el progreso de todos los demás sectores de la economía. Este hecho, nos impone la necesidad de que el capital intelectual de la tecnología de las telecomunicaciones lo orientemos estratégicamente, dada la magnitud de su incidencia en el desarrollo económico mundial. Es importante que quienes tenemos la responsabilidad política de encauzar el crecimiento equilibrado del sector, dispongamos de las más actualizadas fuentes de información debidamente organizadas y ordenadas de acuerdo con los conocimientos especializados e interdiscplinarios del sector, permitiéndonos utilizar la información acumulada de manera oportuna y eficaz en el proceso de toma de decisiones.

La convergencia, la liberalización, la competencia y la globalización, son factores que simultáneamente están transformando permanentemente los hábitos culturales de las relaciones económicas y políticas entre individuos y naciones. Considerando su vertiginosa aplicación, este proceso puede generar inconvenientes desequilibrios sociales en poblaciones excluidas del aprendizaje de las destrezas, que exige el dominio de las nuevas tecnologías. Es un riesgo que sólo lo podremos evitar, si acogemos el compromiso de construir estrategias que mancomunadamente nos permitan asumir con rostro humano la sociedad global del tercer milenio.

Si las autoridades de los países en vías de desarrollo y de los países industrializados no actuamos de manera armónica y articulada, conforme a los nuevos conocimientos y dinámicas que se están gestando, podríamos convertir a este sector en el principal agravante de un desarrollo desigual entre las naciones. Nos corresponde, pues, el deber de pensar en la articulación de un nuevo contrato social internacional, que redefina las responsabilidades sociales de las autoridades y de los empresarios, e incluya la consagración de nuevos derechos fundamentales en una realidad transformada por la tecnología informática.

Por este motivo, acogemos y nos comprometemos con el mayor entusiasmo en la consolidación de esta iniciativa, convencidos de que a través de los Centros de Excelencia vamos a lograr articular una red permanente de divulgación del conocimiento, que brinde la oportunidad de compartir ideas, información y experiencias de útil consideración y aplicación para los procesos particulares de convergencia, liberalización, competencia y globalización en cada uno de los países y regiones del mundo.

Creemos que la misión de los Centros de Excelencia debe centrarse fundamentalmente en proponer estrategias para garantizarle a los ciudadanos el acceso oportuno a los servicios de multimedia, indispensables para participar de la sociedad de la información, y a los empresarios e inversionistas brindarles un desarrollo atractivo de los mercados de telecomunicaciones, de tal suerte que un crecimiento competitivo en calidad y costos contribuya a universalizar el acceso a los servicios de telecomunicaciones.

Se trata de fortalecer la capacidad de generar el más calificado espacio de capacitación y entrenamiento, para el diseño de políticas tanto públicas como privadas y medidas regulatorias que, consultando las últimas concepciones y saberes tecnológicos, contribuyan al fortalecimiento de toma de decisiones acertadas, según las necesidades y realidades del sector en cada una de las regiones. Los Centros de Información deben ser generadores permanentes de investigación, ordenadores de la información e intérpretes del conocimiento para adecuarlo de manera útil a las especificidades de cada país.

Debemos lograr que los Centro de Excelencia eleven el nivel científico de las instancias decisorias, aportando una información que le permita a autoridades políticas y reguladoras, y a los empresarios, pensar estratégicamente, con una visión del desarrollo estructural del sector en beneficio de los usuarios y de los millones de ciudadanos que aún no lo son.

Sobre el caso específico de América, es claro que para la aplicación de este modelo, debemos actuar de manera concertada con los mecanismos de integración propios de cada subregión del continente. Son innumerables los vínculos que los unen y comprometen para actuar de manera coordinada y solidaria. A los países aliados en la Comunidad Andina, en el Mercosur, en Centroamérica y en Norteamérica, los identifican realidades y contextos muy similares, dentro de cuyos criterios se debe aplicar el trabajo y la dinámica de los Centros de Excelencia.

Uno de los indicadores esenciales de la gestión a realizar por los Centros de Excelencia, lo constituirá la capacidad para divulgar una capacitación ajustada a las realidades concretas del desarrollo del sector en cada caso. Es decir, que se trata de recomendar la aplicación de soluciones globales sobre la base de necesidades particulares. Este elemental principio, es fundamental para evitar caer en la retórica de formular recomendaciones que no son realmente viables y sí desgastan inútilmente tiempo, esfuerzos y recursos.

Entre los múltiples criterios a considerar en el diseño metodológico de los Centros de Excelencia, es necesario que se identifiquen las necesidades de capacitación de la región y se canalice la gestión del conocimiento hacia el fortalecimiento de esas áreas específicas. De igual manera, para evitar un desequilibrio en el progreso del sector, se debe considerar un eficiente mecanismo de interoperabilidad entre los diferentes Centro de Excelencia, tanto a nivel continental como mundial, de tal forma que se estimule una retroalimentación de mutuo beneficio para todos los países.

Resulta muy conveniente, que los programas de capacitación se diseñen sobre la base de una clara visión continental y una política común para cada región. Si bien es obvio que debemos consultar las condiciones de regulación e infraestructura local, tenemos también que proponernos objetivos similares en un entorno global de competencia y convergencia. Vale la pena destacar, por ejemplo, los importantes progresos logrados por la Comisión Interamericana de Telecomunicaciones en el sentido de consolidar una conciencia de trabajo continental, que nos permite avanzar muy positivamente en la armonización de las diferentes regulaciones nacionales.

Considerando la actual etapa de transición hacia la Sociedad Global del Conocimiento, surgen de antemano cuatro programas cruciales alrededor de los cuales creemos que se debe concentrar el esfuerzo inicial de los Centros de Excelencia: criterios comunes de regulación para el sector; introducción de nuevas tecnologías; promoción de proyectos piloto en los que las telecomunicaciones generen valor agregado social, como por ejemplo en el campo de la medicina o la educación; y coordinación de políticas institucionales que estimulen una pedagogía masiva, para que los ciudadanos comprendan y aprovechen eficazmente la era de la información.

Sobre esta plataforma básica, los Centro de Excelencia deben proveer señales e instrucciones de alto nivel tanto a autoridades políticas y reguladoras, como a operadores, comercializadores y usuarios, sobre cual es el ritmo de desarrollo del sector, y cual es su norte de evolución. Será este un aporte sustancial para que todos los jugadores del sector conozcan los parámetros, alcances y límites del campo de juego en el que se están desenvolviendo. Estaremos así atendiendo la creciente demanda por capacitación y desarrollo del recurso humano, exigida por los rápidos avances tecnológicos.

Es importante destacar que en la fase operativa debemos centrar los esfuerzos en el aprovechamiento de la red de centros de educación e investigación ya existentes en la región, integrando sobre todo a los órganos reguladores, a las Universidades y a los operadores y proveedores. Pero además, debemos darle especial énfasis a las actividades de capacitación a distancia que hagan uso de las tecnologías de la información y las facilidades de telecomunicaciones disponibles en la región para la enseñanza a distancia.

Ya para finalizar, quiero insistir en que para la realización de este proyecto debemos contar con el aporte del más calificado trabajo intelectual e investigativo de las más destacadas universidades del continente, considerando que es allí donde se está desarrollando permanentemente el conocimiento científico y el lugar donde se cuenta con la experiencia e infraestructura para aplicar la metodología sugerida. La incidencia global del desarrollo de las telecomunicaciones nos indica que ahora más que nunca, en la definición de políticas y regulaciones, se debe tener un conocimiento universal e integral de los aspectos culturales, jurídicos o administrativas que recíprocamente están interactuando con el progreso de las telecomunicaciones. Por eso es importante que se consulte y se evalúe con las principales Universidades del continente, cual podría ser la calidad y condiciones de su aporte para enriquecer el trabajo de los Centros de Excelencia.

Igualmente, considero que deben ser los instrumentos políticos de las autoridades subregionales, las que autónomamente decidan la integración de un comité responsable de gestionar y administrar la aplicación del modelo de Centros de Excelencia en su respectiva subregión.

Curriculum Vitae

Estudios

Ingeniería Industrial. Universidad de los Andes, 1980

Experiencia

Ministerio de Comunicaciones
Ministra de Comunicaciones, 7 de Agosto de 1998
Mandato Ciudadano por la Paz, la Vida y la Libertad
Gerente de Campaña, 1997.
Unión Colombiana de Empresas Publicitarias, Ucep
Presidenta Ejecutiva, 1997-1998.
Campaña Presidencial de Andrés Pastrana
Gerente de Campaña, 1994.
Organización Luis Carlos Sarmiento Angulo
Asesora de Presidencia de Proyectos en Telecomunicaciones, 1993-1994
Fondo de Promoción de Exportaciones, Proexpo
Vicepresidente Administrativo, 1992-1993.
Banco de Colombia
Vicepresidente de Mercadeo, 1990-1992.
Empresa de Teléfonos de Bogotá, Etb.
Gerente General, 1989-1990.
Alcaldía Mayor del Distrito Especial de Bogotá
Secretaría de Hacienda, 1988-1989.
Banco de Colombia
Directora de Presupuesto, 1985-1988.
Bavaria S.A.
Asesora de Planeación Estratégica, 1980-1985.

Mr. David MELLOR
President,
United Kingdom Telecommunications Academy
(United Kingdom)

TDS.1

Committed to excellence

The United Kingdom Telecommunications Academy (UKTA) is committed to providing some of the best telecommunications training and education available in the world today. Members of the Academy include BT, Cable & Wireless, Marconi Communications, Nortel Networks, Motorola, Fujitsu Telecommunications Europe, Hewlett-Packard, Ericsson, Wray Castle and The Department of Trade and Industry.

The range of programmes cover the basic requirements of the technician through to post-graduate qualifications for new and established managers. All training is offered on a no charge basis by the members, and the programmes are co-ordinated to allow delegates from developing countries to choose a selection of courses from different providers linked together in time to form a personalised programme.

The Academy is virtual by design and each provider makes his own arrangements as to where the training will take place. In general events take place in the UK, although where a specific demand exists, tailored events can be delivered overseas. A programme on regulation was run recently in the Middle East by one of Britains leading Universities. The Academy makes good use of specialist expertise from both industry and academia, and is an excellent example as to how the ITU Global Telecommunications University might be established on a worldwide scale. The benefits of the whole telecommunications industry working together to operate such an Academy are many fold but primarily the savings on operational costs should be highlighted. Apart from the contributions made on a part time basis by the members there is one full time and one part time member of staff associated with the Academy. Thanks to e-mail, voice-mail and fax services the General Manager is able to work on a global basis within an extremely tight budget. An elected Chairman oversees expenditure and each full member is given a Directorship on the Management Board, which meets four times each year.

In 1995 the emphasis of the UKTA was to provide a series of short technical overviews of emerging technologies as seen by the member companies. Today the UKTA continues to offer such programmes but in addition a small offering of post-graduate certificate and diploma programmes are available for new and established managers.

The vision for the future, is that a number of unique programmes will be developed by the members, to share with the developing countries, the experiences of the United Kingdom over the last twenty years as it has moved from government owned monopoly to competitive private enterprises.

Working with a selected group of Universities we envisage the development of some specialist programmes which will cover such issues as Cyberspace, E-Commerce, Tele-Health, Legalities and Regulation.

The emerging world of Cyberspace will challenge current management thinking and the open-world of Internet will expose such issues as Intellectual Property Rights as they have never been addressed before.

The UKTA has extensive experience already through its membership of all aspects of the communications industry, be it policy making, manufacturing, operational or education. Some of the members of the UKTA represent companies with a long and established background of dealing with businesses in all countries of the world.

The delegates who participate in the UKTA Scholarship programmes come from all areas of the businesses and are not limited to state-parastals.

The UKTA primarily fund the cost of all the training and consider on occasion's requests for support in respect of travel and accommodation. At this point a special thanks should be made to the ITU, who have provided fellowships for LDC's to attend programmes when it has been considered that special benefits will accrue, if they could be afforded the opportunity to attend.

The United Kingdom is very proud of the UKTA and the Minister, Michael Wills, receives and gives considerable support to the Patrons which include Sir Peter Bonfield, Sir Ralph Robins, to name but two leaders of Industry who monitor with interest the Academy's development.

The UKTA is committed to the development of employees from all sectors of the telecommunications industry and from all countries of the world. All programmes of the Academy are currently delivered in English. It is envisaged that through the ITU-Centres of Excellence project there is scope for sharing some of the ideas with members who operate in a different language such as French, Spanish or Chinese. Such organisations could attend UKTA events and then deliver where appropriate, under licence, some of the programmes offered. The concept of a Global Virtual Telecommunications University is an exciting challenge for all ITU member countries and one, which the United Kingdom will follow and support with interest and commitment.

The British Embassy and British Council officials promote the events, which the Academy has to offer each year and the annual programme is to be found in most British Council libraries. Moreover, a Webb-site is being developed to ensure prospective candidates can identify the most appropriate programmes, which will address specific needs of each participating country.

Human resources are probably the most valuable resource of any of our companies whether they are employed in the public or private sector. The United Kingdom has identified, that by developing such resources, their potential to perform effectively is directly related to the quality and quantity of training and education they have received. It is said that a little knowledge is a dangerous thing! However in today's rapidly changing world of communications it is essential that all human resources receive the right training at the right time from the best provider. The UKTA believes that the programmes it offers, helps to address some of the knowledge requirements of the Telecommunications Industry and that its members are committed to the provision of excellence.

The Valletta Action plan calls for the development of human resources and makes special reference to the subject of gender. The UKTA welcomes applications from female applicants who wish to participate in its programmes. Consideration will be given to requests for support for any such initiative the ITU proposes in the future, in pursuance of achieving the completion of the necessary outcomes of the Valletta Action Plan.

A Virtual Academy in today's rapidly changing world, is able in conjunction with such a strong grouping of industrial members as the UKTA, to deliver programmes which meet the expectations of majority of the participants who attend. It is inevitable that although the expected knowledge of each participant is clearly defined in the UKTA programme, the interpretation of such pre-requisites will vary dependent on the candidate's country of origin.

The UKTA is committed to supporting the ITU Centres of Excellence and Global Telecommunications University/Virtual Telecommunications Training Institute projects and trusts that ITU members will value the United Kingdoms Commitment to Excellence.

Biography

David Mellor, Director, International Relations at the Cable & Wireless College is married with two children.

He started his career in telecommunications in 1965 as an apprentice engineer with Plessey. Having completed his training he then spent the next four years as a PABX Equipment Engineer and combined this with the role of Training Officer on all Plessey supplied telephone exchange equipment. In 1974 David was promoted to Account Manager responsible for all aspects of the company’s contract with Telephone Rentals plc. During the same year David joined Telephone Rentals as a field support engineer. Natural progression through the company continued until 1986 when having reached the position of Divisional Engineer David was awarded a Fellowship in Management and Training Development at Ashridge Management College.

At the end of 1987, David moved to Band Three Radio, a Phillips/Racal jointly funded business as Operations Director responsible for all aspects of technical planning, negotiations, launch and implementation of a National Trunked Mobile Radio Network.

As Head of Technical Field Operations at Mercury Communications in 1989 David developed initial operations strategy for a PCN and developed a three-year training strategy for PCN engineers. This culminated in David joining Cable & Wireless in 1992 as Head of Outstation Training which progressed to marketing Director until his present role as Director, International Relations. David has a wealth of experience on the International front working with both the Commonwealth Telecommunications Organisation and the International Telecommunications Union.

David is currently Chairman of the United Kingdom Telecommunications Academy and chairs the Special Group on Human Resource Development for the ITU Development Sector.

Mr. István FODOR
President
Ericsson Telecommunications Limited
(Hungary)

TDS.1

Knowledge wins the competition battle

Globalisation and development of information society are the most significant processes of our era. They have different effects on obtaining and transfer of knowledge.

The most dynamic changes started in Central and Eastern Europe in the early 90s were experienced in telecommunications and informatics world. Not merely economic and market related factors let to the development in the Hungarian telecommunications infrastructure. Creative, innovative brains have also played a significant role in this process. The importance and effect mechanism of knowledge have changed.

A good example for this is the story in the Hungarian telecommunications industry, which has recently started and still continues today. In 1991 the largest telecom manufacturer was founded from scratch in Hungary, and it has become the most significant company dealing with informatics applied research and software design in the country. This example presents some regional features in addition to an intensive and overall transfer of technology.

Competitiveness of international level is necessary in order to survive the process of globalisation. The compulsion of competition induces effective operations, innovative actions and a well-trained background, in addition to reduced costs. All this propagates growth and expansion of knowledge. Globalisation can stimulate knowledge, because no one can be competitive just by decreasing costs. This has increased the importance of knowledge and its transfer, and changed the process and structure of its functioning. Priorities and values are changing. Such changes have to be carried out in all segments of the economy simultaneously: in company management, financial policy, services or technology. Development has become a key notion to such an extent that we can state: human expertise has the principal role in globalisation. Though this statement seems to be contradictory itself. The most important element of the overwhelming and inhuman competition, and of the program aiming at higher profits and market share, is the creative man owning the knowledge.

Information society is basically a new lifestyle, a new social behaviour. It has a considerable effect on the increase and transfer of knowledge as well as on technological development, but it is rather a catalyst than a triggering factor. Through knowledge, information, co-operation, availability unlimited in space and time help the appreciation of knowledge to a great extent.

As a consequence of this, the competition of individuals has also started. Unemployment results in competition itself. The prestige of a profession chosen for a lifetime prevails no longer; individual development and perhaps the change of profession are needed as the circumstances change. A new notion: the employability appeared. This is mostly valid for the operative part of the economy, but it can also be seen in research and development in a different way.

Speciality and speed put the focus on young graduates. Courageous initiatives often surpass the value of experience. This age group is the basis of company development first of all in the field or research and development, but a moral level higher than the average of the society is also needed to perform successful work.

Curriculum Vitae

Name	István Fodor
Date of birth	1943
Marital status	Married, two children
Qualification	Technical University of Budapest, Faculty of Electrical Engineering, MSc. Degree

Professional carrier

from 1990 to date	**Ericsson Telecommunications Ltd. – President** He was assigned to establish the company in 1990. He has been leading Ericsson Telecommunications Ltd. since then. The company employs a staff of more than 600 people and it realized a turnover of 130 million USD/year on the Hungarian market after 4-5 years. During this period the company won the leading position on the Hungarian market and became the competence centre of the CEE region in the field of engineering and operating public infocom and GSM systems. During 1999 this unit will become the coordination centre of the establisments in Europe, Africa and in the Middle East. Besides this, Ericsson Telecommunications Ltd. established a Software Design Centre and a research laboratory for digital communication systems.
1976-1990	Budavox Foreign Trade Co. (Foreign Trade Company of the Hungarian Telecommunications Industry) He was responsible for main contracting activities of telecommunications exports of Hungary. He established a unit for the turn key contracts at Budavox. He was responsible for the Kuwaiti market in the eighties. Between 1986 and 1990 he led several projects for the Ministry of Telecommunications in Kuwait.
1975	He designed the telecommunications network of South Yemen. He prepared a study plan which was submitted to the ITU.
1967-1975	Design Office of the Hungarian Post He is the designer of wireless systems. He participated in building up of the microwave backbone network of Hungary. He elaborated a dimensioning system for the first radio telephone network in Hungary.

Membership

Member of the Scientific Advisory Board for the Government

Telecommunications Engineering Qualification Committee (TMMB) – for the minister according to telecommunications law

Vice President of the Scientific Society for Infocommunication (HTE)

Chairman of national section of IEEE in Hungary

Steering Committee Member of the OMFB Technological Foresight Program

Vice President of the Swedish Chamber of Commerce in Hungary (SCCH)

Presidential Consultant Board of the Communication Authority Hungary (HIF ETT)

Founding Board Member of the Hungarian “European Round Table” Organization

Awards

Gábor Dénes Award – 1996

“Manager of the Year” Award – 1998

Széchenyi Award – 1999

Mr. M.V. PITKE
Vice Chairman (Technology)
Axes Technologies
(India)

TDS.1

Training in telecommunications technology and applications
The ICTP example

Abstract

In recent years, there has been a rapid rise in demand for manpower in telecommunications technology and applications. This is the direct result of the process of liberalization and privatization. A major problem has been the absence of telecommunications technology in universities all over the world. Recognizing the important role of this key technology, the Abdus Salam ICTP organized several workshops to train scientists and engineers from developing countries around the world. Teaching material both, theoretical and practical was specially developed for this purpose. Over 600 experts from well over 50 countries have been trained. They are now making significant contributions in education and industry in their home countries. This approach can be extended in the future to handle the rapid expansion of services resulting from the Internet and other developments.

1 Introduction

Telecommunications services around the world have undergone major changes due to liberalization and privatization and also by the advancements in technology. Dominated by large corporations, smaller companies and groups are playing increasing significant role. The rise of the Internet has further accentuated this trend. All these factors have created large-scale demand for engineers and managers with sound knowledge of all aspects of telecommunications.

Telecommunications engineering has remained an almost exclusive preserve of the government telecommunications departments and large multinational corporations dealing with both, the technology as well as services. The know-how remained within these organizations and a few practicing professionals. It is only now that the Universities and other academic and R&D institutions are waking up to the worldwide shortage of manpower in telecommunications.

Among the very few institutions that took special interest in this problem, especially for the developing countries is the Abdus Salam Institute of Theoretical Physics in Trieste, Italy. Over the last fifteen years, hundreds of scientists and engineers have been trained in a wide range of subjects both in theory and in practice. The Microprocessor Laboratory and the Radio Communications Laboratory of this Institute provides excellent facilities and infrastructure for implementing some interesting, well-defined projects by scientists from the developing countries.

2 The scheme

Training programmes are organized as workshops of three to four weeks' duration at the Institute's headquarters at Trieste, Italy. Regional workshops are also organized in Latin America, Africa and Asia. The first workshop designated as a workshop in Telematics' was organized in September 1987 and the last (fifth) in October

1997. Regional workshops have been organized in Tehran, Iran and Manila, Philippines.

A notable feature of all these workshops has been the emphasis placed on laboratory sessions, which were provided the same amount of time as the theory sessions. Considerable efforts were involved in the development of special hardware and software (kits) for this purpose. About 60 participants are selected from the large number of applications received from all over the worlds. All of them are provided with excellent boarding and lodging facilities and a modest perdiem allowance. Most are also provided with partial or full travel expenses depending on the level of development of the participant's institution and country. Their educational background varied from masters to doctoral degrees with teaching or professional experience. Excellent library facilities and access to computers and Internet made it a rewarding experience. It can be emphatically stated that no deserving candidate was denied participation. The faculty and laboratory instructors are drawn from leading universities, R&D institutions as well as Industry from around the world.

Handling large number of participants for lecture sessions is not a problem, but the overall capacity, equipment and available instructors seriously limit the number that can be handled in the laboratory. This problem has been overcome to some extent by having two batches of participant's alternate between lectures and the laboratory.

All this has been made possible by the very generous grants provided by the Italian government through the UN system.

3 Course details

Recent advances in communications, computers and component technologies led to the real integration of the computer with the telephone, giving rise to new innovative products and services. New software: languages and tools, and powerful digital signal processing (DSP) techniques are playing a key role giving rise to challenging opportunities in innovative product and service development on the one hand and the introduction of a range of novel value added services on the other. This gives rise to a new critical area viz. the upgradation of older systems and networks to bring them in line with new demands.

Several new developments take place in parallel. Emergence of the Internet is challenging the well-established telephone world. Not far behind are the developments in cable TV, GPS technology, digital photography and speech recognition that will bring out an entirely new family of new products and services that are difficulty to predict at this stage.

The current Internet boom is an important event in the world of telecommunications and promises to be a key enabler for spread of applications based on the use of services provided by computer networks. It integrates the telephone networks with the computer networks in a real sense. The separation between voice and data (and video in the future) has disappeared completely. However, today's Internet with its protocol and equipment is not yet able to meet all of the performance and functional requirements for actual commercial use. Inspite of this, one will see more and more webcentric networks and applications.

Covering such a vast range of subjects in a workshop lasting over a few weeks is not an easy task. It was decided to concentrate on areas depending upon the criticality of the subject and availability of the faculty. The following three broad categories emerged:

1) Emerging networks and services. Networks for basic as well as value added services, cellular, mobile, satellite, Internet, etc.
2) New techniques, products, systems and networks.
3) Software Development. Upgradation and modernization of older systems for newer, more advanced applications and services, upgradation of hardware platforms to conform to new standards, etc.

These workshops are held every alternate year and take note of the rapidly advancing technology. The broad topics that were covered are listed below: (partially)

1) The PSTN.
2) Transmission and Switching Techniques.
3) Signalling Techniques, the SS7 System.
4) Digital Signal Processing.
5) Telecommunications Software.
6) The Radio Spectrum and Wireless Technology.
7) Mobile, Cellular and PCS Systems.
8) Optical Communication.
9) Narrow and Broadband ISDN.
10) Satellite Communication Systems.
11) Video and Broadband Services.

12) Computer Telephony Integration and Cable Telephony.
13) Audio and Video Conferencing.
14) The Digital Subscriber Loop.
15) ATM Technology.
16) Multimedia.
17) Rural Communication and Networks.
18) System Design and Implementation.
19) Value Added Services.
20) Computer Networks.
21) TCP/IP, Internet and New Services.
22) Speech Processing.

Some of the top experts from leading academic institutions and industry around the world including Europe and USA serve on the faculty for these workshops. Apart from formal lectures, they provide valuable guidance to the participants during the several informal meetings and discussions. Such interaction has been extremely valuable since very little information is available in textbooks or journals.

4 Laboratory exercises

A unique feature of these workshops has been the laboratory sessions that provide extensive hands-on experience to the participants. A number of experiments dealing with the fundamental aspects of telecommunications were developed for this purpose. The specially developed hardware and software covered most exercises. However, complex systems that could not be handled by simple hardware and software were covered by computer simulation. Participants with initiative are encouraged to do student projects. Laboratory exercises covered include:

1) Telephony Electronics.
2) Digital Transmission, Synchronization, etc.
3) Circuit and Packet Switching.
4) Signalling, including SS7 System.
5) Call Processing/Software, etc.
6) ATM.
7) Optical Fibre Communication.
8) Digital Signal Processing.
9) ISDN.
10) Digital Radio.
11) Computer Telephony.

This was made possible by the keen interest of several faculty members who devoted considerable effort in getting these developed in their own laboratories.

5 Background

The International Centre for Theoretical Physics was set up with very substantial support from the Italian government and the local government, under the leadership of the late Prof. Abdus Salam to provide facilities and opportunities for advanced studies and research to the young and promising scientists and teachers from the developing countries. Recognizing the critical role of technology and especially the problems of science and technology transfer and the crucial nature of computer technology he initiated several programmes in this area beginning with the workshops on microprocessors. A microprocessor laboratory with the latest facilities was set up to act as an incubator for the development of new ideas and support projects undertaken by scientists from developing countries.

Later, more ambitious programmes were undertaken with support from the United Nations University in Tokyo. Recognizing the importance of communication technology, the first workshop was launched in 1987. This was followed by several international and regional workshops in different parts of the world. Prof. M.A. Virasoro, who took over as director of ICTP from Prof. Abdus Salam, continues to take a keen interest in these programmes.

Participants have opportunities of attending several important workshops in closely related areas. These include the workshops on VLSI Design, Real Time Design, Computer Networks, Rural Communication, Digital Radio, etc.

The excellent documentation and duplication facilities provide high quality teaching material and lecture notes to every participant which serve as texts for use in their home country.

Over a period of about ten years more than 600 scientists and engineers from over 50 countries have been trained. Many of them are playing key roles in communication and information technology development in their respective countries and also have been able to upgrade and modernize the teaching and research programmes in their colleges and universities.

6 Concluding remarks

Workshops conducted at the Abdus Salam ICTP show how a large number of people can be trained in relatively large numbers, short period and modest costs, at state-of-the-art levels. These programmes were started at a time when telecommunications was still a monopoly in most countries and the technology with large companies. This situation has changed substantially in recent years because of two main reasons that are somewhat interrelated: the rapid advances in digital technology and the rise of privatization and liberalization. This trend is going to be further accentuated in the near future. An environment has been created in many countries where small groups and even individuals can play a crucial role in technology development, as well as in the creation of innovative services. The Internet is providing a substantial boost in these efforts. All this has created a need for training manpower in communications and information technology on an unprecedented scale. Fortunately, new techniques and tools based on information technology will help devise cost effective solutions to meet these needs. The model created at ICTP can be adapted easily for this purpose.

7 Acknowledgement

It is impossible to mention the large number of individuals and organizations without whose active and generous help these programmes would not have the success they have achieved. One can only mention a few of them. These include the late Prof. Abdus Salam, the present director Prof. M.A. Virasoro, the late Prof (Mrs.) Ines Wesley Tanaskovic, Prof. Luciano Bertocchi, Dr. Rinus Verkerk, Prof. Alberto Colavita, Prof. S.M. Radicella, Prof. A. Nobile and Mr. M. Periasamy. Among the several organizations very substantial support came from the Centre for Development of Telematics, India and the Centro Studi e Laboratori Telecommunicazioni, Italy.

Biography

Mr. Madhukar Vishwanath Pitke, Ph.D., Vice Chairman (Technology) Axes Technologies has contributed to the design and implementation of several telecommunications and computer based systems over the past forty years. He developed techniques for synchronisation, signalling handling, conferencing and high speed switching as a member of the Academic Staff at the Tata Institute of Fundamental Research. He was instrumental in establishing the Department of Computer Science at the University of Bombay. As founder-director of the Centre for Development of Telematics, he guided the development of technology and products that now form a significant part of the Indian network. He also guided the development of a large parallel processing system for weather modelling.

He has over 250 publications and presentations in leading scientific journals/conferences. His interests include communications and information technology development and transfer, software and training.

Prof. Pitke is a fellow of the IEEE (USA), the Indian Academy of Sciences and a member of the Pacific Telecommunication Council.

PALEXPO **TDS.2**

Monday, 11 October 1999	**13:30 - 15:00**

TDS.2	**Settlement and Accounting Rate Reform**

Chairperson:	**Dr. Michael A. CALVANO,** *Area Representative,* Asia & Pacific (ITU/BDT)
Moderator	**Dr. Tim KELLY,** *Head, Operations Analysis,* Strategic Planning Unit (SPU/ITU)
Keynote Speaker	**Mr. Tsunikazu MATSUDAIRA,** *Managing Director,* International Affairs Department, KDD Corporation and *Chairman,* ITU-T Study Group 3 (Japan)
Panelists	**Mr. Greg STAPLE,** *President,* TeleGeography Inc., (USA)
	Ms. Kathryn O'BRIEN, *Deputy Division Chief, Telecommunication Division,* International Bureau, FCC (USA)
	Mr. Maurice GHAZAL, *Chairman* Global Network System, New Technologies and New Services (Lebanon)
Rapporteur/Right of Response	**Ms. Doreen MARTIN-BOGDAN,** *Regulatory Officer* (ITU/BDT)

PALEXPO

TDS.2

Monday, 11 October 1999	13:30 - 15:00

TDS.2	Settlement and Accounting Rate Reform

This reform is a priority issue for almost all developing countries. The panel will provide the opportunity to discuss the problem of cost-based pricing, the status of work being conducted by ITU-T Study Group 3, the focus group and the regional tariff groups, the introduction of analytical cost accounting systems.

Dr. Michael A. CALVANO
Head, ITU Regional Office for Asia and the Pacific
International Telecommunications Union (ITU)

TDS.2

Settlement and accounting rate reform

Ladies and Gentlemen,

Welcome to the Telecom Development Summit, Panel Session No. 2 on Settlement and Accounting Rate Reform.

The issue of international settlements and accounting rates has been with us for many years – ITU has been working on it for about ten years – but the issue came to a head with the, can I say "infamous", FCC benchmarking decision in August 1997. Since then, the world telecom community's attention has been riveted on the developments surrounding the accounting rate reform process. ITU has taken up the issue with gusto, initiating numerous activities from within the ITU Secretariat, Standards Bureau, and Development Bureau. These activities have involved both industrialized and developing economies at the global, regional, subregional, and national levels. Some of these activities include:

- ITU-T Study Group 3 activities (on-going).
- ITU case studies (December 1997).
- World Telecom Policy Forum (March 1998).
- Regional Tariff Group Meetings (on-going).
- Focus Group Meetings.
- Regional and subregional seminars on accounting rate reform (on-going).
- National level costing analysis assistance (on-going).

to name a few.

Developing countries have (or should have) special interests and concerns regarding the accounting rate reform issue, since international settlements generate significant amounts of critically needed hard currency for developing countries. Yet, developing countries are the least prepared to effectively defend their positions and rights as the international dialogue on reform progresses.

Today, we are going to review the issues, look at the activities carried out over the past few years, and see where settlement and accounting rate reform stands at this point in time. The purpose of our discussion is to encourage developing countries to learn more about their own circumstances especially related to costing and pricing of their telecom services, and to become more involved in the reform process so that they can more actively and successfully defend their positions as reform takes place.

To lead our discussion, we have a very fairly representative group of specialists from within and outside ITU, from developing and industrialized countries, and from various parts of the globe.

We will first hear from our Keynote Speaker, Mr. Tsunikazu Matsudaira, Managing Director of KDD and Chairperson of ITU-T Study Group 3. After the Keynote Address we will have a discussion with panelists from India, Kenya, and the United States of America. Of course, there will be ample time for what I hope will be a very lively and stimulating question and answer session with our panelists.

Without further ado, let me introduce our Keynote Speaker.

Biography

Dr. Michael Calvano has over 20 years experience in telecommunications development in the Asia and Pacific Region. Dr. Calvano is currently Head of the International Telecommunication Union's Regional Office for Asia and the Pacific which is hosted by the Government of Thailand, in Bangkok. Prior to his current posting, he held the post of ITU Area Representative for South-East Asia in Jakarta, Indonesia, and before that, the post of ITU Regional Human Resources Officer for Asia and the Pacific. In the mid-1980s he was Director of the global, USAID Rural Satellite Program which experimented with innovative social applications using satellites. He has managed numerous projects for the ITU and USAID as well as consulting with the private sector. Dr. Calvano has held various academic posts in the United States and abroad.

Dr. Calvano earned a Doctor of Philosophy degree in 1973, and a Master of Science degree in 1970. He attended Georgetown University from 1964 to 1968 where he earned his Bachelor of Science degree.

Dr Tim Kelly
Head of Operations Analysis/Strategic Planning Unit
International Telecommunication Union (ITU)

TDS.2

Biography

Dr Tim Kelly is Head of Operations Analysis within the Strategic Planning Unit of the International Telecommunication Union (ITU), a post he has held since 1993. Before joining ITU he spent five years as a Communications Policy Analyst with the Organisation for Economic Co-operation and Development (OECD) and three years with Logica Consultancy Ltd. He has an MA (Hons) degree in Geography and a Ph.D in industrial economics from Cambridge University.

Over the last sixteen years, Dr Kelly has specialised in the economics of the telecommunications industry. He has written or co-authored more than 20 books on the subject including ITU's "World Telecommunication Development Report: Mobile Cellular", "Direction of Traffic: Trading Telecom Minutes" (1999) and "Challenges to the Network: Internet for development", all published for Telecom 99.

Preparing for a world without accounting rates

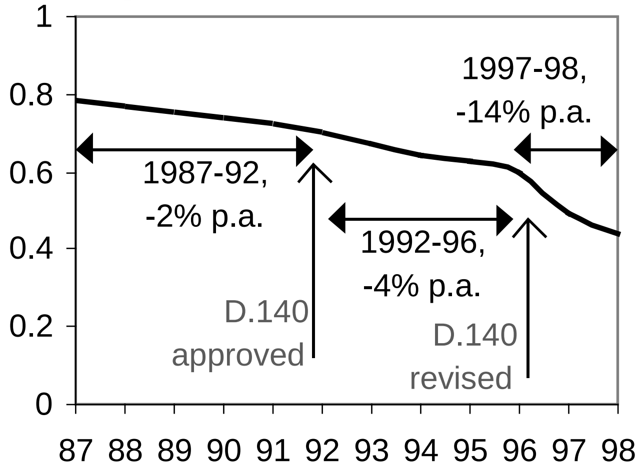
Dr Tim Kelly
ITU, Moderator
Development Summit,
11 October 1999

The views expressed in this paper are those of the author and do not necessarily reflect the opinions of the ITU or its membership. Tim Kelly can be contacted at Tim.Kelly@itu.int.

Issues for discussion

- **Comparing the FCC Benchmarks and the ITU Focus Group**
- **What is the true level of variation between costs?**
  - ⇨ **in developing countries**
  - ⇨ **in developed countries**
- **How should developing countries prepare for the changing market?**
- **What difference will the Internet make?**

Global average settlement rates, US$ per minute



Source: ITU/TeleGeography Inc. "Direction of Traffic 1999: Trading Telecom Minutes".

Two alternative scenarios:
ITU Focus Group targets, by teledensity (T), to be achieved by 2001 (2004)

T < 1	1<T<5	5<T<10	10<T<20	20<T<35	35<T<50	T>50
$0.44	$0.35	$0.29	$0.23	$0.16	$0.12	$0.06

FCC Benchmarks, by income group

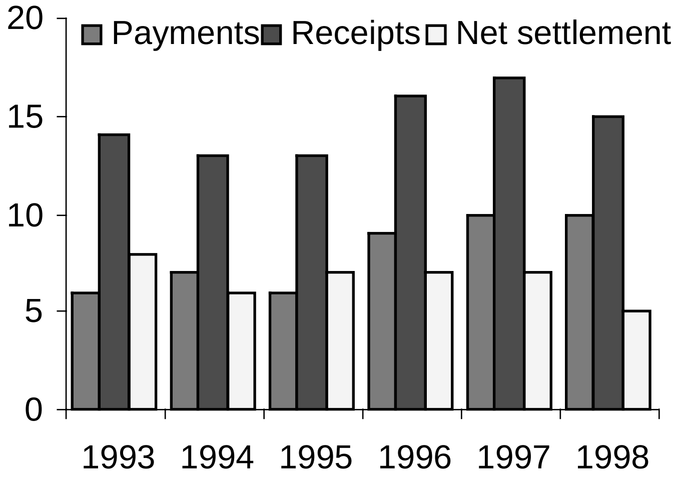
Low income, T<1	Low income	Low-mid income	Upper-mid income	High income
$0.23	$0.23	$0.19	$0.19	$0.15
2002	2001	2000	1999	1998

Note: All rates are shown in US$ per minute. Source: ITU Focus Group Report, FCC.

Questions for discussion

- Which approach should developing countries follow?
- To what extent does the cost of terminating international calls vary between developing and developing countries?
- What causes the variations?
- Would the introduction of competition help to reduce rates?
- How soon will domestic interconnect replace accounting rates?

Trends in settlement payments and receipts, Developing countries, US$bn

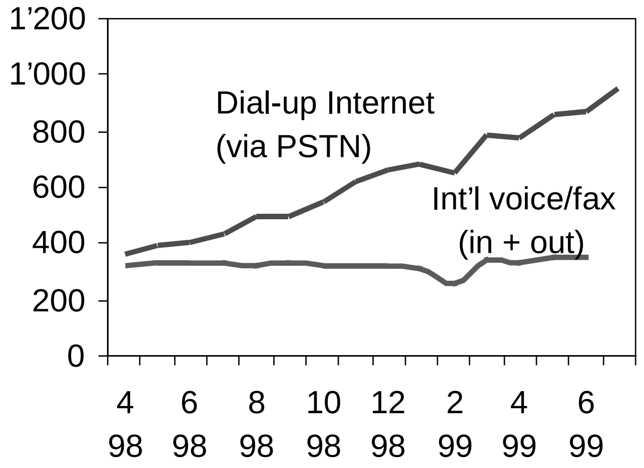


Source: ITU/TeleGeography Inc. “Direction of Traffic 1999: Trading Telecom Minutes”.

Questions for discussion

- **Which countries are likely to be the most affected by reductions in net settlement payments?**
- **How quickly will the transition to cost-oriented settlement rates take place?**
  - ⇨ **in developed countries**
  - ⇨ **in developing countries**
- **What can operators do to prepare for lower revenues from international services?**
- **What should be done to help the most vulnerable economies?**

Internet outgrowing voice
Hongkong SAR, April'98-July'99, Minutes of user per month, '000s



Source: ITU/TeleGeography Inc. "Direction of Traffic 1999: Trading Telecom Minutes".

Questions for discussion

- **When will Internet traffic outstrip voice/fax traffic?**
  - ⇨ **By volume**
  - ⇨ **By number of minutes**
  - ⇨ **By value**
- **What share of international voice/fax traffic will shift to the Internet?**
- **How do the settlement mechanisms of the Internet work?**
- **What are the implications for developing countries?**

Mr. Tsunekazu MATSUDAIRA
Managing Director, International Affairs Department,
KDD Corporation
Chairman, ITU-T Study Group 3 (Japan)

TDS.2

Goodbye, accounting rates

1 Introduction

The conventional system of telephone accounting rates is defined in ITU-T Recommendation D150, under the "accounting revenue division procedure". The French term for accounting rate is "taxe de repartition". As such terminology indicates, the concept of "revenue sharing" is embedded in accounting rates. This stems from the fact that the ITU has basically determined the international service as one being jointly provided by two terminal administrations so that the revenue from such service should be shared. Prior to the 1973 Telephone Regulations, the collection charge and the accounting rate were linked. The demonetization of gold and the flotation of currencies made such a principle impractical and the two rates were separated. However, the "sharing" concept of accounting rates survived.

Deregulation, market development and new technology have dramatically changed the environment under which international telecom services are provided. The telephone service is rapidly becoming a consumer commodity provided by several players not limited to traditional carriers. The telephone minutes are now "traded" in the market as a commodity. International transmission, termination and distribution components are being competitively "sold" and "bought", so that telcos can assemble them to manufacture their product, the phone call. Clearly, this is a big departure from the ITU definition of the international service. Settlement rate is no longer the 50% share of the accounting revenue but it is the price paid for exporting and importing service components. No wonder the World Trade Organization has something to say about telecom services.

2 The issue

This being the case, anyone can see that the accounting rate as we have known it cannot be sustained. The question is, what is going to replace it? And how should the interests of the developing countries be taken into account?

3 A brief history

The element of "cost" in accounting rates was first recognized officially in the International Telecommunication Regulations (Melbourne, 1988) in which Article 6.2.1 provided:

For each applicable service in a given relation, administrations shall by mutual agreement establish and revise accounting rates to be applied between them, in accordance with the provisions of Appendix 1 and taking into account relevant CCITT Recommendations <u>and relevant cost trends</u>. (emphasis added)

Argument towards cost-based accounting rates became stronger within ITU-T Study Group 3 from the beginning of the 90's and resulted in the adoption of Recommendation D140 entitled "Accounting rate principles for international telephone services" in 1992, which stipulated, inter alia, that "*accounting rates for international telephone services should be cost-orientated and should take into account relevant cost trends*". The Recommendation was further supplemented with three annexes in 1995.

Indeed, cost trends showed a rapid decline and intensifying competition in the liberalized markets brought drastic reductions of collection charges. Meanwhile, in spite of the above regulation and recommendation, the decline in the level of accounting settlements was not in pace with the decline of the rate per minute collected from the users. This meant that settlement outpayments made by carriers in the liberalized markets became a huge burden for them. This was particularly painful for the long distance telcos in the United States. This led the FCC in 1996 to issue a Notice of Proposed Rule-Making about international settlement rates, in which the famous "benchmarks" were proposed. The FCC subsequently adopted a Report and Order in the Matter of International Settlement Rates, commonly referred to as the "Benchmark Order", in August 1997.

Generally speaking, for the developing countries the hard currency income assured through the settlement process is of considerable importance in order to develop their telecom infrastructure. A quick reduction of the level of settlement rates therefore poses a serious problem . Basically, it is this dilemma that has made the issue of accounting rate reform a most difficult issue to be tackled on a multilateral basis.

Nevertheless, the rapid change of business environment coupled with the controversial move by the US prompted the ITU to strengthen its multilateral efforts in driving the accounting rates towards cost-orientation. On the one hand, SG3 debated alternative methods of remuneration between and among administrations in addition to the three methods already incorporated in Recommendation D150, namely:

1) Flat-rate price procedure;

2) Traffic-unit price procedure; and

3) Accounting revenue division procedure.

On the other hand, SG3 discussed and agreed in December 1997 (officially adopted in June 1998) the initial transitional arrangement towards cost-orientation in the form of Annex D to Recommendation D140 in which it was recommended to set a price cap guideline of accounting rate SDR 1.00 per minute (excluding transit fees) by the end of the year 1998. This already required hard negotiations both in and out of the meeting rooms and resulted in 5 administrations taking a reservation to the Annex. This was in fact the first time ever that specific numeric recommendation on accounting rates was adopted by the ITU, with the exception of regional recommendations.

The pressure upon the ITU to reform the accounting rate system was so significant that the ITU used all available means to make progress in this area. For example, the main theme for the 7th ITU Regulatory Colloquium held in December 1997 was "Transforming economic relationships in international telecommunications". Likewise, the 2nd World Telecommunication Policy Forum in March 1998 discussed "Trade in telecommunications" where the accounting rate reform was very much high-lighted. An Opinion was also adopted at the WTPF to set up a Focus Group under the management of SG3 to make headway in the study of transitional arrangements towards cost-orientation beyond 1998. This new "working tool" enabled SG3 not to be constrained to its normal timetable and budget for meetings. In December of 1998, SG3 considered the report of the Focus Group in the form of a draft Annex E to Recommendation D140 which included, inter alia, indicative target settlement rates to be attained by end-2001, categorized under seven groups of countries according to their teledensities as well as indicative target transit shares. The report itself did not represent a unanimous position within the Focus Group and it took two more SG3 meetings, in December 1998 and in June 1999, for administrations to reach "a measure of agreement" on the draft Annex E. SG3 determined the text ready to proceed to the approval process and it is foreseen that at the next full meeting of SG3 in December 1999, a vote will be taken.

On the issue of revising Recommendation D150 to incorporate new methods of remuneration, SG3 was successful in reaching a consensus to adopt three new alternatives, namely the "settlement rate procedure" in which administrations will agree to cost-orientated settlement rates rather than on an accounting rate, the "termination charge procedure" under which the destination administration receives a payment on the basis of a cost-orientated termination charge set by it and "other procedures" as appropriate under the market conditions when traffic is handled between two liberalized countries. The new revision to Recommendation D150 was officially approved in June 1999.

4 Observation

More specifically, on the "other procedures" mentioned above, the first sentence of the new paragraph 2.6 in Recommendation D150 reads as follows:

2.6 For traffic between two countries with open and competition orientated telecommunications markets, administrations may elect to use other procedures where such procedures are more suited to the nature of their relationship...

This is in fact an epoch-making recommendation for the ITU because, ironically, it is not recommending anything. It means that carriers are free to make whatever arrangements as they fit in a liberalized environment, as far as international settlement is concerned. It also means that as more and more countries liberalize and introduce competition, relations governed by this laissez-faire paragraph will increase so that the ITU would have no more role to play in this area. Indeed it is felt that this is the logical consequence of international telephone traffic becoming a commodity. Like any other commodity which is freely traded in the market, there will be no more need for international standards.

However, for still some time to come, majority of international traffic is expected to be settled in the traditional manner along the guidelines set in Recommendation D140. The termination charge procedure which was generally advocated by developing countries and the success of the scheme will depend during the negotiations remains to be tested highly on the actual levels of the charges which must be calculated on the basis of acceptable costing methodologies, yet to be determined.

The focus at SG3 will now shift to the study of these costing methodologies. Already, the Regional Tariff Groups (TAF, TAL and TAS) have developed or are developing their regional cost models and a Rapporteur Group has been established within SG3 on costing methodology. Again, this is no easy task to conclude considering the wide range of market development in various member countries.

In the meantime, the world moves on. The speed of development in information technology has to be measured in so-called “dog years”, i.e. seven times faster than calendar years. It is crucial for all international phone companies in the world, most of whom are ITU sector members, to adapt themselves to this shift of paradigm. In the area of telephone accounting rates, this means that all carriers, irrespective of whether it belongs to a developed or a developing economy, must achieve cost-orientated and market-driven levels as quickly as possible. Following the newly developed D140 Annex E guidelines is one way of proceeding. However, it should be well understood that that does not guarantee anyone of their survival in the market place.

Biography

At the World Telecommunications Standardization Conference held in October 1996, Tsunekazu MATSUDAIRA was elected Chairman of Study Group 3 (Tariff and accounting principles) of the ITU’s Telecommunications Standardizations Sector, for the term 1997-2000. From 1984 to 1996, he was one of the vice chairmen of the same group. Matsudaira has represented KDD at Study Group 3 since 1974 and is one of the longest serving members of the group. Between 1984 and 1992, he was the Chairman of Working Party 5, dealing mainly with the regulatory aspects. He played an instrumental role in drafting the International Telecommunications Regulations, in particular its Article 6 and Appendix 1 concerning international accounting principles. He also chaired the Plenary Working Party A at the World Administrative Telegraph and Telephone Conference (WATTC-88) in Melbourne, where the ITR was finalized and adopted. In the years 95/96, Matsudaira chaired the special ad hoc group on “Alternative Calling Procedures” (callback).

Matsudaira is a Corporate Officer of KDD Corporation and is the Senior Executive Director responsible for international strategy and carrier business. Matsudaira graduated from Gakushuin University in Tokyo where he majored in political sciences.

PALEXPO **TDS.3**

Monday, 11 October 1999	15:20 - 16:45

TDS.3	Community Access

Chairperson:	**Professor Heather HUDSON,** *Professor and Director,* Telecommunications Management and Policy Programme, McLaren School of Business, University of San Francisco (USA)
Keynote Speaker	**Mr. Daniel ESPITIA,** *Vice-President,* Global Strategy, FINSTRUCT (South Africa)
Panelists	**Dr. Clement DZIDONU,** *Executive Director,* International Centre for Internet and Telecom Technology (Ghana)
	Mr. P. C. GUPTA, *General Manager (Development),* Gujarat Telecom Circle, Department of Telecommunications (India)
	Prof. Kenji SAGA, *Professor,* Faculty of International Relations, Asia University (Japan)
Rapporteur/Right of Response	**Ms. Paula UIMONEN,** *Researcher,* Department of Social Anthropology, Stockholm University (Sweden)

PALEXPO

TDS.3

Monday, 11 October 1999	15:20 - 16:45

TDS.3	Community Access

Having promoted the development of rural telecommunications and the concept of multipurpose community telecentres (MCT) for many years, BDT is considered a leader in this field. However, it must continue sharing experiences with the delegates of developing countries, in order to find possible ways to implement the concept in their respective countries and regions.

The idea of this panel is to give an opportunity to discuss examples of MCTs in rural areas, the role of the community in creating a successful MCT, the necessary funding and its duration, what it takes to make MCTs sustainable, the management profiles needed to make MCTs successful, the benefits and spin-offs for the community (impact on social, economic and cultural development), technology options, and so forth.

Dr. Heather E. HUDSON
Professor and Director
Acacia Project
(United States of America)

TDS.3

Beyond infrastructure: Lessons in Telecommunications planning and Policy for development

Biography

Dr. Heather E. Hudson is Professor and Director of the Telecommunications Management and Policy Program in the McLaren School of Business at the University of San Francisco. She is also currently Evaluating and Learning Systems Coordinator for Acacia, a project sponsored by the International Development Research Centre (IDRC) to provide community access to the Internet and other services in Africa.

Dr. Hudson has a Ph.D. in Communication Research from Stanford University and JD from the University of Texas at Austin. She has planned and evaluated communications projects in more than 30 developing countries, and has consulted for many international organizations and development agencies including the ITU, World Bank, Unesco, UNDP, USAID, CIDA, IDRC, and the Commonwealth of Learning.

She is the author of several books ranging from, When Telephones Reach the Village (1984) to Global Connections: International Telecommunications Infrastructure and Policy (1997), more than 50 articles and numerous conference papers. She is a member of the Board of the Pacific Telecommunications Council and Telecommunications Policy Research Conference, and Governor of the ICCC. She was a special advisor to the Maitland Commission.

Mr. P.C. GUPTA
General Manager (Development)
Gujarat Telecom Circle
(India)

TDS.3

Multipurpose community telecentres for integrated rural development
Rajkot Project

1 Introduction

In developing countries like India, vast majority of the population lives in rural areas that are characterised by the lack of amenities and services essential for wholesome life. The state sponsored Integrated Rural Development (IRD) programmes tend to be long term due to resource constraints of a developing economy. Humanitarian assistance alone is short term remedy and cannot improve living conditions of the rural population in a sustained manner. BAAP 9 programme (Buenos Aires Action Plan, see References) of International Telecommunication Union (ITU) identifies telecommunications as the key to the success of sustainable IRD programmes. By strategically integrating the potential of telecommunications, the governments can give impetus to the IRD programmes. The resource constraints of a developing economy can be eased by this synergy. BAAP 9 programme envisages a realistic and cost effective way of providing advanced telematic services by means of a shared multipurpose facility, "Community Telecentre". Such community telecentres equipped with the necessary equipment and IT tools, can provide access to diverse services in the areas of healthcare, education, banking, administration and business.

Pre-investment feasibility study of a pilot project for implementation of multipurpose community telecentres in Rajkot District of the State of Gujarat in India was undertaken by the Department of Telecommunications, India and the ITU. The broad objective of the feasibility study was to identify the service applications of community telecentres for integrated rural development and formulate strategies for their implementation. Its scope also included development of financing and tariff models for the community telecentres. This paper presents briefly the findings of the feasibility study.

2 Background information

Rajkot district is located in peninsular region of western corner of India. It is spread over an area of 11,203 km^2. There are 856 villages in the district and 65.7% of these have population range of 500-2000 inhabitants. Administration of Rajkot District is divided into 13 *talukas.*

3 Population

As per 1991 census of India, Rajkot District had a population of 2.5 million and showed a growth rate of 20% over a period of ten years. 52% of the population lives in rural areas. 56.7% of rural population consists non-workers and 78.9% of the workers are engaged in agriculture and related activities. Cotton, groundnut and cereals are the main agriculture produce. Diesel engines, oil mills, machine tools and textile printing are the main industries.

4 Basic amenities

Electricity is available in all the towns and villages of the district. Although drinking water from wells is available in all the villages, there is season of water scarcity every year before the onset of the rainy season.

5 Telecommunications

Telecommunication network of the district is relatively developed compared to other infrastructure. Basic telephone service is available all over the district except in 26 villages. All the telephone exchanges are electronic exchanges. ISDN service is available in Rajkot. Packet switched data network node installed in Rajkot city provides nation-wide data service. The paging and cellular telephone services are available in Rajkot city. The nearest Internet node is installed at Ahmedabad which is about 225 km from Rajkot. Rajkot will have its own Internet node shortly.

6 Education

There are 26 colleges, 73 higher secondary and 1497 middle and primary schools in the district. They serve 0.55 million pupils of the district. All the villages have at least a primary school. Colleges are available in some of the *taluka* headquarters. There are two engineering colleges and one medical college.

7 Healthcare

Medical facility in one kind or the other is available in 88.6% of the inhabited villages of the district. There are 12 hospitals and 55 community and primary healthcare centres in the district.

8 Trade

Agriculture is the main occupation in Rajkot district. Nine marketing yards have been established for the sale of the agriculture produce. These marketing yards are run on co-operative basis and deal in grains and oilseeds primarily. Almost all the agriculture produce of the district is sold through the marketing yards.

9 Service needs of rural population

Socio-economic survey of the remote rural areas was carried out to assess the essential service needs of the rural population. The focus of the survey was on those areas where telecommunications and information technology can be useful. The survey revealed the following areas of deprivation which distinguish the isolated rural communities from the better off urban inhabitants.

1) The isolated rural communities have little access to services of medical specialists. The healthcare centres in the *taluka* headquarters are ill equipped and do not have regular attendance of qualified doctors. The rural population is referred to hospitals in cities for specialist services. People spend for each such visit an amount of money that they cannot really afford. Travel by public bus over a distance of 30 to 100 kilometers is time consuming and exhaustive for the patients. No medical advice may be available in case of emergency, as other means of travel are not available.
2) Agriculture is the main source of earning for majority of the rural population. The agriculture produce is sold through marketing yards which are located in the towns. The cultivators transport the agriculture produce to the nearest yard for auction. The traders of nearby localities only participate in such auctions. The marketing opportunities in the rural areas are limited.
3) Villages by and large face the lack of facilities for vocational training and access to information.
4) There are several employment generation and welfare schemes of the State Government, but their implementation is slow. The success of these schemes depends on public awareness, access to administrative machinery and feedback monitoring mechanisms. The isolated rural areas are handicapped on all these accounts. The procedures for availing benefits of these schemes are cumbersome and require several visits to the district headquarters in Rajkot city.
5) The management information system of the district administration is outdated. The most neglected are the remote pockets of the district that are rarely visited by district officials.
6) The customer interface of the electricity, water and telephone services is missing in rural areas. People need to travel to nearest towns for payments of the bills for these services.

10 Multipurpose community telecentres

The concept of multipurpose community telecentres as envisaged in BAAP 9 document is applicable to those remote areas that have lagged behind in the development process and now continue to be in the state of deprivation. It is important that the telecentres are located at such remote sites. The following criteria were adopted for site selection in the Rajkot Project.

- It should be a remote location where health care, education and trade facilities are not available.
- The service area should cover population of about 15,000 to 30,000. It was envisaged that service area of each telecentre could be of 10 km radius.

- The site should have latent growth potential.
- The selected site should be easily accessible from adjacent villages within the service area.
- It should have a telephone exchange that can be upgraded for ISDN service.

The demographic profile of the service areas of the twelve sites selected for the pilot project is given in Table 1. The telecentres at the selected sites will serve population of 400,280 people and 66,700 house holds in 232 villages.

11 Service profile of community telecentres

The following applications were envisaged for the community telecentres for meeting the service needs identified during the survey.

1) Tele-medicine
2) Tele-administration
3) Tele-trading
4) Tele-customer service
5) Tele-education

11.1 Tele-medicine

The healthcare services by and large are inadequate in the rural areas of Rajkot district. It is, however, not practical to create healthcare infrastructure having specialty services for every cluster of villages. Tele-medicine limited to consultation with specialists can be a practical and cost-effective alternative in the remote villages. It can as well be an affordable service if offered through multipurpose community telecentres. The service users will save on travel time, travel and stay costs.

Tele-medicine requires communication infrastructure for image transfer, interactive consultation and data transfer. To meet these requirements, each community telecentre will be equipped with clinical diagnostic terminals and video conferencing equipment connected to a computer having ISDN interface. The specialist's services will be provided from the Civil Hospital in Rajkot city. Civil Hospital at Rajkot will also be equipped with computers having ISDN connectivity. A server connecting these computers will maintain the patient-history, medical examination record, registration and appointment record in the Civil Hospital.

Table 1 – Demographic profile of the service areas

No.	Telecentre	Taluka	Area Served	Villages Served	Population Served	Households Served
1	Moti Marad	Dhoraji	19,339	12	32,933	6,251
2	Bhayavadar	Upleta	25,935	10	46,094	8,654
3	Jam Kandorna	Jam Kandorna	34,543	29	46,951	7,836
4	Derdi	Gondal	17,735	14	33,024	5,417
5	Maliya	Maliya	23,979	18	26,102	4,181
6	Khareda	Morvi	25,561	15	23,166	3,818
7	Mahika	Wankaner	31,076	30	26,398	4,158
8	Vinchhiya	Jasdan	24,165	22	41,479	6,075
9	Paddhari	Paddhari	24,914	26	34,521	5,773
10	Lodhika	Lodhika	30,944	27	38,490	6,136
11	Kotadasangani	Kotadasangani	19,455	18	25,263	4,172
12	Charansamadhiyala	Jetpur	15,242	11	25,859	4,229
	Total		**292,888**	**232**	**400,280**	**66,700**

During field surveys, the local medical practitioners indicated that ten patients on average from each of the villages surveyed, are referred to the city hospitals every day for consultation with specialists. If it is assumed that 50% of the required visits to the hospitals can be avoided by tele-medicine service, it is estimated that 240 patients will visit the twelve multipurpose community telecentres daily.

11.2 Tele-administration

Community telecentres can play a vital role in socio-economic development of rural areas by acting as nodal points in isolated rural areas and by bringing the district administration closer to the rural masses. Tele-administration can be useful in increasing efficiency of the administrative machinery by providing better communication and access. This application will run on the computers installed in the telecentres, district and *taluka* headquarters. It will consist of the following four modules.

- Module for welfare and employment schemes
- Management information module
- Bulletin board
- Public grievances and applications mail module

The first module will enable access to the various application forms for the welfare schemes and their dispatch to the respective departments of the district administration. Standard formats of the applications will be made available in the computer terminal at each community telecentre. After the information fields have been filled up, the module will forward the applications to the respective department and generate acknowledgment in hard copy for the applicant.

Management information module will provide a standard format for collection of the management information in the computer terminal at the community telecentre. The district administration functionaries at the village level will feed the information in the terminal as per the prescribed schedule and send it by electronic mail to the district collector office.

Bulletin board service will provide information about the various development and welfare schemes of the State Government. It will also serve as bulletin board for public announcements made by the district administration. Public grievances and applications mail module will enable the people to send their grievances and appeals to the concerned departments and officers through e-mail.

Functions of district administration cover a wide spectrum of socio-economic areas. Comprehensive system analysis is required to assess the volume and nature of information flow for each of the modules mentioned above. It is estimated that the number of applications for the welfare schemes alone will be 2,27, 000 and will engage the telecentre terminals for 3 hours daily. The terminal usage time (Table 2) for this application has been assessed assuming that 80% of non-workers avail welfare benefits, they approach telecentres uniformly throughout the year and the terminal service time per application is three minutes.

11.3 Tele-trading

The agriculture produce is sold by auction through marketing yards established by the State Government in the main towns of the district. These yards are run by co-operative societies. The co-operatives collect commission on each transaction from the buyers and the sellers. By connecting the marketing yards on a network and by providing access from the community telecentres, the farmers will be benefited in the following ways.

- It will be possible for the buyers and sellers to finalise the deal through use of the computers. The agriculture produce will not require to be transported to the marketing yards.
- Since all the buyers and sellers in the district will be interconnected, the market size will be larger leading to fair competition.

The on-line transactions between the community telecentres and the marketing yard network will require transfer of data. Access through the ISDN connection or through dial up modem will be sufficient. No special device other than a computer with printer and modem is required. The average terminal usage time for tele-trading application will be about 2 hours daily during the harvesting season. This assessment is based on the assumption that 50% of the households engaged in farming will make ten transactions during the harvesting season of 5 months in a year.

11.4 Tele-customer service

Multipurpose community telecentres located in remote clusters of villages can be convenient sites for providing customer services relating to electricity, water and telephone. Bill collection, registration for new connections and other customer services can be provided. For the telephone service alone, it is estimated that there will be 36 transactions daily for bill collections at each community telecentre. The user population for telephone customers will consist of the existing telephone subscribers and those in the waiting list. The terminal usage time for this application is given in Table 2. It is assumed that the bill collection service time is 3 minutes and time for registration of a new connection is ten minutes.

11.5 Tele-education

The education facilities at pre-university and higher levels are inadequate in the rural areas. The students go to the nearby towns for university education. Formal education through the use of computers requires development of course modules. It will not be possible to undertake this work within the time frame for implementation of community telecentres. The community telecentres, to start with, can focus on areas like on-line information of courses, admissions, examination results, course calendars etc.

During recent years, computer education has opened vast employment opportunity world over. Such computer education centres are not available in rural areas. The community telecentre can be potential computer education centres. To start with, the computer time of the telecentres can be offered on lease to the schools during the slack business hours for hands-on experience. Another potential area of application is Internet. The telecentres can offer Internet service on hourly payment basis.

12 Other services

Some of the other possible services of community telecentres are listed below. These services will be add-ons if the spare telecentre equipment time is available.

- Number of banks have computerised their operations. Back office computerisation is over in most of the banks. However the branches of these banks in the remote still do not have computers. These branches can use the data transfer services of the community telecentres.
- Word processing service.
- Photocopying of the documents.
- Public call office with national and international dialing facility.

Table 2 – Overall terminal usage in community telecentres

	Telecentre	Usage Time in Minutes					
		Tele-medicine	Tele-trading*	Tele-admn.	Tele-education	Tele-customer Service*	Total Terminal Minutes
1	Moti Marad	200	129	187	120	96	732
2	Bhayavadar	270	150	261	120	113	914
3	Jam Kandorna	280	-	266	120	159	825
4	Derdi	200	111	187	120	108	726
5	Maliya**	160	111	148	120	33	572
6	Khareda**	140	75	131	120	25	491
7	Mahika**	160	108	150	120	51	589
8	Vinchhiya	250	150	235	120	83	838
9	Paddhari	210	126	196	120	130	782
10	Lodhika**	230	174	218	120	133	875
11	Kotadasangani	150	111	143	120	147	671
12	Charansamadhiyala**	150	99	146	120	71	586
	Total	**2400**	**1344**	**2268**	**1440**	**1149**	

* These applications will have seasonal and monthly variations in the traffic.

** Tele-medicine application in these community telecentres will not be feasible during the first year of operation due to non-availability of ISDN service.

13 Project cost

Major components of the project are terminal equipment, application software and the computer systems. The total cost of the project is estimated to be US $ 190,738. It does not take into account the following indirect costs which are essential for implementation of the project.

- Cost of upgrading the telecommuni-cation network for providing ISDN facility in the telephone exchanges at the community tele-centre sites, has not been made part of this project as ISDN service will have universal applicability, i.e. it will benefit all the telephone subscribers. Secondly, like other subscribers, the community telecentres will be billed for the usage of this service.
- Computerisation in the office of the District Collector is immediately required in view of the volume and variety of development, welfare and administrative functions. Compu-terisation will enable efficient monitoring and control of these functions. The cost of computerising the functions of this adminis-trative office is not made part of the pilot project. The community telecentres will merely act as the information collecting nodes of the computerised administration system.
- The marketing yards handle the seasonal trade of agriculture produce of the district. Computerisa-tion and networking of their operations will enable competitive bidding by increasing the size of the market. The cost of computerising the marketing yard operations is not included in the project cost as the community telecentres will supplement their functions by allowing distant access.

14 Tariff policy

The concept of community telecentre is based on shared use of services which are needed by the isolated rural population. The tariff of these services should be within the means of the rural population. At the same time, it is to be ensured that the project should be financially viable so that it could sustain itself. The following principles and considerations were taken into account while developing the tariff models.

- The tariff of any service is determined primarily by the cost of providing the service, which includes the capital costs and the operating cost. Unless these costs are reco-vered, the service cannot be sustainable.
- It is essential that the tariff should be acceptable to the customers. A customer parts with his money in return for certain quality and quantity of the goods or services.
- The tariff of a service should be comparable with the tariff of other competitive alternati-ves.
- The tariff should be affordable and should encourage optimal utilisation of the services.
- Cross-subsidisation of social services like tele-medicine with commercial services like tele-trading is required.
- The tariff structure should be simple to administer.

Table 3 – Tariffs for telecentre services

1.	Tele-Medicine	Registration	Rs. 10	per new case
		Consultation	Rs. 50	per consultation of 10 minutes
		X-ray transmission	Rs. 20	per x-ray
		ECG	Rs. 50	per ECG
		Foetal scan	Rs. 50	per scan
2.	Tele-administration		Rs. 12	per application
3.	Tele-trading		Rs. 25	per transaction
4.	Tele-customer services	Bill collection	Rs. 02	per bill
		New registration	Rs. 10	

US $ 1 = Indian Rs. 42.

Table 3 gives the proposed tariffs of important services. The major component of the operating expenses of the telecentres is the telecommunication usage charge payable to the Department of Telecommunications. This component of the cost is distance and usage-time dependent. Thus the cost of offering services will be higher in far off and isolated areas. The rural population in such areas is also economically more deprived and cannot be asked to bear the higher cost of telecentre services. Therefore uniform tariff structure irrespective of the location of the community telecentre, has been proposed.

15 Operating results

The operating results for first five years of operation are given in Table 4. All the figures have been converted to US dollars (US$ 1= Indian Rs. 42). The capital investment spills over to second year as tele-medicine application is not feasible at five telecentre sites in the first year of operation. The operating expenses consist of staff expenses, telecommunication charges, maintenance cost, consumables, accommodation rent and other miscellaneous expenses. These are estimated to be $ 115,772 for the first year of operation and they grow to $ 210,734 in the fifth year.

Telecommunication charges constitute the largest component (about 60%) of operating expenses and determine to a large extent the tariffs of the services offered in the telecentres.

Considering that:

- the community telecentres will be set up with the ultimate objective of integrated rural development,
- the rural population will be using the telecentres for availing government sponsored health care, education, welfare programmes, and
- there is shared usage of telecommunication services.

It is proposed to treat the telephone and ISDN connections in the community telecentres on the lines of PCO policy of the Department of Telecommunications. The PCOs attract rental concession and bill discount. The operating expenses as projected below take into account these concessions.

Annual revenue from the community telecentres is worked out on the basis of user population, average service time, frequency of usage, and the tariffs as indicated in Table 3. It is assumed that the projected business will grow from 80% to 100% in four years. The net revenue from all the services works out to be $ 189,144 in the first year and it grows to $ 263,771 in the fifth year. It is noticed that tele-medicine and tele-administrations are major revenue earning applications. These applications address healthcare, employment and rural development issues and thus have bearing on the achievements of the BAPP9 IRD objectives.

The internal rate of return works out to be 19% and the pay back period is less than five years at the discount rate of 15%. Profit and loss analysis based on depreciation at 10%, interest rate of borrowings at 15% and tax on income at 35%, reveal that the project is sustainable. The annual interest liability on borrowing is about 51% of the operating surplus. This being a pilot project with of socio-economic development objectives, a grant from an international development agency to cover part of capital investment will make the project more attractive commercially.

Apart from the revenue, the multipurpose community telecentres will contribute to indirect socio-economic benefits in terms of better healthcare, community development, employment and overall economic development of the region. There is little empirical data to quantify the socio-economic benefits of provision of such services in rural areas.

Table 4 – Operating results*

		0 Year	I Year	II Year	III Year	IV Year	V year
1	**Capital investment**	133,531	49,429				
2.	**Operating expenses**		115,772	183,597	199,071	207,130	210,734
3.	**Operating Revenue**		189,144	239,584	251,387	260,984	263,771
4.	**Operating Surplus**		73,372	55,987	52,316	53,854	53,037

* All figures are in US $.

16 Financing and implementing strategies

As mentioned earlier, raising the full quantum of capital by way of commercial borrowings will result in high interest liability rendering the project less commercially attractive, though self sustainable. Therefore, depending on the implementation strategy, the project needs to be financed through one or combination of several resources. The implementation alternatives are several. It can be implemented as:

– a private or public sector enterprise financed through loans and equity,

– a state government project fully financed through budgetary allocation,

– A co-operative enterprise.

17 Private sector enterprise

It has been the experience that there is general reluctance of the private sector to take up rural development projects as the economic returns are moderate and the indirect socio-economic benefits are of little interest.

18 State Government project

Community telecentre project is has its roots in IRD programme which is primarily a state issue. Therefore the State Government of Gujarat can take the onus of equipping, operating and maintaining the community telecentres on itself. It is a low-budget and cost-effective project, and will easily fit into the annual budgetary allocations for the rural development programmes. The state government can also consider taking grant from an international development agency. Alternatively, the state government can implement the project through one of its existing public sector enterprises. The public sector enterprise can finance for the project from its own resources or it can raise loan through financing institutions.

19 Co-operative

Co-operative movement has been very successful in the State of Gujarat. There are many co-operative societies in the areas of milk marketing, agriculture produce marketing, banking, and financing. On the similar lines, a co-operative society can be formed for the telecentre project. Telecentre co-operative will be beneficial in several ways.

- The participation of local population will ensure greater degree of acceptance of telecentre services by the villagers.
- The service needs of the local population will be looked after better.
- Telecentre being the only business of the co-operative, the returns will be re-invested for expansion of the business.
- The co-operative will be eligible for tax exemption and other benefits extended by the government.
- The capital for investment can be readily raised through banks and grants.

20 Financing strategy

The project requires borrowings of $ 160,000 in the first year and $ 24,000 in the second year to meet the capital and working expenditure. The following financing strategy is recommended to meet these requirements. The recommended strategy will ensure that the community telecentre project is self sustaining and expanding business.

1. The capital requirements of $ 160,000 in the first year and $ 24,000 in the second year can be raised as a grant or low interest rate loan from an international development organisation like UNDP or World Bank.
2. The initial working capital for the first year of operation is provided by the cooperative society. This amount could be raised as equity by way of membership shares.
3. The profit share of the cooperative society will be in proportion to the equity if the project is financed through a grant.
4. Operating surpluses are to be used for loan repayment. If the project is financed through a grant, the surplus will be used for implementing similar projects in other districts of the Gujarat state.

21 The Partners

Buenos Aires Action Plan (BAAP) 9 of the International Telecommunication Union (ITU), emphasised the need to develope tariff, cost, regulatory and administration models for community telecentres and to assess their impact on socio-economic development of the rural masses. These multifarious issues can be addressed only through collaborative efforts of the State Government of Gujarat which is responsible for integrated rural development in the state, the Department of Telecommunications (India) which provides nationwide telecommunication services, and the International Telecommunication Union which originated the concept of community telecentres.

While the ultimate objective of the pilot project is to provide infrastructure for rural development within the limited resources, the focus involvement of each of these three partners is different. For the State Government of Gujarat, this pilot project is a new concept that will give impetus to the IRD programme and provide needed relief to the isolated rural population in short term. For the Department of Telecommunication, it will be the first application of its kind that uses advanced telecommunication services for rural development in the remote corners of India. The Department of Telecommunications will, thus, fulfill is social commitments apart from the commercial objectives. From the point of view of the international partner, ITU, this pilot project will be the test bed for demonstrating the role of telecommunications in socio-economic development and for its replication in the other parts of the world.

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Biography

Mr. P. C. Gupta holds M.Tech degree in electrical engineering from Indian Institute of Technology, New Delhi. He joined the Department of Telecommunications, Government of India in 1974. He specializes in transmission systems and information technology. His career in the department includes several years of R&D, teaching, planning and management experience in these fields. He was Project Director in Telecommunication Consultants India Ltd. from 1985 to 1989, and worked in several national and international telecommunication projects.

He holds the post of General Manager (Development) in the State of Gujarat at present. He is responsible for planning and development of the telecommunication network of the state. During his current assignment, he carried out pre-investment feasibility study of a pilot project for establishing Multipurpose Community Telecentres (MCT) in Rajkot District.

He has authored several technical papers for international and national journals and written a book on Data Communications for the undergraduate engineering courses.

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TDS.3

Development of rural network and applications at community telecentres

Asian cases and policy recommendations

My comments as a panelist will be focused on general policy regarding the development of multipurpose community telecentres (MCT) for rural areas in developing countries.

As specific subjects such as tele-applications, universal access, wireless access, Internet related issues, and development models will be discussed at other times during this Development Summit, they will not be central to my comments.

There are significant differences between rural MCTs in developing countries and rural MCTs in industrialized countries. In Japan where a nationwide basic telecommunications network has already developed and every home has universal access to telephone network even in remote areas, the major purposes of rural MCTs are to build CATV network which enable the rural people to enjoy more TV channels and to allow them high speed access to the Internet.

Conversely, in developing countries, realizing the availability of telephone service for rural people is one of the key issues for rural MCTs. At the same time, however, there are rapidly growing needs for new IT applications such as tele-education, tele-work, tele-medicine, and so on. Additionally, village administrations increasingly depend upon the Internet as the infrastructure at the rural MCTs in developing countries.

For example, in Indonesia, the development of the Community Teleservice Centre (CTC) in rural villages is a key factor for the success of the Indonesian NII called "Nusantara 21."

The roles of the CTC in Indonesia are as follows:

a) to realize grass roots access to global information through the Internet,

b) to promote the sale of local products through the Internet and E-Commerce,

c) to attract investors to villages by ensuring global access from rural areas, and

d) to educate people and to enrich living standards through tele-education, tele-medicine and other applications.

1 Important subjects to be considered for the design of rural MCTs.

I would like to raise four subjects related to this issue:

1.1 Selection of network technology

Global trend of basic telecommunications and information network.

Policy makers and network/system planners in developing countries should take into account the rapidly changing global trends in the information infrastructure such as:

a) the transition from analogue networks to digital networks,

b) from public switched networks to IP based networks,

c) from telephone based networks to high speed digital networks, and

d) the variety of technologies and applications in designing user-oriented MCTs.

1.2 Financing

Financial needs for the development of the information infrastructure and MCTs in developing countries have been increasing very rapidly. However, total amount of ODA resources from developed countries have been decreasing in recent years. Although ODA to LDC is still playing a important role, we must take into account the following trends:

a) the shift from ODA assistance to private investment,

b) from government funding to private funding,

c) from non-commercial base to commercial base, and

d) new role of government: to encourage and support private sector investment.

Making MCTs business profitable is a key issue for successful implementation.

1.3 Socio-economic and geographical elements to be considered

a) depopulated area or overpopulated area,

b) mountainous area or flat land or island area,

c) widely scattered or swarmed,

d) relatively high income or low income, and

e) literacy rate: high or low, and

f) level of infrastructure development.

1.4 Selection of technology

The development of new innovative technologies such as wireless local loop (WLL) and mobile access through GMPCS are helping to reduce the cost of connecting rural MCTs.

These technologies include:

a) terrestrial wireless technology,

b) satellite technology (geostationary or LEO/MEO),

c) upgrade of existing copper wire network,

d) optical fiber technology,

e) submarine optical fiber technology.

2 Key issues for the success of rural MCTs

There are common policy issues for the successful implementation of rural MCTs. These are:

a) powerful leadership with careful management,

b) identification of needs from initial stage and step by step development,

c) collection of sufficient information: case studies and system proposals,

d) continuous coordination and discussion among policy makers, system planners and manufacturers,

e) small investment and low operational cost at initial stage for commercial operation, and

f) expandable system design to meet increasing needs and new innovative applications.

3 Conclusion: Role of ITU-D (Focus Group 7)

For policy makers and network/system planners in developing countries, it is essential to gather sufficient information and undertake continuous discussions and coordination with network/system designers and manufacturers in industrialized countries.

Just recently, at the meeting held on June 16 in Geneva, the Focus Group 7 of the ITU-D has decided to initiate significant measures. As an academic who has been involved in the drafting work of the new initiative, I would like to conclude my comments with the decisions of the Focus Group 7:

a) to establish the Case Library on rural applications on the Internet and provide sufficient and state-of-the-art information,

b) to establish cyberspace conference rooms and provide a platform for continuous coordination and discussion among interested parties,

c) to encourage experts and manufacturers to undertake R&D activities focussing on the development of rural applications including MCTs,

d) to encourage policy makers and planners in developing countries to utilize the Case Library and the platform for the successful implementation of rural applications, and

e) to establish linkage to the group of experts at the Centre of Excellence of the ITU.

Biography

1957: Graduated from Osaka University of Foreign Studies Joined KDD (international telecommunications carrier in Japan).

1957-67: Studied Economics at Kyoto University.

1957-90: During career at KDD filled following positions:

- Senior Manager, Foreign Research Division of Management Research Department.
- Senior Manager, Research and Analysis Division of International Affairs Department.

1990: Professor, International Telecommunications Policy, Faculty of International Relations, Asia University.

1993-97: Vice President for International Affairs, Asia University.

1997-98: Visiting Fellow at Victoria University of Wellington, New Zealand.

1998: Professor, International Telecommunications Policy Faculty of International Relations, Asia University.

Social Activities

1990-19995: Vice Chairman of Education and Seminar Committee of PTC (Pacific Telecommunications Council).

1995-1999: Vice Chairman of Research Committee of PTC.

1994: Research Director of Telecommunications Taskforce of Japan National Committee of PECC (Pacific Economic Cooperation Council).

Major Achievement

1) "Global Telecommunications Revolution" Japan Industrial Journal, 1987.

2) "Key Issues in the Development of Telecommunications Infrastructure in the Asia-Pacific Region" PECC 1990.

3) "Private Sector Investment for the Development of Telecommunications Infrastructure in Asian Developing Economies" International Relations Journal, 1995.

4) "APEC: Regional Harmonization of Telecom Policy" Telecommunications Policy, April 1999.

PALEXPO **TDS.4**

Monday, 11 October 1999	**16:45 - 18:15**

TDS.4	**Telecoms for teleapplications**

Chairperson:	**H.E. Mr. Purna B. KHADKA,** *Minister for Communications & Home Affairs,* Ministry of Communications & Home Affairs (Nepal)
Moderator	**Mr. Craig MATTHEW**, *Director,* Creative Communications Group (United Kingdom)
Keynote Speakers	**H.E. Mr. Ismail ALAOUI,** *Minister of Education,* Ministry of Education (Morocco)
	Dr. Salah MANDIL, *Director-Advisor,* Health Informatics and Telematics (HIT) (WHO)
Panelists	**Dr. Isao NAKAJIMA,** *Associate Professor,* Emergency Medical Service Centre, Tokai University School of Medicine (Japan)
	Mr. Muhammad JAVED, *Chairman,* Pakistan Telecommunications Authority (Pakistan)
	Mr. Renato CORTINOVIS, *Officer,* Human Resources Development (HRD) (ITU/BDT)
	Mr. Emiel DE HERT, Principal Scientific project officier *European Commission,* DGXIII-F (Belgium)
Rapporteur/Right of Response	**Ms. Barbara WILSON,** *Officer,* Human Resources Development (HRD) (ITU/BDT)

PALEXPO

TDS.4

Monday, 11 October 1999	16:45 - 18:15

TDS.4	Telecoms for teleapplications

Having promoted the combined use of information technologies and telecommunication facilities for distance working and distance training for many years, the BDT is also considered a leader in this field. New multimedia applications are now easily available in developing countries, and the distance-training approach is maturing towards teletraining for telecommunication organizations and tele-education for communities in general. The ITU has also being promoting the concept of telemedicine to improve health-care services in rural areas using the available telecommunication and multimedia facilities.

This panel will provide the opportunity to discuss such applications, and how they may be incorporated as services of the multipurpose community telecentres. Consideration will be given to the ways in which industrialized organizations may establish contact with developing countries in order to provide the equipment required and set-up the infrastructure to deliver the services in question.

Son Excellence
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Ministre de l'Education nationale
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TDS.4

La formation par la télévision interactive L'exemple marocain

L'objectif de cette communication est de présenter l'application technologique que notre Ministère tente de mettre en œuvre dans le domaine de la formation continue, à travers le projet conjoint MEN/UNESCO/UIT: *«Education à distance par la télévision interactive: formation continue des éducateurs»*. Trois points composent cet exposé:

– une problématique «pourquoi la téléformation?»;

– les réponses: le choix marocain en termes de dispositif;

– des attentes et difficultés liées à ce projet.

1 La problématique: des questions qualitatives et quantitatives

L'un des problèmes majeurs que rencontre le secteur éducatif dans notre pays est l'absence d'un système de formation continue bien établi. La formule des regroupements que nous avons employée jusqu'à maintenant est nécessaire, parfois incontournable mais présente quelques limites:

- cette formule ne résiste pas face à la contrainte quantitative: nos études ont montré qu'en moyenne un instituteur doit attendre entre 7 et 12 ans pour bénéficier de deux à trois jours de formation;

- les bénéficiaires quittent leurs classes, sans qu'ils soient remplacés, pour des stages qui ne peuvent excéder une trentaine d'heures de formation et pour des programmes généralement trop denses et trop académiques;

- l'absence d'un système d'évaluation et de suivi rend impossible la mesure de l'impact de ces regroupements sur les pratiques;

- ces regroupements s'adressent à des formés comme groupe homogène, alors que l'on sait qu'ils sont différents selon le niveau de recrutement, selon l'expérience, selon les régions; etc.

Deux questions principales s'imposent donc:

Comment répondre aux besoins en formation des 160 000 éducateurs dans le premier cycle fondamental dans des délais et à des coûts raisonnables et selon un système de rotation satisfaisant?

Quel programme et quel modèle de formation concevoir pour améliorer le profil des éducateurs mais aussi pour le maintenir au niveau souhaité?

2 Des réponses: les choix stratégiques

2.1 Niveaux de réponses

2.1.1 Niveau institutionnel

a) La programmation explicite de la qualité comme priorité ministérielle juste après la généralisation de la scolarisation. La recherche de cette qualité nous a imposé l'ouverture de plusieurs chantiers de réformes: évaluation de notre système éducatif, refonte des curriculas et des programmes, révision des méthodes, initiation d'une véritable stratégie d'appui, etc.

b) La création de structures dédiées à la promotion de la formation, comme la création du

Conseil de coordination de la formation et l'unité de coordination de la formation des cadres.

c) La recherche de réponses nouvelles et complémentaires à travers des plans d'action et des expérimentations pilotes. La formation à distance exploitant les ressources offertes par les nouvelles technologies constitue une voie possible.

Ce qui fait donc de la TVI un projet pilote de formation continue à distance des éducateurs dans le 1er cycle fondamental et en priorité dans le milieu rural.

2.1.2 Niveau projet TVI

1) Les objectifs assignés à cette expérimentation sont les suivants:

a) Objectifs de développement:
   - l'amélioration des profils des différents cadres du 1er cycle de l'enseignement fondamental;
   - l'amélioration de la qualité de l'enseignement fondamental et la réduction des déperditions scolaires.

b) Objectifs immédiats:
   - développer un système flexible et moderne d'éducation à distance basé sur l'utilisation des techniques de diffusion de télévision interactive;
   - développer un modèle de formation continue des instituteurs du 1er cycle de l'enseignement Fondamental, accessible dans leur environnement immédiat de travail;
   - renforcer les services d'information pédagogiques pour soutenir et compléter la formation en cours d'emploi, et relever le niveau de connaissance des membres des communautés dans les domaines intéressant leur développement;
   - tester de nouvelles approches de formation continue à travers l'éducation à distance et la télévision interactive.

2) Quant aux échéances, nous projetons de réaliser cette expérimentation en trois ans:
   - une année à 18 mois de préparation de la mise en œuvre;
   - deux années scolaires d'expérimentation dans les 15 sites;
   - évaluations intermittentes et recherche de nouveaux partenaires;
   - généralisation progressive (vers 85 sites).

2.2 Le dispositif: le choix marocain

2.2.1 Le réseau

Celui-ci est composé de:

- un centre de présentation (Rabat) relié par satellite à 15 sites d'apprentissage;
- 15 sites d'apprentissage situés dans 4 provinces (dominante rurale et taux d'analphabétisme élevé): Essaouira (1) – Kelaâ Sraghna (5) – Ouarzazate (5) – Al Hoceima (4).

a) *Centre de présentation*

Celui-ci est mis en place à Rabat pour gérer à plusieurs niveaux de priorités les interactions (écrites et électroniques) et il abrite:

- les équipes pédagogiques composées de formateurs issus du terrain et proches des préoccupations des éducateurs apprenants;
- les équipes techniques (audiovisuel, informatique et télécommunication);
- les équipements nécessaires à l'émission des sessions TVI, à la gestion de l'interaction entre le centre et les sites;
- les équipes qui conçoivent les émissions (contenu et design) et préparent les différents supports (textuels, audiovisuels et électroniques).

b) *Sites d'apprentissage*

Aménagé pour accueillir jusqu'à 50 éducateurs apprenants, chacun des 15 sites sera équipé de matériel lui permettant de:

- recevoir les émissions TVI;
- interagir pendant les sessions et réagir pendant et hors session;
- assurer les liaisons entre les apprenants et les formateurs en dehors des sessions ainsi qu'entre apprenants dans le cadre de groupes de travail;
- consulter les ressources éducatives disponibles sur site et à distance: base de données, Internet, etc.

2.2.2 Le programme

1) Une équipe de concepteurs compétents et motivés est chargée d'élaborer un programme qui doit viser:
   - une meilleure maîtrise des savoirs disciplinaires et didactiques;

– l'impulsion d'une nouvelle pédagogie centrée sur l'élève;

– l'introduction de nouveaux rôles et de nouvelles compétences pour participer au développement communautaire, notamment en intégrant les notions d'éducation en matière de population.

2) Chaque stagiaire devra suivre un certain nombre d'unités de formation avec un seuil minimum de 600 heures pour les deux années d'offre de la formation.

2.2.3 Le modèle de formation

Grâce à l'appui de nos partenaires, en particulier l'UIT et l'UNESCO, et avec la collaboration d'experts nationaux et internationaux, nous avons conçu un modèle d'encadrement spécifique à la réalité marocaine et qui, nous l'espérons, pourra servir d'exemple à interroger, pour les autres pays désireux d'avoir recours aux technologies de l'information pour répondre à des besoins éducatifs.

En effet, trois principes caractérisent notre modèle: le principe de l'encadrement mixte présente/à distance; le principe de la palette de ressources technologiques et le principe de la palette de fonctions pédagogiques.

a) *L'encadrement mixte*

Dans chaque site d'apprentissage, deux formateurs animent la formation en apportant un soutien à l'apprentissage: ils offrent aux formés conseils et orientations, encouragements et motivations, assistance méthodologique au travail individuel et de groupe réel et virtuel, clarification et explications complémentaires à celles fournies par le présentateur, etc.

b) *La palette des ressources technologiques*

Le dispositif médiatique (synchrone/asynchrone) est doté d'une palette de ressources technologiques, les unes disponibles dans le centre d'apprentissage (CD-ROM, enregistrements TVI, logiciels et didacticiels, téléphone, télécopieur, etc.), les autres accessibles via le réseau télématique (informatique et de télécommunication) tels que le courrier et les forums électroniques, les présentations TVI, les bases de données et Internet.

c) *La palette des fonctions pédagogiques*

Chaque technologie est associée à une ou plusieurs fonctions pédagogiques à l'intérieur d'un modèle pédagogique homogène alliant l'apprentissage individuel et collaboratif:

– *L'apprentissage individuel*

un moment d'apprentissage qui permet au formé de se tracer un parcours personnalisé à travers une série d'activités: consultation de documents d'autoformation, recherche d'information, élaboration de projet à réaliser dans le milieu, etc. (guides, livrets, documents audiovisuels, document multimédia présentant des dictionnaires et des applications éducatives, ressources Internet, base des données).

– *L'apprentissage collaboratif*

repose sur des interactions de groupe menées face à face dans les sites d'apprentissage, ou dans le cadre de forums électroniques en mode asynchrone et supportés par un réseau télématique. Ces rencontres physiques et virtuelles permettent à l'apprenant de: discuter, confronter et valider les connaissances acquises en apprentissage individuel, développer des capacités de travail en groupe, partager les difficultés rencontrées et les expériences réussies, etc.

2.2.4 Mesures institutionnelles

Pour permettre au projet d'atteindre les objectifs visés, nous avons senti la nécessité de prendre un certain nombre de mesures d'accompagnement:

– dégagement de 5 heures par semaine pour la session TVI sur le temps de travail de l'instituteur. Celui-ci, s'il est volontaire, s'engagera à mettre 5 heures/semaine sur son temps libre au profit de l'autoformation;

– accès au transport vers le site d'apprentissage;

– valorisation de la formation continue en adoptant par exemple l'arrimage de la formation à l'évolution de carrière.

3 Attentes et difficultés

Outre la réponse à nos besoins quantitatifs et qualitatifs en formation, nous travaillons à ce qu'à l'issue du projet, nous aurons à notre disposition:

- Un modèle souple de téléformation rendant la formation continue accessible sur les lieux de travail des éducateurs (ou à proximité) permettant ainsi:
  – d'augmenter la chance des publics dispersés et isolés d'avoir accès à la formation et à l'information;
  – d'offrir aux éducateurs une formation de façon continue et en alternance avec la prise en charge de la classe;
  – de créer des salles de classes virtuelles sans limites d'espace ou de distances,

offrant la possibilité aux enseignants d'accéder aux moyens et ressources éducatif diversifiés;
  - de mesurer l'impact, la progression et l'apport de la formation à la classe.
- Un programme de formation développé selon le modèle de téléformation généralisable au Maroc, et représentant un exemple pour d'autres institutions et organismes:
  - constitution de pôles et de réseaux de formation et d'information dans les provinces: sites d'apprentissage et centres de documentation pédagogique (CDP);
  - création d'un réseau technique exploitable:
    a) par le MEN (pour d'autres besoins de formation);
    b) par d'autres départements (santé, environnement, offices et instituts de formation, etc.);
  - production d'un rapport d'évaluation du modèle de téléformation à la fois par la TVI et par Internet;
  - élaboration d'un ensemble de guides et de manuels d'ingénierie de matériel pédagogique de téléformation pour les concepteurs et les réalisateurs.

Nous avons à affronter un certain nombre de difficultés liées:

- aux restrictions budgétaires de plus en plus handicapantes;
- au recrutement de profils très recherchés comme l'ingénieur en télécom-informatique et le designer de bases de données à des fins éducatives.

Malgré ces obstacles, et bénéficiant de l'appui de nos partenaires comme l'UIT et l'UNESCO et l'Agence pour la francophonie, nous avons:

- produit avec l'assistance de l'UNESCO le document révisé et définitif du projet et préparé un cadre de gestion et d'exécution facilitant la réalisation du projet;
- identifié un important espace et programmé son aménagement pour accueillir le centre de présentation;
- identifié les sites d'apprentissage et programmé leur aménagement;
- sélectionné et affecté le chef du projet, l'équipe pédagogique noyau, l'ingénieur en électronique;
- acquis, dans le cadre de l'appui de l'UIT, du matériel pour organiser un site pilote d'essai et de formation.

Le projet se réalise donc lentement et avec l'aide d'autres partenaires, nous pourrions aller plus vite et atteindre les résultats escomptés.

Biographie

M. Ismail Alaoui que S.M. le Roi a nommé ministre de l'éducation nationale, est né en 1940 à Salé.

Après ses études primaires à Salé, secondaires à Rabat et à Kénitra, il poursuit ses études de lettres au lycée Lyautey à Casablanca puis à la faculté des lettres et des sciences humaines de l'université Mohammed V de Rabat, avant de rejoindre l'institut de géographie de la de Sorbonne à Paris.

De 1965 à 1969, il est attaché de recherches au centre universitaire de la recherche scientifique (actuel institut universitaire de la recherche scientifique). M. Alaoui occupera les postes d'assistant, de maître assistant, puis de maître de conférences avant de devenir professeur à la faculté des lettres et des sciences humaines de l'université Mohammed V de Rabat.

Il a été également chef du département de géographie de la faculté des lettres et des sciences humaines de l'université Mohammed V de Rabat à plusieurs reprises.

En 1962, il rejoint les rangs du parti communiste marocain (PCM). M. Alaoui est élu membre du comité central au 3e congrès, en 1966.

En 1975, lors du premier congrès du Parti du progrès et du socialisme (PPS), il est élu membre suppléant au bureau politique, puis membre du bureau politique lors du 2^{e} congrès du Parti tenu en 1979.

Il est député des Beni Hcen (Gharb) de 1984 à 1992. Puis député représentant les salariés de 1993 à 1997, période durant laquelle il a été président du groupe parlementaire «Renouveau et Progrès» du PPS.

En novembre 1997, M. Alaoui est député à la Chambre des représentants.

En septembre 1997, M. Alaoui est élu, par le comité central du PPS, Secrétaire général du Parti, succédant ainsi à M. Ali Yata décédé la même année.

M. Ismail Alaoui, qui a été décoré chevalier de l'ordre du trône en 1993, est père de trois enfants.

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TeleHealth/TeleMedicine at a Cross-road: The alternatives?

And the main influencing factors?

1 Introduction

The ongoing dramatic improvements in the performance, access and geographic spread of telecommunications, are rapidly changing most socio-economic sectors of life. Examples abound in business, trade, media and entertainment, and to a lesser extent in education, health and medical care. Many of these examples show how cost-effective applications of computing, networking and communications can bring about major improvements in the methods, quality, efficiency and economy with which health care services are provided and managed; health care knowledge and expertise are shared; health information is collected, processed and disseminated; health literature is accessed and searched; health education and training material is prepared and actual education and training are delivered; research is conducted and co-ordinated; and contacts and dialogue are established and maintained between individuals or institutions.

In particular, TeleMedicine studies, practical experiments and some operational services have developed to a level where it is drawing profound interest, sometimes only the curiosity, of health sector strategists and policy makers. Even though most of these developments are in the industrially developed countries, there are relatively fewer, but significant and rapidly increasing, examples in the industrially developing countries.

This paper cites TeleHealth/TeleMedicine experience in a few countries (section 3), and points out two main trends (section 4) in the role of TeleMedicine within the health care services. Section 5 discusses the main factors that could influence the depth and the pace of these trends. The paper starts, in section 2, by setting out, with a definition and a model, an understanding of what is TeleHealth, including TeleMedicine.

Throughout this paper, the terms TeleHealth and TeleMedicine are written as such, that is with a capital "H" and "M". This is to re-emphasise our belief that, within few years, the wide and sophisticated uses of telecommunications in health will be routine, commonplace, and wide-spread – so much that the prefix "Tele" could and would be viewed as superfluous and thus dropped to continue to underline that the objective, and thus the challenge, is Health and Medical Care. This view has been consistently expressed since Africa Telecom 94 [1].

2 TeleHealth and TeleMedicine

This definition of TeleMedicine was formulated and adopted for our own work over six years. It has been accepted and cited in various regional and international fora on the subject [2].

TeleMedicine is the practice of medical care using audio, visual and data communications; this includes medical care delivery, consultation, diagnosis, treatment, education and the transfer of medical data.

By "education", we refer to both the education of the patient and the "continuing education" of the health care staff.

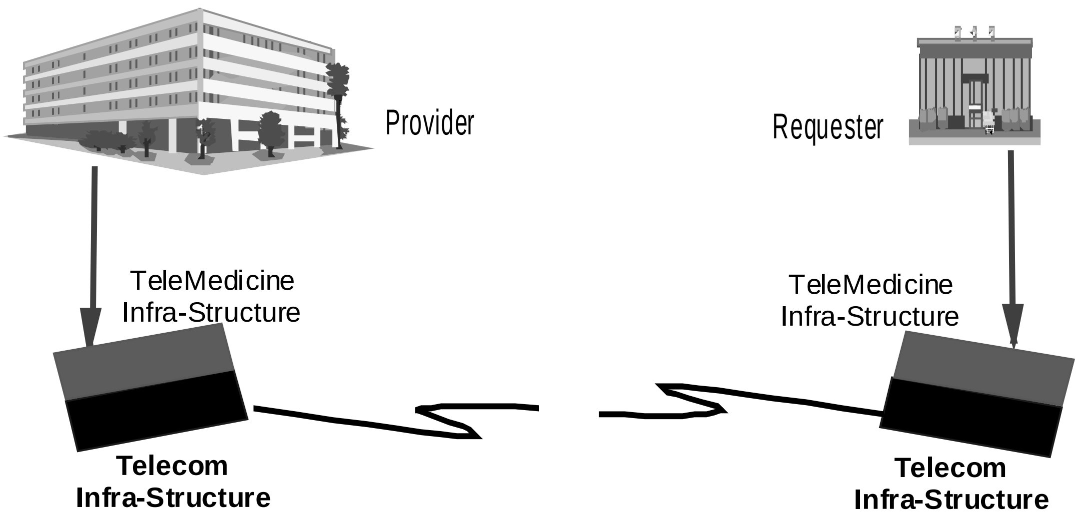
TeleHealth is broader and encompasses *TeleMedicine* and the other uses of telematics support to non-clinical functions such as management, surveillance, literature and access to knowledge.

The *main requisites* of a TeleMedicine service are shown as a simplified model in the figure below. This model applies to TeleMedicine links over any distances, within a nation or between nations. The people who are or form part of each end of the TeleMedicine link, need three main items for such links:

– rules, protocols and procedures;
– a TeleMedicine infrastructure, which interfaces with and rests on;
– a Telecommunications infrastructure.

The *rules, protocols and procedures* are required to guide and govern each aspect and step in the remote exchanges on the professional tasks to be fulfilled. Some on these are common to all telelinks and some are unique to the type of the professional task to be fulfilled. *TeleMedicine infrastructure* is the means by which medical data, including images, charts and sounds, are digitally captured and exchanged between the requester and the provider of the TeleMedicine service. For example, the facility at one end to scan, compress and transmit the image, and at the other end the facility to accurately reproduce it, and to re-transmit back his/her interpretation and comments expressed either on the image, or as a separate report or both. Thus, the TeleMedicine infrastructure could be simple or complex, reasonable or costly, depending on the types of TeleMedicine services to be provided. The *Telecommunications infrastructure* comprises the means to actually carry the content of the two-way communications between the requester and the provider of the TeleMedicine service. That is, it includes the communications medium between the two locations. Such a medium could vary, depending on the TeleMedicine service to be supported. The need could be for narrow or broadband, standard or high-speed telecommunications, depending on the type, volume and accuracy of the data, particularly whether it includes high resolution, dynamic images and voice.

Simple Model of a TeleMedicine Link



The people's issues apart, the technological characteristics that make the difference and thus decide the extent and quality of the medical care supported via TeleMedicine, are the accuracy, versatility and power of the TeleMedicine peripheral equipment and the breadth and speed of the telecommunications media.

3 Experience in TeleMedicine

TeleMedicine services make it possible to extend all sorts of professional, including specialist, services to locations where there are no or sparse services, such as in health centres and hospitals in remote and rural areas. The past five years has witnessed a wide variety of studies and practical tests to verifying the promise of TeleMedicine. So much so that a *momentum of convincing examples, often by other institutions or countries*, is sensed or quoted outright with proposals for the introduction and uses of TeleMedicine. These examples were widely reported [7].

This section briefly highlights the anticipated potential, the outcome and sometimes even the impact of the introduction, development and uses of TeleMedicine, with particular reference to examples from countries of differing levels of economic development and differing national systems of health services. Because the relevant examples in Europe, Japan and North America, has been widely reported [3], the examples quoted throughout the rest of this paper are mostly from the industrially developing countries.

The global experience with TeleHealth/TeleMedicine todate points to a great deal of findings, lessons and issues, of which the following relate to the gist of this paper:

a) The practical experience todate is predominantly in TeleMedicine, and few examples are in the other aspects of TeleHealth, such as TeleSurveillance. An examples of TeleSurveillance is that of the river blindness, or Onchocerciasis Control, Programme covering eleven West African countries [6] where a mix of satellite and Radio Frequency communications was and is used to collect and analyse data to decide on the optimal spray of the disease vector-ridden waters.

b) 75%-80% of the TeleMedicine services todate are being, or could be, provided over offline links. Online links, particularly Video Conferencing, which are relatively much more costly, are not needed for most of the present TeleMedicine work. However, the evolution of telecommunications services and tariffs are pointing towards major drop in multi-media lines.

c) TeleMedicine can contribute to the improvement of the quality and coverage of the health care services in a variety of ways, notably by providing access to remote human experts and costly equipment. Numerous examples [7] are available, of which we would cite a few. South Africa is currently completing the setting up of 28 sites with TeleMedicine links and facilities whereby well-equipped and well-staffed provincial and national referral hospitals would provide expert advice and support to general hospitals or centres, in TeleOpthalmology, TeleUltrasound, TelePathology and TeleRadiology. Tunis cancerologists, particularly those in the Pasteur Institute, Tunis, telelink with their counterparts in Hospital Antoine, Nice, France, to ascertain second opinions on complex cases. General Practitioners in the general hospital of Beira, Mozambique, telelink with and obtain support from expert Radiologists in the capital, Maputo, for the interpretation of radiological images. Similarly, General Practitioners in the general hospitals of the islands of Penghu and Kinmen, telelink with and obtain specialist support from colleagues in the Taiwan University Hospital on the diagnosis and proposed treatment of certain cases. And, Malta has an operational service whereby telelinks enable physicians and other health care professionals to look after the elderly and patients located at home where simple dial-up and vital signs equipment are installed.

d) One of the immediate and measurable impacts of TeleMedicine services is the reduction in unnecessary referrals of patients. The first year of operations of a TeleMedicine service between the 20 November Hospital in Mexico City, and 16 other general hospitals particularly in the less-developed Chiapas region, achieved a 65%-70% reduction in unnecessary referrals. The economic and social premium of this, to both the health care services and the patients and their families, are quite significant.

e) The fact that the same TeleMedicine facilities and links also serve to provide TeleEducation is often a major impetus to the "justification" of a TeleMedicine link. The cost-effectiveness argument here is most pronounced; actual figures indicate that the cost of two doctors attending a few days course abroad, is equivalent to the cost of receiving the course via telematics for the benefit of ten's of other doctors. To this must be added: first, the benefits of the trainees remaining in their own work and cultural environment and, second, the concern that the training content and materials are properly adapted to suit their countries needs, means and methods.

f) The TeleMedicine peripheral equipment can be the largest cost element in a TeleMedicine workstation.

g) The standards needed for TeleMedicine services, within a nation and between nations, are far from being satisfactory. Some standards are generic and some are specific (medico-professional), and include technological standards and standards for procedures and protocols. There is a lot to be learned to establish the most efficient procedures and protocols for TeleMedicine practice – before, during and after the actual TeleConsultation. WHO has, and is expected to play, a major role in availing its technical, global and neutral platform to identify, discuss proposals and reach consensus on such standards.

h) The absence of a formally approved ethical-legal framework for practising health and medical care over a distance is the major hurdle, in some countries, for the move to actual TeleMedicine practice from studies and experimentation with it. In fact, for medical care to be practised, and medical data to flow, over networks (both Intranets and the Internet), these networks must be *legally predictable*. Otherwise, medical transactions and indeed e-business in health care cannot be pursued, or pursued at high risks to breaches of security and confidentiality. The health sector needs to learn from the long-standing e-banking and the recently introduced e-commerce, and to bootstrap itself to some of the tools, means and services that are beginning to emerge that ascertain the authenticity of the parties concerned and the security of the transactions involved. Again, WHO has, and is expected to play, a major role in availing its technical, global and neutral platform to identify, discuss proposals and reach consensus on an ethical-legal framework for TeleMedicine practice within and between nations, and to "represent" the health sector in the ongoing discussions and initial services aimed at the certification of the authenticity of the parties involved in transactions over national and international networks, particularly the Internet.

i) TeleMedicine appear to start adding, in a small way, to cross-border trade in health services [4]. But this is mostly one-way and its growth is greatly slowed down by the long-standing issues of inter-country and inter-state Licensing of medical practice. Furthermore, the same countries (e.g. Saudi Arabia) that started with TeleMedicine services as a means of obtaining and paying for "expert second opinions" from abroad (mostly from USA university hospitals), are shifting gear and rightly introducing a National TeleMedicine Network, to provide within the country support to general, remote and lesser staffed or equipped hospitals and health centres and to strengthen and deliver their continuing medical education programmes.

4 The Cross-road

It is important to stress that we are not suggesting that deploying TeleHealth should be a priority over facing the basic causes of ill health, namely poverty, poor sanitation, lack of clean water and basic nutrition. The resources required to eliminate the basic causes of ill health are of a much higher scale than the resources required to deploy and take advantage of TeleHealth. If the necessary scale of resources can be availed, then eliminating the basic causes of ill health is the undisputed priority. In the meantime, relatively smaller investment in TeleHealth can contribute towards equitable access to quality health care.

In section (3) above, we discussed how it has been demonstrated again and again that TeleMedicine is a tool and a means by which professional and expert services may be provided to remote, under-served areas; the uses and value of existing resources may be optimised; improved population coverage of health services may be achieved; continuous education may be more cost-effectively provided to large numbers and sparsely located health staff.

The key point is that such a "tool and means" is giving rise to some major thinking within the health sector as to the potential extent to which TeleHealth, particularly TeleMedicine, could influence the health care services – particularly its coverage, quality and costs. *There are two main views* – hence our referring to it as a crossroad.

One view stresses that TeleHealth is to be used to support the provision of the health care services as presently and traditionally delivered. In other words, the current paradigm of health services is maintained, and TeleHealth is merely an improved support for improving the coverage, quality and cost-effectiveness.

The other view maintains that TeleHealth is the trigger and the actual start of a new paradigm in health services, whereby the relationship of, and interface between, the individual and the health services, are significantly different and whereby the individual (not the state, an institution or a physician) takes a key role in managing his/her health care and well-being. Inherent in this is the admission that the state cannot continue to bear all the management and cost of the health services to its population.

Other views are essentially variations of these two main views, or of the strategy of implementation.

Whichever view is maintained, it is substantive enough to dictate or greatly influence the policy and strategy, particularly at a National level, for the introduction and broad implementation of TeleHealth. The first view, that is maintaining the present paradigm in health services and utilising TeleHealth to makes these better, faster and possibly less costly, could essentially mean an evolution of TeleHealth similar to that of computing support to health care institutions: with minimal overall guidance and standards, each health institution decides, on its own, the breadth and depth of its introduction and uses of these support tools. The role of the consumer is unchanged.

The second view, that is the start of a new paradigm in health services, could essentially mean a re-definition of the respective role of the consumer, of the health/medical professional, of the health care institution, and of the state, whereby the consumer maintains his/her own medical record or even a whole personal health information system, including routine access to relevant knowledge bases and links to those who professionally maintain his/her well-being. Protocols and other standards, that are much more rigorous than at present, will be required to ascertain the flow and extraction of summary, aggregated and other information for national and international uses, e.g. surveillance and research.

Since the second view appears to be far-fetched for many of the industrially developing countries, they would, de facto, continue to maintain the first view, and face the cross-road at a later stage. However, it is a fact that all the communications improvements in these countries, over the past five years, had been modern and digital; and many of these countries already appreciate the need for a national infrastructure of computing, networking and communications services. If the health care community and consumers want it, and are ready, the infrastructure is not far-fetched.

5 The Main Factors

This section cites and briefly discusses the main factors that are shaping the cross-road and would influence the ability and pace of going through it. The order in which the main factors are cited in this section is not significant. It is also not suggested that all these factors apply at a country level; some of these influence, or are influenced by the institutional level of the TeleMedicine links.

5.1 Health Care Coverage-Quality versus Costs

A recent years' phenomenon is that the costs of health care have been spiralling so much that governments, which bore the major burden of managing and funding the health care services and related insurance schemes, are unable to meet the full expectations, requirements and demands of its population. Consequently, in the industrially developed countries, this resulted in a significant reduction in the health insurance coverage by governments. And, in the industrially developing countries, particularly the poorest where the health care services have been mainly "free", this resulted in a significant decline to the scope and quality of the health care services, and in the initiation of differing forms of health insurance – at least for certain sectors of the population, e.g. the employed.

Thus, the health sector, in nearly all countries, is facing two demands that appear to be contradictory: first, to provide equitable access to quality health care services and, second, to reduce, or at least control, the increasing costs of health care services. It is the health sector's dichotomy. One of the initial measures that may be taken to alleviate the above is to seek to optimise the uses and productivity of existing resources – professional staff, health care institutions, expensive equipment, etc. This is in favour of TeleMedicine. On the reverse side, there is some concern, which is leading to hesitation, which stalls the introduction or expansion of TeleMedicine links. In some of the relatively well-off regions of some countries, there is a growing concern that TeleMedicine links would promote revenues to the urban and specialist centres away from rural/ remote centres. This points to the need for an equitable, controllable payment system for TeleMedicine services.

Hence a main factor is: the extent to which it can be clearly established that TeleMedicine would measurably reduce the gap inherent in the health sector dichotomy, that is the gap between the population demands for better and more health services and the available resources.

5.2 Health Care Reform

The "reform" of the health sector is an international phenomenon in both the rich and poor countries, and it is ongoing. The underlying objective of such reform can be expressed threefold: equity in the population access to the health care services; improved quality of the services; and controlled costs. TeleHealth would influence some aspects of each of these three underlying objectives. Managed Care is one of the methods to control health care costs, and may be thought of schemes a direct outcome of the recognition of the impossibility to continue to expect governments to fully fund quality health care for all its population.

5.2.1 Health Insurance

A general trend of the health sector reform in most countries, where health care was heavily subsidised or free, is the move towards some form of “health insurance”. This includes many developing countries. The traditional health insurance schemes and policies do not honour claims for services provided via TeleMedicine. “Managed Care” is the generic term referring to systems which integrate the funding and the delivery of health care through contracts with selected physicians and hospitals, linked with health insurance companies to provide health care to enrolled participants for a pre-determined annual premium [8]. Managed Care is a direct outcome of the recognition of the impossibility to continue to expect governments to fully fund quality health care for all its population. Differing forms of Managed Care have become popular in many of the industrially developed countries, and is making in-roads in several Asian and Latin American countries, and in Egypt and South Africa. Where these are being conceived, TeleMedicine is one of the means used and should be covered by the health insurance scheme. *Hence a main factor is:* the extent to which care via TeleMedicine would be a refundable service.

5.2.2 Administrative chores

The technological infrastructure for TeleMedicine could also be used to support several other health care administrative functions, such as scheduling and re-scheduling patients visits, laboratory tests, and medical record keeping and updating. *Hence the main factor:* the extent to which an added value can be demonstrated particularly in improving the efficiency and costs of other administrative chores.

5.2.3 The Individual Health Record

Traditionally, the health record of an individual was kept by, and in, his/her General Physician cabinet, or the health centre in which the individual is registered. But, this practice has proved quite inadequate and not reliable or foolproof. Partly computerised records are an improvement but still suffer from the lack of a fully functional system that ensures a reliable maintenance of the health record including when the individual’s care have had to be provided elsewhere – emergencies, travel, patient “shopping for better care”, etc. Some of the time-wasting and costly chores in the health care services relate to the importance of tracking and maintaining data and information from, about and for the individual patient. A TeleMedicine transaction would requires existing data, and generates data, that normally held in the relevant individual medical record. The present-day TeleMedicine transactions are not directly related to the relevant Medical Record System. *Hence a main factor is:* the extent to which the TeleMedicine links and transactions are conceived and implemented such that they would also update the relevant individual medical record and thus partly alleviate the financial costs and delays.

5.2.4 Surveillance

It is a fact that a large percentage of the budget for “health information” in many developing countries, particularly the poorest, is consumed in collecting raw statistics, analysing these and producing annual national health statistics reports, including the calculation of some important indicators used for surveillance and planning, and international reporting and comparisons. There is a strong need for better and optimal uses of the limited budgets for “health information”, and an even stronger need for better ways of achieving the same surveillance results. For example, sampling instead of routine collecting from all centres and hospitals. Another example is the use of “Remote Sensing” for the surveillance of water-born and crop-born diseases. *Hence a main factor is:* the extent to which the telematics infrastructure for TeleMedicine could be used for key, and traditionally costly, information-related functions such as Surveillance.

5.3 Access to Knowledge and Information

Internationally accessible networks increasingly have sources of health care, including professional, expert, medical knowledge and information. In particular, the Internet is indeed the richest source of health and medical information and/or references to these. TeleMedicine links are primarily means of accessing knowledge and know-how. Without appearing to question or crouch over the freedom of expression and liberal principles, that are inherent in the foundation of the Internet, a cautious attitude needs to be adopted regarding the “content” of the health and medical knowledge-based systems accessible over the Internet. There is a significant increase in these and a correspondingly significant increase in those systems that do not spell out the source(s) of the “knowledge” they contain, how was it vetted, by whom and when? A strong case could be made for an international consensus on simple rules that govern the posting of such knowledge bases on internationally accessible networks, such as the mighty Internet. *Hence a main factor is:* the extent to which the consumers become confident that the knowledge-based systems, accessible over international networks particularly the Internet, have been properly vetted.

5.4 Education and Training

As remarked in § 3 e) above, TeleMedicine links double up to support TeleEducation. Indeed, some TeleMedicine links were basically justified because of the added value of TeleEducation. A totally different, but relevant extra is that students and trainees prefer to study in their own environments and countries so as to avoid the problems of licensure and re-certification of qualifications. A growing volume of a wide variety of educational and training courses are beginning to be available via direct, two-way TeleMedicine links, and many are also broadcast over the Internet. TeleMedicine links enable a lecturer or trainer to deliver a lecture or a training course, with the aid of images, to any number of remotely located "students", scattered over a campus, city, nation or the world. Our TeleMedicine experience, based on work with and for several countries, has shown that, invariably, the users requirements for TeleMedicine services and facilities include a significant portion of Distance Learning, or TeleEducation, particularly for Continuing Medical Education (CME). This can be quite significant because of the value of CME and the fact that, in some countries, CME is a compulsory requirement for re-licensure of medical practice. *Hence a main factor is:* the extent to which the TeleMedicine services are coupled with availing TeleEducation for CME.

5.5 Health Info-Structures

The term "health info-structures" is used to briefly refer to "health information infrastructures". These are essentially the networks – Intranets and the Internet – and the servers, and the knowledge and data bases which support national and international transactions and the flow of related (health) information. As pointed out some three years ago [4, 5], and as further confirmed since then, the demands for TeleMedicine prompts the development of networks where these did not exist before. There is a steady growth of pockets of networks, which begin to link to each other and grow with the demands and contributions of its principle partners, thus leading to a sure evolution of logical Regional and Global Health Info-Structures superimposed over the physical Internet and other networks. For example, SADC is the Southern African Development Community which comprise of 12 countries, many of which have full-connectivity to the Internet and a few have started TeleMedicine links. It is no wonder that SADC considers that it is time to think in terms of a SADC TeleMedicine Network.

5.5.1 Globalisation

It is merely academic at present to question whether the current "globalisation" phenomenon is the cause or the result of global communications. It is a reality whose full consequences are not yet fathomed, but one can already live and sense some of its fascinating outcomes. We believe that national "info-structures" will develop, and a high-speed, global "info-structure", able to support all sorts of multi-media information and transactions, will be a reality within five years. This is confirmed by the tremendous political agreements on liberalisation of the telecom services and on the importance, the obligation and the right of each country to contribute to, and benefit from, the global info-structure. Health will be a major presence, and a "user" of the physical global info-structure which can be referred to as a Global Health Info-Structure. *Hence a main factor is:* the extent to which a country, or even a community or a professional group believes in, and take concrete steps to adapt its systems and methods to take advantage of the inevitable and soon-to-be Global Health Info-Structure.

5.5.2 The Internet

Apart from the main factor cited in § 5.3 above, there is at least one other factor relating to the Internet. The Internet is the prominent example of the telecommunications "dramatic improvements", as stated in section 1 of this paper. It is a juggernaut that is propelling the world into meaningful communications between those who never did or those who communicated little because of cost; into accesses to sources of information and know-how that were beyond reach; into treasures of significant and insignificant information; into trading partnerships between hitherto unlikely partners; into a level of democracy that was hitherto thought beyond this millennium; into professional collaboration that may lead to minimum levels of equity or, at least, opportunity. *Hence a main factor is:* the extent to which the health sector, possibly cultivating the global, neutral platform of WHO, is able to agree on standards and methods to ascertain the legal predictability of Internet-based transactions, including verification of the authenticity of the parties concerned and the security of the transactions involved.

5.5.3 Tariffs

Our experience when participating with representatives of ministries of health in consultations with the national Telecommunications authorities and operators, is that when it comes to the health care services, they are particularly flexible and encouraging. But, the tariffs and costs of the telecommunication services are relatively very high in the poorest, industrially developing countries. That makes it an important consideration and a key impediment to usefully cultivating Telematics in Health. *Hence a main factor is:* the extent to which the tariffs and costs of networking and telecommunications could drop down, to almost nothing, to make major national and international uses, such as TeleMedicine, affordable by the health sector.

5.6 Seeds for Cross-Border Trade

Up to 1995, trade in TeleMedicine was viewed as entirely within the industrially developed countries, and that cross-border trade was entirely between an industrially developed and a developing country. However, the past two to three years witnessed the start of such trade within and between a few developing countries.

Given that telecommunications in health, and particularly TeleMedicine, can be valuable and are thus desirable to establish in certain health care settings, a demand is building up for technical services for the conception, specifications, acquisition and installation of TeleMedicine services. Some countries are beginning to convert their TeleMedicine technical expertise into an export earning.

Hence a main factor is: the extent to which the long-standing issues of inter-country and inter-state Licensing of medical practice, are resolved.

5.7 Norms and Standards

Data definitions and coding schemes need to be agreed by the TeleMedicine partners, together with minimum measures for the Security and Confidentiality of the medical data and medical transactions. Whereas the developments in the computing, networking and telecommunications technologies appear to have achieved secure encryption of data, secure networks and secure interim network nodes, a great deal needs to be invested in informing and assuring the public of the measures available and imposed. This aspect is not only detrimental to international in TeleMedicine, but to most uses of telecommunications in individual health care.

The adoption of basically common Protocols and Procedures for similar health or medical tasks or transactions, will greatly contribute to the quality and efficiency of rendering a TeleMedicine service.

A growth industry is booming around TeleMedicine, especially for the development of digitised peripheral medical devices and their interfaces to the computing and telecommunications environment. In absence of publicly declared specifications of the necessary standards for such peripheral devices, some speedy developments have placed in the market some ad hoc, non-standard devices and their interfaces. Despite progress in recent years, the lack of standards in peripheral medical equipment remains a technical and a cost problem.

Hence a main factor is: the extent to which the Norms and Standards relating to TeleMedicine and to the networks supporting TeleMedicine links, will be resolved particularly those relating to security and confidentiality of medical data and medical transactions, and the establishment of a foolproof international scheme for the certification of the authenticity of the parties involved in transactions over national and international networks, particularly the Internet.

5.8 Ethical-Legal Considerations

TeleMedicine introduces a departure from a health care practice that is as old as time: the face-to-face encounter between the healer and the sick. Whereas, technically, there may be no difference between the tele-encounter and the face-to-face encounter, and putting the psychological aspects apart, some ethical and legal questions remain. For example, those concerning the respective responsibilities of the managers, users and intended beneficiaries and in particular of the provider and recipient of the TeleMedicine services.

Nearly all aspects of the health professions, in virtually every country, are regulated by a system of laws and regulations intended to safeguard the interests and concerns of the health care consumers and to protect the profession and its individual practitioners. A substantial proportion of the existing legislation is geared only to the hospital setting. The legislation gaps or obstacles that hinder the progress in reaping the benefits of informatics and telematics in health, including

TeleMedicine services, need to be addressed soon – at the national and international levels.

Hence a main factor is: the extent to which the basic laws and regulations for the uses of telecommunications in health, particularly TeleMedicine, can be formulated and passed at national and international levels.

6 An Epilogue, in conclusion

A traditional, but understandable, issue is the reaction to the thought of introducing "high technology" into a poor or industrially developing community. A long-standing argument is that "high tech" in medical care mostly leads to cost increases or to improvements in the non-primary health care services that is to the services of those who are already served. This is also being said, by some, about TeleMedicine. It is a mistake to compare a TeleMedicine link for a rural health centre with the installation of, say, an MRI facility in a city hospital, because of their respective difference in scope and overall impact on the health services.

The traditional attitude towards high technology in health care must be replaced by an open approach to seek feasible, affordable and effective solutions regardless of the level of technology. We firmly believe that the poorest countries' recourse to the informatics and telematics technology is not a luxury. It is they who need it the most so as to bridge the development gaps which they would not be able to do with their existing or conventional technologies [5].

Clearly, TeleMedicine with all its bells and whistles, is a long way away from a village where clean drinking water and basic sanitation are the key causes of ill health. TeleMedicine services in such circumstances are not advocated here. The key messages in this chapter is that there are several ills with the health services in developing countries that can be cost-effectively improved with a careful application of telematics in health. Supporting a general practitioner in a remote and rural area to serve his/her community better. Alleviating the pains and costs of patients and members of their families being unnecessarily "referred" from one health care site to another. If that is viewed as "a new paradigm in health care" or not, does not matter. What matters is to boldly give a chance to a departure from methods and services that are clearly failing to deliver to expectations. TeleMedicine is a venture into a world that we do not fully know but in which we can foresee significant progress towards equitable access to quality medical care.

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[7] *"TeleMedicine and Developing Countries"*, A Report of an ITU Study Group, Rapporteur David Wright, reproduced in the *Journal of Telemedicine and Telecare*, volume 4, suppl.2, 1998, pp 1-88.

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Biography

Dr Salah Mandil is, since 1991, the Director-Advisor on Health Informatics & Telematics (HIT), World Health Organization, Geneva, Switzerland. His responsibilities are: the support to WHO Member Countries in health informatics and telematics, including TeleHealth/TeleMedicine; the international role of WHO in HIT which includes collaboration with a network of collaborating centres of excellence; and the liaison with the informatics and telematics industry on the needs for, and uses of, norms, standards and new IT products and technologies in the health sector. In this capacity, he directed, and personally contributed to, the WHO support to over many countries on the policy, strategy, design and implementation of their National Health Information Systems and Networks, particularly the health care management information systems and the introduction and uses of TeleMedicine.

Prior to his current position, Dr Mandil was the Director of the WHO division of Information Systems Support, in which capacity (1979-91), he led and directed the design and implementation of major WHO informatics systems, and the WHO Local and Wide Area Networks. Before joining WHO, Dr Mandil was the Team Leader, Data Base Technology, I.B.M. (UK) Scientific Centre. Dr Mandil did his under and post-graduate university studies in the United Kingdom, and has a Ph.D. in Computer Science.

Dr. Isao NAKAJIMA, M.D., Ph.D.
Associate Professor,
Emergency Medical Service Centre
Tokai University School of Medecine
(Japan)

TDS.4

The future of telemedicine implementation

1 Objective

The objective of this paper is to identify problems that could obstruct implementation of telemedicine in the future, and to suggest ways to resolve these problems.

2 Existing problems

2.1 Difficulties involved in promoting communications between medical facilities

Medical facilities participating in telemedicine test projects are not using communication channels reserved for such exchange at the anticipated rate. These communications channels are designed exclusively for teleconsultation and teleconferences. However, hospitals that have traditionally resolved problems without external help rarely find the need to communicate with other institutions. Past cases demonstrate that telecommunications service providers cannot expect hospitals to increase communications with other hospitals by supplying them with telephone circuits based on the goals and desires of the telecommunications service providers.

Many hospitals have a star-shaped network of public telephone circuits. Patients, medical suppliers, doctors, nurses, and support facilities radiate from the hospital in such networks. Meanwhile, communi-cations networks that connect medical facilities do so on a point-to-point basis, connecting only several stations (hospitals). Calls occur far less often with this type of networks. Many past projects for increasing communications among medical facilities have failed to produce good results because they ignored call occurrence rates and the network topology.

2.2 Uncooperative clinicians

Uncooperative doctors represent the most significant obstacle to telemedicine. Doctors in urban areas and busy clinicians show a strong tendency to refuse to cooperate. One study found adherence to self-opinion increased in the following order – servicemen, paramedics, nurses, then medical doctors. That is, doctors were the least cooperative. Past cases suggest that telemedicine projects led by military officers advance smoothly, but those directed by doctors always end up running into problems.

2.3 Absence of high-speed circuits

High-speed digital circuits (public circuits) such as those used for the integrated services digital network (ISDN) are indispensable for transmitting X-ray pictures and images used for diagnosis. However, they are still unavailable in developing countries. Even in industrialized nations, such circuits have yet to reach remote rural regions, and where they are found, they are very expensive. It is difficult for medical institutions to foot such bills. There are only two ways to secure high-speed circuits. Countries can solve the problem by adopting universal service, the system established by the U.S. Federal Communications Commission (FCC). Alternately, they can reserve special circuits for exclusive medical (or educational) use. Future implementation of telemedicine is difficult because both courses of action require huge investments.

3 Analysis and proposals

3.1 Scenario for realizing successful communications among medical institutions

3.1.1 Medical communication and its characteristics

Satellite-based communications services have only been able to connect major stations on different continents on a point-to-point basis. Even companies like Motorola and NEC have never networked very small aperture terminals (VSATs) in a way that allows dynamic topologies over time. Communications among medical facilities have the following characteristics, which must be kept in mind when we select circuit designs:

1) small-scale radio stations;
2) low numbers of calls;
3) call concentrations within specific periods (for example, the hours before noon);
4) dispersion of a large number of stations over a wide area;
5) relatively small data volumes;
6) demand spike following emergencies.

3.1.2 Barriers to the promotion of communications among medical institutions

Medical doctors dislike the concept of teleconsultation for a number of reasons.

They popularly attribute their aversion to the following three factors:

1) insufficient image quality for diagnosis;
2) lack of time for teleconsultation;
3) personal policies against teleconsultation.

These three factors have acted as barriers to telemedicine, especially communication among medical facilities. Medical institutions in urban areas provide medical treatment of higher levels. They also maintain high walls. Meanwhile, medical institutions in remote rural regions tend to be more open to exchange. These tendencies exist because:

1) people who work in medical services want to unite experts for economic reasons; and
2) doctors working in the countryside and remote areas take a stronger interest in advanced medicine, because information is hard to come by.

I believe telemedicine projects have a better chance of succeeding in locales such as remote rural areas, isolated islands, and developing nations, rather than in urban areas. Generally speaking, urban hospitals demand circuits that offer greater speed and diagnostic images of higher quality. Demand for circuit speed and picture quality fall in rural locations. It is not easy to offer mutual consultation services to medical facilities in Tokyo, because they demand that service providers transmit Super High Definition (SHD) images via gigabit circuits. In one successful test case, Kyoto Prefectural University of Medicine exchanged SHD pictures with the affiliated Yosanoumi Hospital using asynchronous transfer mode (ATM) circuits (at speeds of 156 Mbit/s) (Figure 1). In the North Pacific, the Pacific Basin Medical Association and Western Pacific Health Net is using teleconsultation on patient transfers that rely on analog circuits and modems transferring pictures taken by digital camera and uploaded by PCs. This network provides information and helps to answer questions at the Hawaii Tripler Medical Center’s website operated by the U.S. Army.

3.2 Requirements for successful teleconsultation

3.2.1 Second-opinion centers

Clinicians in urban areas and medical specialists who provide consultation have virtually no time to spare. This is the second factor obstructing successful implementation of teleconsultation. Hospitals can reduce clinician responsibilities by establishing a new department in charge of teleconsultation. Picture-based medical diagnosis employing X-rays, computerized tomography (CT) and magnetic resonance imaging (MRI) is already provided commercially in Japan using ISDN circuits and the store-and-forward data-transfer system. This is an extremely cost-effective and efficient system in cases where patients can wait about 24 hours for diagnosis. Let me give an example. Secom, a Tokyo security service company, operates a second-opinion center profitably by hiring only five radiologists and asking them to examine 60,000 pictures a year for diagnosis. Forty-seven local (prefectural) governments in Japan are now operating their second-opinion centers only for emergency services. These centers provide diagnoses based on electrocardiograms transmitted via analog circuits. People engaged in emergency medical service determine whether to send patients to hospitals in ambulances, and how to transport patients from one emergency hospital to another, based on their diagnoses. In my opinion, the success or failure of teleconsultation depends on the "presence of a second-opinion center and its isolation from general clinical service" and "efficient provision of high-level diagnosis."

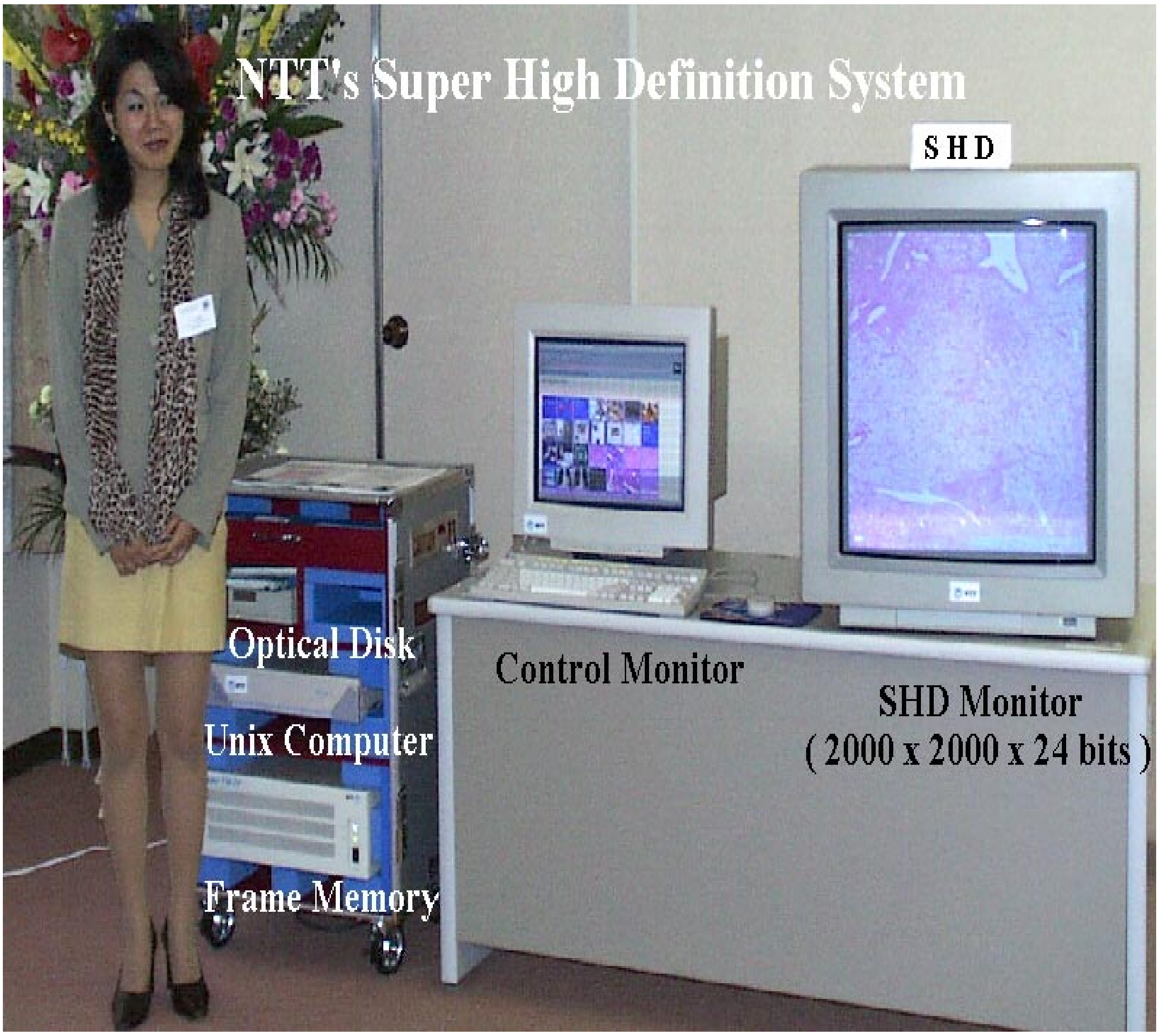

Figure 1 – NTT's SHD system

3.2.2 *Proposal barring hiring uncooperative doctors*

Many clinicians are unwilling to cooperate in telemedicine projects. Resolving this problem is extremely difficult under present conditions. Medical doctors have diverse personal opinions and policies, with many not even recognizing the need for teleconsultation. Many are computerphobic and have no experience with computers. These people have never used videophones or gone onto the Internet. They belong to the past. People have long allowed them to justify their backwardness by saying that they became doctors to treat patients, not to use computers. In my view, more than half of the physicians practicing around the world today can be considered to be computer-illiterate. This must change. Computer illiteracy is a serious problem. The only solution is to teach computer use slowly. Medical treatment depends entirely on data such as clinical histories, inspection records, and X-ray images. Medical doctors must realize that computerization of their routines is inevitable to help reduce medical expenses and raising the efficiency of social systems.

I believe facilities whose teleconsultation reply rates are low should be excluded from the reduced communications expenses universal service enables when implemented. I think the measure will act as an extremely effective penalty. For example, this penalty will increase annual public circuit expenses by 3 million U.S. dollars (about 300 million yen) for the 1,000-bed Tokai University Hospital. I came up with the figure by assuming that universal service reduces costs by 90 percent. I think medical institutions that hire uncooperative doctors should be penalized; they *should* pay higher communications expenses. Hospitals can reduces costs by choosing not to hire such physicians. I would like to add that people who cannot share their information with others should not become clinicians. Our information-oriented society cannot allow such doctors to practice.

3.3 Separate satellites and separate circuits

3.3.1 Examination of economic factors

Telemedicine requires significant communications expenses. High cost is another factor obstructing the successful implementation of telemedicine. There are only two ways to reduce communications expenses: The first is to adopt universal service. The second is to provide separate circuits for telemedicine. The only nation that has already established universal service is the U.S. The only way for other countries to realize telemedicine at low cost is to reserve circuits exclusively for the service. Let me illustrate this point with examples. In the South Pacific, people who call domestic numbers can reduce telephone charges 88 percent by using separate satellite (PanAmSAT) circuits. Likewise, international callers in the North Pacific can lower their costs 33 percent by using satellite circuits. In my view, the sum of hardware and other initial expenses and running costs (communication expenses) is appropriate for economic evaluation. Separate circuits become cheaper as communication rates increase. Separate satellite circuits are clearly more economical for telemedicine providers who require broadcast capacity and who wish to handle diagnostic pictures.

3.3.2 Concrete designs for teaching nursing essentials and public hygiene

Providing pictures using CD-ROMs, videotapes, and the Internet has limits. It is difficult for us to control our own education. Compulsory attendance drives most schools. Classroom-type instruction is an extremely effective education method, because it allows many people to discuss a common topic and to listen to diverse opinions. Real-time instruction allows participants to share not just knowledge, but their personal impressions, allowing a balanced information exchange between people involved in public hygiene in remote rural areas and on isolated islands and people in urban areas, and maintaining uniformity in epidemiological research. Figure 2 shows how to design classroom-type programs for instruction involving public hygiene and nursing essentials, and how to broadcast such instruction real time by satellite-hookup. It is essential for broadcasters to give viewers a chance to ask questions and hear answers. They must ensure that viewers adequately comprehend programs, and perceive information as flowing in both directions.

3.3.3 Concrete designs for facilitat-ing communications among medical facilities than the Internet

A combination of cellular phones, microwave equipment, and specially-reserved satellite circuits is effective for communications among medical facilities located in remote rural areas and on isolated islands. I illustrated this proposal in Figure 3. Microwaves can only cover communications within line-of-sight distance – about 20 km to 40 km. Therefore, the system relays microwaves in a serial manner. Communications failure does not occur because digital data is used.

Satellite circuits are effective for communications with medical institutions located more than 200 km away. This system is based on a star-shaped network. I propose it for communications among medical facilities in developing nations. The system enables hospitals in rural towns and villages without an adequate number of telephone lines to provide medical service around the clock by supplying physicians, nurses, and other medical workers with cellular phones.

4 Examination

4.1 Effective use of media other

The number of Internet users continues to increase at a remarkable rate all over the world. Teleconsultation is already available on the Internet. For example, physicians in North Pacific islands centering on the U.S. Associated Pacific Islands (USAPI) offer consultation services to patients at a jointly-maintained website. However, as Figure 4 shows, the volume of data that travels the worldwide web is three times greater than data reaching destinations on a point-to-point basis. Teleconsultation costs more per bit when the service is provided on the Net. Accessing the Internet for teleconsultation is not a practical option for medical workers in remote rural areas, because it generally takes a lot of time to transmit data using a public circuit. For example, it took one such doctor 42 minutes to transmit a diagnostic chest X-ray using a 19.2-kbit/s modem.

Table 1 lists some of the factors that prevent the Internet from becoming a popular telemedicine medium. The Internet is not the only medium for telemedicine. I believe integration of the Internet with real-time transmission is indispensable for promoting communication among medical institutions.

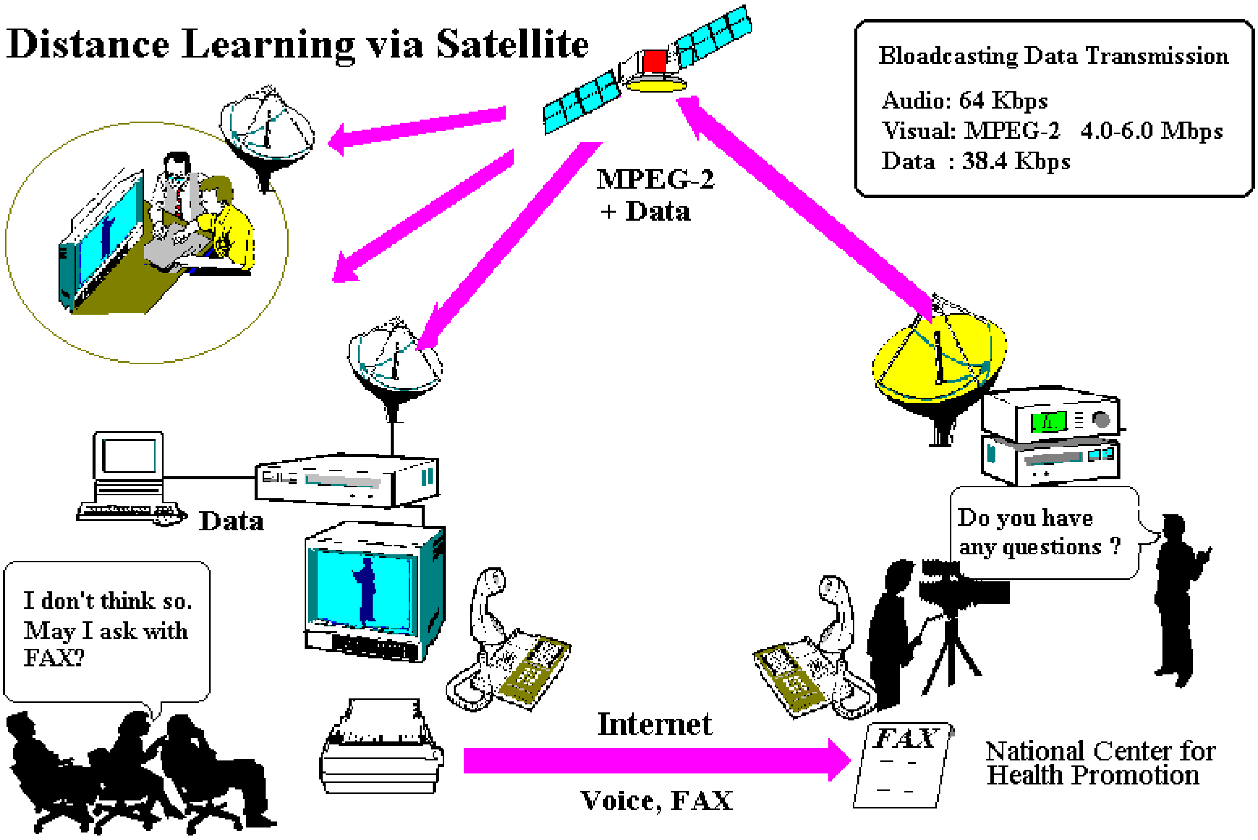

Figure 2 – A satellite-based distance learning system for public health and for assisting people with data handicaps

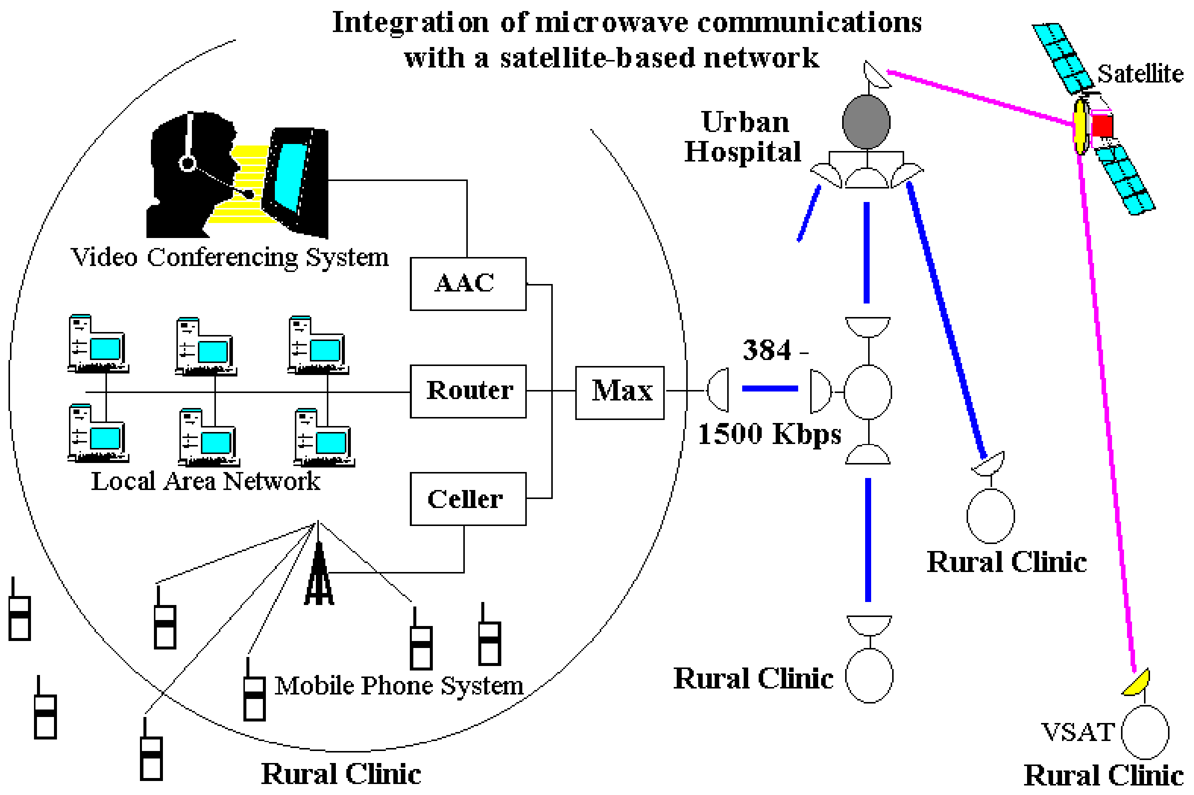

Figure 3 – Integration of microwave communications with a satellite-based network

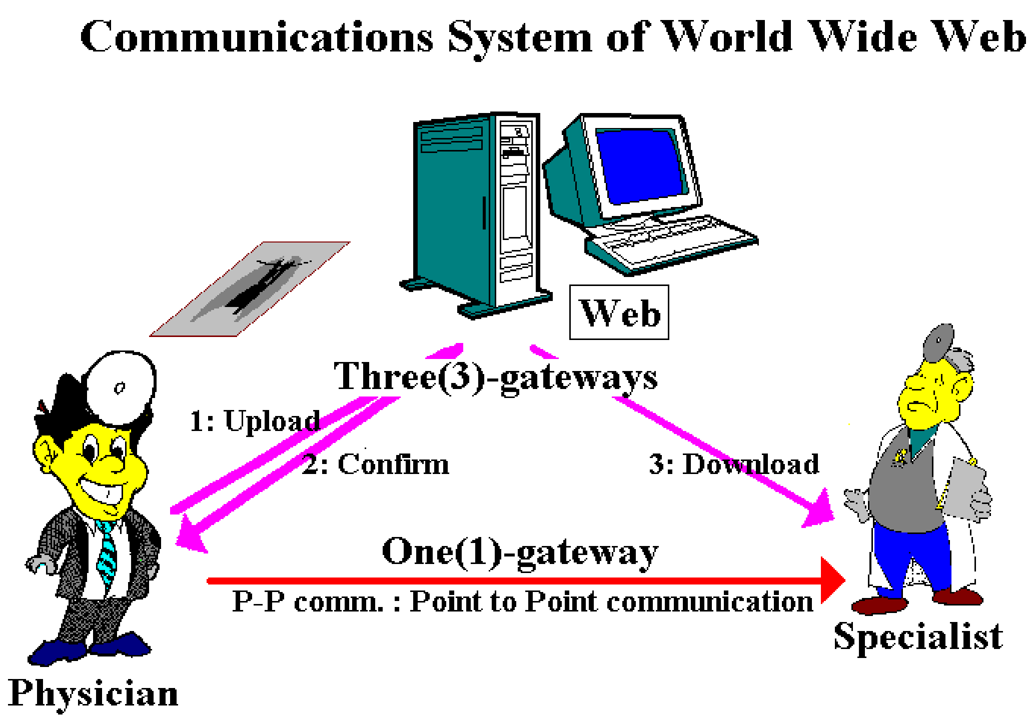

Figure 4 – Problems presented by the Internet Worldwide Web (Gateway)

Table 1 – Commentary on World Wide Web for Telemedicine

1)	Currently, over 50% of doctors and medical staff are effectively computer illiterate.
2)	There is no established framework of laws and regulations governing telemedicine practices across national borders and boundaries.
3)	Funding bodies and organizations have yet to evaluate the net value of telemedicine.
4)	Clinical diagnoses and operational evaluations pertaining to the image quality of X-rays which are captured with digital camera and compressed with JPEG or to delays in diagnosis and/or triage of emergency patients caused by store and forward data transmission have yet to be conducted.
5)	The current telecommunication infrastructure in developing countries hinders the introduction of telemedicine, by forcing reliance on available telephone lines and low data speed.
6)	Telecommunication fees for remote/rural areas and isolated islands are high. The current system (i.e., "Universal Service Obligation") should be looked into or renegotiated by ITU-D, since telecommunication fees are outside the jurisdiction and scope of responsibility of Medical fee.

4.3 Provision of assistance to people with data handicaps

I asked the ITU-D and the WHO to assist with high-resolution broadcasts designed to teach nursing and public hygiene essentials to residents of remote rural regions and isolated islands, who do not know how to use computers. Medical doctors lead and influence national medical policies. However, telemedicine does not belong to doctors alone. Until now, telemedicine projects have assisted experiments performed by wealthy physicians. From now, I believe the ITU-D and the WHO must assist people with data handicaps and individuals who support them through telemedicine projects. People with data handicaps include health nurses working in isolated islands, young people unaware of the terrible consequences of AIDS, islanders unable to keep up with rapid dietary changes, those with mental or physical handicaps experiencing discrimination, and those who support activities for the handicapped in small communities. The ITU-D and the WHO should help them in ways in which computers and the Internet cannot.

I believe these two international organizations should offer programs that explain preventive medicine, support activities for nursing at home, explain the risks of fast food, and support activities for the handicapped and women in a plain manner to computer illiterates as quickly as possible. In so doing, the two organizations must remember to shoulder responsibilities such as content production, and bear burdens such as connection fees:

1) Public hygiene programs:
   - AIDS education programs designed for young people;
   - programs warning against diabetes;
2) nutritional programs:
   - programs warning against diabetes;
   - programs for preventing high-blood pressure and heart disease;
3) programs designed for resolving various problems within communities.

Cases of discrimination against people performing certain jobs, violation of the basic rights of women, and discrimination against the handicapped tend to emerge more often in remote rural regions and on isolated islands. To prevent these cases, the small communities must procure programs designed to resolve misunderstandings. I believe they also need programs that explain psychological care for victimized individuals.

4.3 Provision of assistance to programs designed for training telemedicine specialists

Telemedicine test projects have been undertaken by many nations. However, there remain only a few specialists or individuals who can act as core project members. I think the lack of capable personnel explains the premature termination of most projects. Education and personnel recruitment are two of the most important preconditions for telemedicine. They hold the key to "successful" implementation of telemedicine. I believe telemedicine requires promotional experts, software application specialists, instructors in charge of doctors and nurses, and telemedicine courses for training such instructors at ITU collaboration centers or universities. We cannot implement telemedicine without a sufficient number of capable workers.

4.4 Ultimate decisions by patients

Public administrators wish to increase communication among medical institutions in order to make medical service more efficient. On this particular point, patients do not necessarily agree. They find it preferable to see doctors face to face. They remain unaware of the nature of direct patient care (DPC) using communications circuits and teleconsultation. They don't know whether these are good or not. It must ultimately be the patients who determine whether to use telemedicine. We must leave them room to make their decision. Doctors and public administrators should not force telemedicine upon patients, DPC in particular. DPC must be provided at the request of the patient. I would like to add before closing that communications service providers remember this: Patients are not computers. They are human beings with emotions.

5 Acknowledgments

This paper owes a significant debt to instruction provided by Dr. Kiyoshi Kurokawa, the Dean of Tokai University School of Medical, Dr. Tsukasa Ashihara, Professor of Kyoto Prefectural University of Medicine, Dr. Yoshihiro Takashima of the International Medical Center of Japan, Mr. Teisuke Inagaki of NTT, Mr. Yasuhiro Hoshino of NEC, and Mr. Hiroshi Juzoji of Telemedicine Society of Japan. I would like to acknowledge their assistance.

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Biography

Isao Nakajima, M.D., Ph.D, Associate Prof. at Tokai University School of Medicine, he was born at Tokyo in 1953, received his M.D. degree from Tokai Univ. in 1980 and Ph.D. in 1987. He had finished a chief resident of the general surgery in 1986, and have studied and developped telemedicine since 1983, have conducted Asia Pacific Medical Network using ETS-5 satellite, AMINE / PARTNRS project. He is an invited senior researcher at the Communications Reseach Laboratory of the Ministry of Posts and Telecommunications Japan, an invited staff of WETS project of NASDA, a short term consultant of WHO-WPRO on TeleHealth, a member of the ATA, APEC-IMCP, IEEE, AIAA.

Mr. Renato CORTINOVIS
ITU/BDT/HRD
(International Telecommunication Union (ITU))

TDS.4

The ITU virtual training center

The ITU Virtual Training Center is a training center offering its services **on-line**, or in other words a training center on the Information Highway.

The ITU developed this service in the framework of its activities aimed at **fostering the use of information technologies** in the telecommunication training-sector, mainly in developing countries.

Services offered include:

- world-wide virtual-classes tutored by top-class experts,
- access to multimedia training material,
- distance consultancy services,
- access to information – e.g. about commercial material and courses available or service providers.

The paradigm of the VTC is **on-line learning**, suitably complemented and reinforced by alternative mechanisms as needed. Therefore, it makes use of:

- asynchronous conferencing,
- standalone CBT,
- real-time teleconferencing supported by inexpensive technological solutions,
- traditional face-to-face activities.

A large number of courses/activities are available in the VTC, on a variety of subjects, including:

- technical areas such as telephony, data networks or mobile telecommunications;
- soft-skills areas such as communication skills, negotiation skills, and specific mannagement skills.

We have already successfully experimented these activities in a multi-cultural environment all over the world. Here are a few concrete up-to-date examples:

- multiple delivery of very successful distance learning courses on Spectrum Management via the Internet, to regulatory organisations and operators in Latin America and Asia;
- multiple delivery of distance learning courses via the Internet on modern distance learning methodologies, to telecom organisations in Asia and Arab States;
- electronic forums on subjects such as Marketing of Telecommunications services, Quality in Telecommunications, Fixed Wireless Access, Business Plan Development.

In our experience:

- The flexibility of these virtual courses permits the participation of key persons (including tutors and students), who wouldn't normally be available for traditional face to face activities, due to other commitments.
- As a side effect of these virtual courses, many participants – frequently including tutors and experts – discover the tremendous potential of these new forms of communication. This is having a concrete impact on the personal and effectiveness of the participants and their organizations.

- We have records demonstrating that these courses sparked-off genuine and permanent collaborations among different organizations, even among operators and regulators in the same Country!

We are currently developing/organising/offering additional Technology-Based Training courses (multimedia standalone and online) in partnerships with external service and content providers.

Our challenge is the further expansion of these activities. The key to further expansion is to establish and maintain reliable contacts with co-ordinators of these activities in each ITU or sector member organisation. I hope you will help us!

The ITU Virtual Training Center paves the way to other complementary and synergetic initiatives, including the ITU Global Telecommunication University/global Telecommunication Training Institute and the Centers of Excellence initiative.

Available at: http://www.itu.int/VTC

Biography

Mr. Renato Cortinovis is currently working with ITU in the HRD Unit of the BDT, where he is responsible for activities related to the use of information technologies in training. He has post-graduate degrees in computing and education and a background rooted in I.T. research and development.

PALEXPO **DEV.2**

Tuesday, 12 October 1999	09:00 - 12:30

Dev.2	Universal Access: how to make it happen

Chairperson	**Prof. Jean-Pierre CHAMOUX,** *Professor,* Université du Havre (France)
Keynote Speakers	**H.E. Mrs. Oulématou Ascofare TAMBOURA,** *Minister of Communication,* Ministry of Communication (Mali) **Mr. Noah A. SAMARA,** *Chairman and Chief Executive Officer* WorldSpace Management Corporation (U.S.A.)
Presentations	**Mr. José Leite PEREIRA-FILHO,** *Counsellor,* ANATEL (Brazil)
Strategy to provide Universal Access in Developing Countries	**Mr. Gustavo Peña QUIÑONES,** *General Coordinator,* Telecommunication Regulation Commission(Colombia)
Market Trend and Technology for Access Networks to realize Universal Access in Developing Countries	**Mr. Paul BERKOWITZ,** *Vice President,* Product Planning, UTStarcom (U.S.A.) Co-author: **Mr. Takuya IWAKAMI,** *Senior Manager,* Overseas Transmission Network Systems Division, NEC Corporation (Japan)
Mechanisms for promoting tele-density in liberalised emerging markets	**Mr. Graham JOHNSON,** *Senior Consultant,* Telecoms Consultancy Analysis Ltd. (United Kingdom) Co-authors: **Mr. Andy DYMOND**, Intelecon Research and Consultancy Ltd (United Kingdom) **Mr. Lam Leong KIEN,** Analysys Ltd (United Kingdom)

The positive Impact of Universal Access on the Rural Population: Chile, Two Years Later	**Mr. Bascur MATURANA,** *Former General Manager,* Global Village Telecom (Chile)
Development Flexible Network by Internet oriented switches	**Mr. Harry TAKEICHI,** *General Manager,* Integrated Systems Division, Telecommunication Network Systems Group, Fujitsu Limited (Japan)

Published

Attainment of Universal Access/Service by the South African Telecommunications Regulatory Authority through regulation in the public interest and using the bill of rights (181)	**Mr. Myron ZLOTNICK,** *Company Legal Adviser,* Office of the CEO, M-WEB Limited (South Africa)
The access bottleneck: The broken link to provisioning high speed internet access in Latin America	**Mr. Hector HERNANDEZ,** *Research Manager,* Telecoms Advisory Services, Pyramid Research-The Economist Intelligence Unit (United States) (1481)
Advantages and Possibilities of Virtual Telephony(1130)	**Mr. Michael GULLEDGE,** *Vice President,* Marketing and Applications Engineering, Glenayre (U.S.A.)
Compatibilización del Servicio Universal con la Apertura del Servicio de Telecomunicaciones (1419)	**Sr. Guido Loayza MARIACA,** Ingeniero en Telecomunicaciones, Superintendencia de Telecomunicaciones (Bolivia)
Universal service: a hope for Africa in the new millennium (240)	**Mr. Muriuki MUREITHI,** *Director,* Summit Strategies (Kenya)

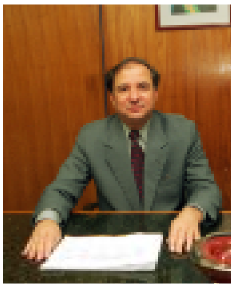
PALEXPO # DEV.2

Tuesday, 12 October 1999	09:00 - 12:30

Dev.2	Universal Access: how to make it happen

The trend of globalization of economies around the world threatens to increase the gap between those who have access to information services and those who are, for different reasons, deprived of this access. It has been already quite generally acknowledged that the universal access should not only cover basic telephony services but also basic data services and Internet. Therefore the universal access to the so-called basic telecommunication services has become a priority issue for policy makers and regulators in almost every country. Even in the most developed countries with relatively high average teledensities, this question remains an important political and socio-economic issue.

The speakers in this session will present various alternatives how to make the basic telecommunication services accessible to all sections of population in a geographical area or an entire country.They will also discuss ways how to make universal access happen in a fast and economical way in the context of the universal phenomenon of de-monopolization, privatization and competition.



Dr. José Leite PEREIRA-FILHO
Member of the Board of Directors
ANATEL – National Telecommunications Agency
(Brazil)

DEV.2

How can developing countries obtain universal access in a privatization scenario

1 Introduction

In the recent past, most countries, including developed and developing economies, believed that the best way to provide telecommunication services was by means of monopolist operators, either private or public. Strong telecommunication providers working on the basis of monopolies were considered indispensable to enforce national targets of universal access.

In the nineties, Governments worldwide faced a new reality created by the technological developments and the globalization of the world economy. Developed economies realized that present business dynamics increasingly demands larger access to the growing information economy. Huge monopolistic telecommunication operators were no more able to efficiently provide the necessary telecommunications means. Developing countries had to adhere to these new views even though the stages of their infrastructure and service provision were quite different.

This paper focuses on the measures taken by the Brazilian Administration to obtain Universal Access after privatization. Universalization of telecommunication services is part of the objectives envisaged by the model adopted by Brazil in the reform of its telecommunications sector. This model is summarized in the next topic.

2 Telecommunications Sector Reform in Brazil

The first step in the reform was the submission to the National Congress of an amendment to the Constitution. Public telecommunication services (services available to the general public) could only be provided directly by Government or companies having the Brazilian State as their major shareholder. This proposal was sent to the Congress in January 1995 and approved in August that same year.

A new law for the Brazilian telecommunications sector, aligned with the new constitutional amendment and based on the directives established in several documents, was submitted to Congress in December 1996. Following intense debates and discussions with the several segments of the Brazilian society, the General Telecommunications Law was enacted and sanctioned by the Head of State on 16 July 1997. In addition to establishing a new telecommunications model, the law defined the rules for privatization of Telebrás, holder of twenty-eight state-owned companies. All these companies were privatized on 29 July 1998.

The law is divided into four sections, called books. The first, with seven articles, deals with fundamental principles. The second, with 52 articles, contains provisions for the organization of ANATEL – National Telecommunications Agency – intended to enjoy the maximum degree of independence allowed under the Brazilian Constitution. Book III, having 126 articles, provides for the organization of the telecommunication services. The final book, with 21 articles, disposes on the restructuring and privatization of Telebrás. In addition to the books, the General Telecommunications Law contains ten articles with general and transitory provisions.

The Telecommunications sector reform in Brazil was designed to achieve five major objectives:

1) strengthen the regulatory role of the State and eliminate its role as an entrepreneur;
2) increase the offer and improve the quality of telecommunication services;
3) in a competitive environment, create opportunities that draw in investments and foster technological and industrial development;
4) provide conditions so that the sector development be consistent with the country's goals for social development; and
5) maximize the sale value of state-owned telecommunication companies without prejudicing the foregoing objectives.

To achieve targets 2), 3) and 4), the model relies on two basic principles: Competition and Universal Access.

Competition in the Cellular Telephone Service, as it happened in practically all countries, preceded that in the fixed service. The Brazilian territory was divided into ten operational areas for the cellular service, as illustrated in Figure 1. In each area there are two operators, one in band A and the other in band B. Licenses in band A are held by operators resultant from the privatization of the Telebrás system. Those in band B are held by new operators, who compete with the old state-owned monopolistic companies. The first license in band B was given in April 1998. The latest band B license, for Area 8, was granted in October 1998.

It is relevant to emphasize that the cellular telephone operators, in both bands A and B, are expanding their networks very fast. Until December 1999, according to estimations, the total number of accesses may reach the level of around 12.6 millions (see Figure 2). The actual number of accesses, in June 1999, was around 10 millions.

The band B operators are quickly getting important shares of the cellular telephone market, as for instance BCP S/A, a band B operator in the city of São Paulo. From the signature of the contract, in April 1998, until June 1999, it succeeded in getting more than 45% of the market in that big city (around 17 millions inhabitants). It is also worthwhile to mention that consumers are having important benefits. The tariffs practiced by most operators are below the maximum values authorized by ANATEL (see Figure 3).

Competition in the public switched fixed telephone service is already allowed in Brazil. For the local service, it will be a reality from the end of year 1999, when the new operators will have a minimum of infrastructure to run for competition. In the regional long distance service, since 3 July 1999, consumers can choose between the national and the regional operators, both sprang from the privatization of the Telebrás system. For each telephone call, subscribers have the opportunity to select the carrier.

Having recognized that the establishment of competition in the fixed services is difficult, especially in the local service and in the presence of a dominant operator, the Law created a legal framework allowing for the existence of asymmetric regulation.

Service providers can be regulated differently depending on the juridical regime under which they are operating. Operators in the public regime are granted a concession contract with an expiration date, are subject to universalization and continuity obligations and are also subject to tariff regulation. On the other hand, private regime operators are granted authorizations with no expiration dates, are not subject to universalization or continuity obligations and can set their prices as they see to better fit the market.

The country was divided into Regions I, II and III. The three regions have great growth potentiality and are roughly similar in terms of GDP. The Telebrás companies were grouped under four holdings: one for each of the three regions and a fourth for the company in charge of national and international long distance services. These operators are in the public regime and therefore have been granted concessions.

According to the General Telecommunications Law, immediately after privatization, on 29 July 1998, ANATEL initiated the process to select competitors with those incumbents derived from the Telebrás system. These competitors hold licenses to provide the same scope of services as the current operators – hence, the name "mirror companies". These operators are in the private regime and therefore are granted authorizations. In addition to the advantage inherent to the private regime, the mirror companies were given a significant advantage against their counterparts. The authorization includes radiospectrum frequencies to install a fixed wireless local loop network. Incumbents, on the other hand, have restricted access to such resource; they can only use this technology in towns with less than 50,000 inhabitants, or in those not included in the business plans of the mirror companies.

Thus, for each of the Regions an authorization to operate local and intra-regional long distance services has been granted. At the national level, an authorization to operate national and international long distance services was awarded. This means, from the consumer's point of view, that he will be able to choose between two operators for his local service, among four operators for intra-regional long distance (the regional incumbent, the long distance national and international incumbent, and their two mirror companies), and between two operators for the inter-regional and the international long distance services.

In 2002, the sector will be opened to everyone who is interested in participating. If the incumbents fulfill all their universalization obligations of year-end 2003 before that date, they will be allowed to compete nationally and provide international long distance. The same applies to the mirror companies if they fulfill their obligations set for year-end 2002.

In June 1999, the bidding process to choose the mirror company for Region II was on the way. For the other two regions and for the long distance national and international license, the mirror companies had already been selected and the relevant contracts signed. These companies have ambitious contractual targets to be met until the end of 1999, as well as for years 2000 and 2001. The situation of incumbents and mirror companies is presented hereafter.

CELLULAR TELEPHONE AREAS

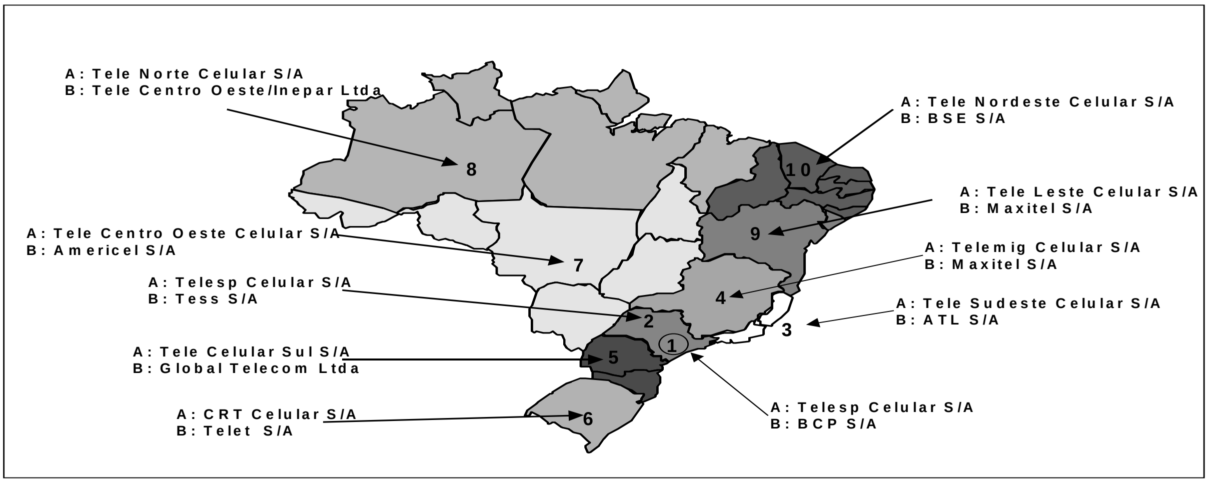


Figure 1

CELLULAR TELEPHONE ACCESSES

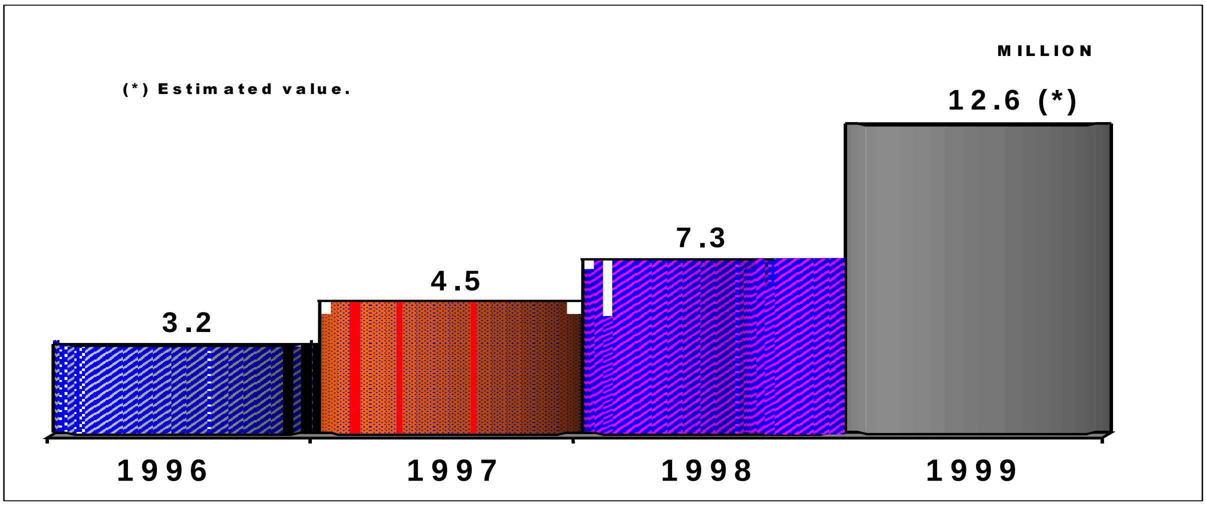


Figure 2

CELLULAR TELEPHONE TARIFFS

AREA	OPERATOR	REFERENCE BASKET (R$)		REDUCTION (%)
		MAXIMUM	PRACTICED	
AREA 1	TSP	84.43	80.21	5.0
	BCP	82.43	78.89	4.3
AREA 3	TRJ	87.15	71.33	18.2
	ATL	59.69	59.02	1.1
AREA 7	TDF	73.26	57.97	20.8
	AMERICEL	54.41	53.04	2.6

Figure 3

A Long Distance National and International

- Incumbent: Embratel S/A
- Mirror: Bonari Holding Ltda

B Local and long distance regional

REGION I

- Incumbent: Tele Norte Leste (Telemar) Participações S/A
- Mirror: Canbrá Telefônica S/A

REGION II

- Incumbent: Tele Centro Sul Participações S/A
- Mirror: unknown

REGION III

- Incumbent: Telesp Participações S/A
- Mirror: Megatel do Brasil S/A

Figure 4 presents the three Regions and their present incumbents and mirror companies.

Although competition is still in the beginning, the number of installed fixed telephone accesses in Brazil has significantly increased (see Figure 5). Since privatization, in July 1998, until June 1999, 4 millions additional telephone accesses were installed. It is worthwhile to mention that the maximum number of accesses installed by Telebrás in one year was around 2 millions.

In the first year after privatization, the country teledensity increased from 12.2%, in July 1998, to 14.5%, in June 1999. This represents an extraordinary yearly growth of 2.3%, which can be favorably compared with the best results obtained in other countries. In case the estimated value for 2001 (teledensity of 25.2%) becomes a reality, this will represent an extraordinary growth of 3.71% per year in the first three years after privatization.

Until December 2001, the total number of fixed accesses is foreseen to reach the level of at least 42.5 millions, being 33 millions under contractual responsibilities of the incumbents. The estimation for the number of accesses to be installed by the mirror companies is 9.5 millions, representing 22.3% of the market share in only two years of operation.

Bonari Holding Ltda, the mirror company for the national and international long distance service, plans to install, until 2002, a fiber optical network of 15,000 kilometers (9,320 miles) to cover the most populated areas. Seven earth stations will provide satellite communications for the Northern and Western regions of Brazil, to cover less populated areas. Until December 1999, 38 cities will be interconnected to the system and 3,500 kilometers (2,175 miles) of fiber optical will be installed.

Similarly to the cellular telephone, fixed service subscribers will soon benefit from decrease in prices. Some of the tariffs were already reduced after approval of the General Telecommunications Law and consequent decision to privatize Telebrás. Installation fee of the subscriber terminal was drastically reduced, as illustrated in Figure 6.

3 Universal Access before Privatization

In developing and developed economies, it was intensely discussed whether the privatization process would put the provision of universal access under pressure. Many were very much concerned on whether private companies seeking profits would be able to provide the necessary infrastructure to remote areas or to make advanced telecommunications available to all or only to a “happy few” that could afford it.

FIXED TELEPHONE SERVICE

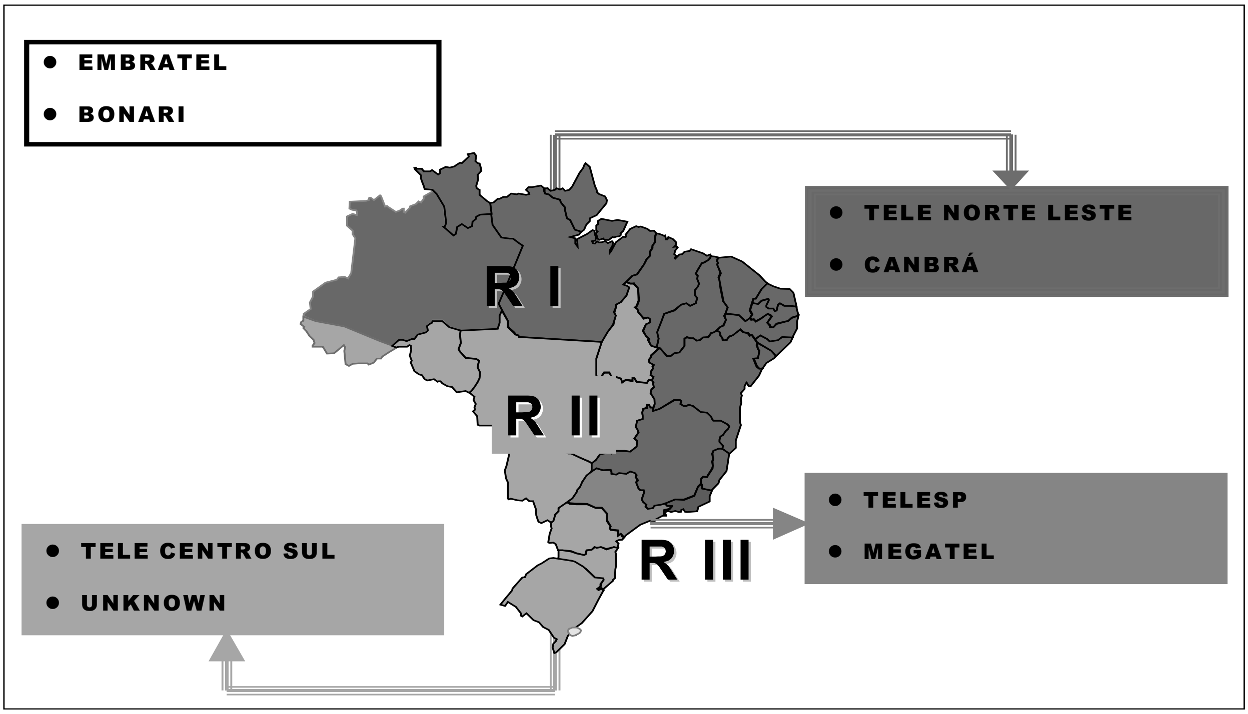


Figure 4

FIXED TELEPHONE ACCESSES

Million

		1994	Jul.1998	Jun.1999	2001
BRAZIL	INCUMBENTS	14.7	19.6	23.6	33.0 (*)
	MIRROR COMPANIES	------	------	------	9.5 (*)
	TOTAL	14.7	19.6	23.6	42.5
	DENSITY	8.7%	12.2%	14.5%	25.2%

(*) Estimated values

Figure 5

FIXED TELEPHONE INSTALLATION FEE

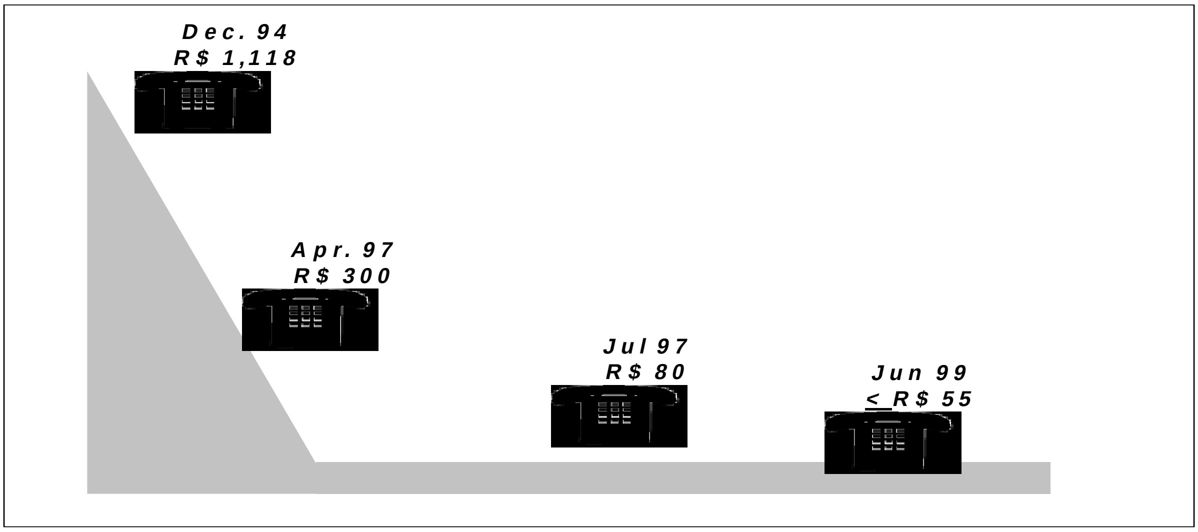


Figure 6

Developed countries had already obtained universal access of basic telephone services. Therefore, they needed only to design a framework to sustain universal access. Developing countries, on the contrary, should design a framework to create universal access. As a matter of fact, the existence of this dichotomy was somehow overlooked in studies related to universal access in developing countries.

Brazil is a good example to illustrate the situation of most developing economies with respect to universal access. Telebrás, the state monopolistic company, created in 1972, was able to increase the number of telephone accesses in 400% between 1976 and 1996. However, the demand of the service, in this same period, was much higher. The local service demand increased in 900% and the long distance in 1,700%. But even more serious than this latent incapacity to cope with the demand, was the very poor distribution of the telephone lines. Around 98% of the existing telephone accesses attended only 43% of the Brazilian families.

4 The Brazilian Strategy to obtain Universal Access

The importance of access to telecommunication services for the development of the economy and of society is unquestionable. A telecommunications sector capable of meeting the demand for those services in an efficient and effective manner is a key-tool of Government, not only to meet its goals for the sector, but also to enforce other economic and social development policies.

In Brazil, the reform of the telecommunications sector aims primarily at ensuring the expansion of the telephone network, allowing the sector to meet the demand for telecommunication services within reasonable and homogeneous conditions all over the country. The reform also aims to reduce existing regional disparities, in order to promote greater social equilibrium, and to contribute to the development of the poor areas in the country. Therefore, any plan to achieve universal access of telecommunication services in Brazil should aim not only at speeding up the delivery of such services to those consumers acknowledged as economically profitable, but also at making them available in rural areas or in areas of precarious urban conditions, as well as in faraway areas, to public and private institutions and to disabled individuals.

The Brazilian strategy to create universal access after privatization is very simple and straightforward. Before privatization, a concession contract was signed with each company of the Telebrás system. These contracts are very comprehensive and contain all kinds of rights and obligations for both parts, the User and the Concessionaire. Among the several contractual obligations, the concessionaires must comply with the targets established by the first *Brazilian Universal Access Plan*. Evidently such heavy obligations resulted in substantial reduction of the market prices of the companies. In practice, the Brazilian Administration has paid to private operators the necessary costs to obtain universal access. In despite of that, the revenue of privatization of the Telebrás companies reached the impressive amount of 19 billions US dollars considered the biggest telecommunications privatization in the world in 1998.

Together with the above-mentioned obligations, a project of law to create the *Universal Access Fund* was submitted to the National Congress. Similarly to the solution adopted by most developed and developing economies, the major contributors to this fund will be the telecommunication operators. The objective of this fund is to provide the necessary resources to make much more than the basic telephone service available to all.

5 The Brazilian Universal Access Plan

The first *Brazilian Universal Access Plan* establishes obligations to the incumbent companies, derived from the Telebrás system. It contains a quite extensive set of targets for the public switched fixed telephone network. The plan sets obligations for the expansion of two types of accesses: individual telephone and public payphones. In addition to the expansion targets, the plan establishes priorities and obligations with respect to the following special consumers: schools, hospitals, handicapped persons and public emergency entities. The main plan targets are summarized hereafter.

5.1 Targets for Individual Telephone

The main mechanism to reach expansion of the fixed telephone network is competition. However, before a competition environment is fully achieved, the incumbents shall comply with the targets below for individual public switched fixed telephone network. These targets include the promotion of services at schools and health institutions, access to emergency services and service delivery to disabled people. Furthermore, priority access will be granted free of charge to emergency services, such as police, fire squad, civil defense and paramedic services.

5.1.1 Period 1999 - 2001

From 31st December 1999, priority in service delivery will be attributed to regular learning and health institutions. They will benefit of computer network connection, as well as access to information by electronic means. The maximum waiting time for these services should be one week.

In order to enable hearing and speech disabled persons to communicate, access to telecommunication services shall be extended to them as from 31st December 1999.

In 1999, 2000 and 2001, the incumbents will have to install, in the areas of their concessions, individual accesses in such an amount that the total number of accesses in the country reaches, respectively, 25.1, 29 and 33 millions. These expansion targets will increase the existing plant in Region I from 7.9 to 14 million accesses, in Region II from 4.9 to 7.9 million accesses and in Region III from 5.6 to 11.1 million accesses.

In addition to the above mentioned expansion targets, all communities having a population of more than 1000 inhabitants shall be served, by 31st December 2001, with individual public switched fixed telephone network.

5.1.2 Period 2002-2005

Instead of quantitative targets for this period, incumbents will have to comply with some minimum waiting times. The maximum waiting time for satisfying service delivery requests shall be four weeks in 2002, three weeks in 2003, two weeks in 2004 and, finally, one week from 1st January 2005. These waiting times are comparable to those of developed countries, and when confronted with the present conditions prevailing in the country, will mean a sensitive change in the standards of delivery of telecommunication services.

In addition to these waiting time targets, all communities having a population of more than 600 and 300 inhabitants should be served, respectively, by 31st December 2003 and 31st December 2005, with individual public switched fixed telephone network. This target aims at making sure that the network expansion also takes place in less populated areas, in those with lesser purchasing power or of more difficult access. Thus, in addition to expanding the amount of localities endowed with access to local telephone services, this target will promote a more balanced social and economic development in the country.

5.2 Targets for Public Payphone

Universal service targets have a primarily social character, aimed at providing access to telecommunications to less privileged people, institutions or localities, or by those with a public interest function. In this first universalization plan, the payphone, as a collective access, was adopted as the major mean to meet the minimum requirements of telecommunication services to the whole population. Furthermore, these targets encompass the extension of telecommunication facilities to educational and health institutions and easy access to emergency services. At least, two percent of the payphones shall be reserved to hearing and speech disabled persons. In what follows the payphone targets are summarized.

5.2.1 Period 1999-2001

In 1999, 2000 and 2001, the incumbents will have to install, in the areas of their concessions, payphone accesses in such an amount that the total number of accesses in the country reaches, respectively, 713.2, 835 and 981.3 thousands.

With regard to regular educational and health institutions, the maximum waiting time for these services shall be eight and four weeks, respectively, in years 2000 and 2001.

Incumbents must ensure that, by December 31st 1999, any person being in an urban area may have 24-hour access to a public payphone located within a range of no more than 800 meters (875 yards). This walking distance shall not exceed 500 meters (545 yards) by 31st December 2001.

In addition to the above expansion targets, all communities having a population of over 1000 inhabitants shall be served, by 31st December 1999, with public payphones. This facility shall be extended to villages with more than 600 inhabitants by 31st December 2001.

5.2.2 Period 2002-2005

By 31st December 2003, the density of public payphones is foreseen to increase from the current 3.3 to, at least, 7.5 telephones per 1000 inhabitants. This density is expected to increase to 8 by December 2005. There are requirements to ensure that these densities be reached in a uniform manner in all the 26 States of the Brazilian federation and the Federal District, aiming at eliminating present regional unbalances. These targets will ensure that urban areas will have, on the average, one public payphone per block of buildings.

As for regular educational and health institutions, the maximum waiting time for these services shall be two weeks, in year 2002, and one week, in 2004.

Incumbents must ensure that, by December 31st 1999, any person being in an urban area may have a 24-hour access to a public payphone located within a range of no more than 300 meters (328 yards).

In addition to the above expansion targets, all communities having a population of over 300 inhabitants shall be served, by 31st December 2003, with public payphones. This facility shall be extended to hamlets with more than 100 inhabitants by 31st December 2005. The goal is to promote basic telecommunication services to the whole population, irrespective of the size of the district they live in or visit. At present public payphones can be found in over 21,000 localities and the target means have such facility to a total of 46,000.

The main universalization targets described above are summarized in the table of Figure 7. It is worth to call the attention to the most ambitious targets, for both individual and collective accesses.

Among the several targets related to individual telephone access, it is worth to mention the one relative to the increase from 14.7 millions accesses, in 1994, to 33 millions in 2001, that is to say an increase of 124.5% in a space of time of seven years. Another outstanding target is the obligation to offer individual telephone access, after 31st December 2005, to all townships of more than 300 individuals.

Concerning payphones, one of the many targets is the obligation to install this facility, after 31st December 2005, in all townships with more than 100 individuals. This target is probably the most ambitious of the whole Brazilian universalization plan if we take into consideration the huge geographical area of Brazil and its present inadequate and heterogeneous telephone penetration.

6 Conclusions

The present case study testimonies that it is quite possible to obtain universal access in a competitive and private environment. This statement may go further and imply that, in some circumstances, it may be even easier for Administrations to enforce universal access obligations through private operators than by means of a national monopoly.

Several practical recommendations to developing countries may be drawn from the Brazilian experience. It is worth to mention the recommendations below.

First of all, the new Telecommunications Law should adopt universal access as one of its main principles. The law may give autonomy to the Regulatory Authority to establish a Universal Access Plan containing targets to be met by the telecommunication operators.

Secondly, the obligations contained in the Universal Access Plan could be part of the concession contracts to be signed with the telecommunication operators. It is preferable that the concession contracts be signed before privatization, as long as the telecommunication companies are still state-owned. In this way, investors would know exactly which their universalization obligations are.

Finally, in order to assure continuity, the law can also rule on the creation of a Universalization Fund. All operators providing telecommunication services to be used by the public in general could support this fund.

UNIVERSALIZATION TARGETS

TARGETS	UNIT	1999	2001	2003	2005
INDIVIDUAL FIXED ACCESSES	MILLION	25.1	33.0	-----	-----
LOCALITIES WITH INDIVIDUAL FIXED ACCESS	PEOPLE	-----	1000	600	300
PAYPHONE ACCESSES	THOUSAND	713.2	981.3	-----	-----
	PER 1000 INHABITANTS	-----	-----	7.5	8.0
LOCALITIES WITH PAYPHONE	PEOPLE	1000	600	300	100
PAYPHONE DISTRIBUTION	METER	800	500	300	-----

Figure 7

Biography

Dr. Pereira-Filho received the degrees of Doctor of Philosophy (PhD) and Master of Science (MSC) in Electrical Engineering from the Naval Postgraduate School, California, United States of America. He received the Diploma of Telecommunications Engineer from the Catholic University of Rio de Janeiro and the Diploma of Navy Officer from the Brazilian Navy Academy.

He first worked in research and development (R&D) in the Telecommunications Bureau of the Navy in Rio de Janeiro. In the same bureau, he had the opportunity to occupy several posts including Head of the Telecommunications Division and Chief of the Technical Department, where he coordinated the work of around 100 engineers.

From 1987 to 1990 Dr. Pereira-Filho worked in Rio de Janeiro with Embratel, the long-distance telecommunication company in Brazil. He was in charge of the Transmission Division responsible for the operation and maintenance of the whole National terrestrial transmission network.

From January 1990 until November 1997, he held a position of senior engineer, at the level of Counselor, in the Telecommunication Development Bureau (BDT) of the International Telecommunication Union (ITU). Among other activities, he was the BDT Focal Point for the execution at the global level of Programme 4 of the Buenos Aires Action Plan.

Since November 1997, Dr. Pereira-Filho is one of the five Members of the Board of Directors of ANATEL, the Brazilian regulatory body.

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DEV.2

Providing universal access to shared telecommunications and communications services

Estrategia para resolver el acceso universal

Resumen

Se pretende demostrar como se ha tratado de resolver el problema del acceso universal en Colombia, mediante la aplicación de subsidios cruzados en el servicio urbano entre población de altos y bajos ingresos; y en el ámbito rural mediante subsidios entre rutas rentables y no rentables, sin afectar la rentabilidad de las empresas.

En Colombia se han clasificado las viviendas desde el punto de vista de su calidad, indirectamente el ingreso de su propietario, sistema llamado «estratificación». Las viviendas según los ingresos de sus propietarios se clasifican en seis niveles: el 6 el ingreso más elevado y el 1 el más pobre. La estructura tarifaria para ofrecer el servicio de telefonía obliga en cada ciudad a cobrar un sobrecosto en los estratos altos 5 y 6 de hasta el 20%, «contribución» con el fin de subsidiar a la población de los estratos 1, 2 y 3 (conexión y consumo) de dicha ciudad. Así las cosas, se ha logrado un cubrimiento aceptable a la población de bajos ingresos, estratos 1 y 2 de cerca del 17%, población con ingreso de US$ 150 dólares por mes.

En el servicio rural, se permiten subsidios entre rutas rentables de mayor tráfico y rutas no rentables de menor tráfico dentro de un mismo departamento o estado y sin que la empresa respectiva preste el servicio deficitario como un todo. Ejemplo de esto, es el caso de EDATEL empresa de cubrimiento regional en el departamento de Antioquía y de TELECOM en muchos departamentos del país.

1 Introducción

Los países en vía, de desarrollo tienen una seria dificultad para lograr el acceso a los sitios más remotos y sobre todo a las personas cuyos ingresos son realmente bajos. Por esto la solución que ha adoptado Colombia para el servicio universal de telefonía cumple con una fórmula por demás interesante que podría ser aplicada en otros países.

Colombia situada en la región noroccidental de Sudamérica tiene una situación geográfica privilegiada, una gran superficie, 1.141.000 km^2, y una población de 40 millones de habitantes.

En el sector de telecomunicaciones se ha permitido subsidios cruzados con el fin de contribuir a llevar el servicio de telefonía a zonas geográficas de difícil acceso y a un grupo poblacional de muy bajos ingresos, sin restringir el desarrollo del sector y la competencia entre diversos operadores de telecomunicaciones. La población de altos ingresos está sujeta a pagar un costo más elevado por el servicio de telefonía, llamado contribución, mientras que la población de bajos ingresos tiene un subsidio pagado con esa contribución. Por otro lado, en el ámbito rural se permite que las rutas más rentables puedan subsidiar a las rutas menos rentables en las empresas o servicios de telecomunicaciones regionales del país.

2 Subsidios cruzados urbanos

En la prestación del servicio urbano de telefonía, se permite subsidios cruzados entre población de altos ingresos y de bajos ingresos. Con este fin, se han clasificado las viviendas de acuerdo a su calidad, indirectamente del ingreso de su propietario. Este sistema se ha llamado estratificación, las viviendas para el efecto han sido catalogadas en seis niveles, el nivel seis (6) el ingreso mas elevado y el uno (1) el más bajo.

La estructura tarifaria establecida de tiempo atrás permite y obliga en cada ciudad a cobrar un sobrecosto en la prestación del servicio en los estratos 5 y 6 o sea los de ingresos más elevados, hasta del 20% llamado contribución, con el fin de subsidiar a la población localizada en los estratos de ingreso más bajos 1, 2 y 3 en lo relativo a las tarifas por consumo fijo y variable y derechos de conexión. Este sistema permite, dentro de una misma empresa y una sola ciudad, que se crucen ingresos por medio de tarifas entre la población de altos y bajos ingresos en el servicio de telefonía básica.

El siguiente cuadro presenta la forma como opera el sistema de subsidios y contribuciones:

CIUDADES	ESTRATOS	Factura Media US$ / mes	Tráfico - mes minuto/mes	Subsidios y Contribuciones
Bogotá, Medellín, Cali, Barranquilla, Bucaramanga, Cartagena	1 Muy Pobre	$4.39	926	-45.54%
	2 Pobre	$5.47	1,030	-36.66%
	3 Medio Pobre	$9.10	1,224	-7.13%
	4 Medio	$11.78	1,570	0.00%
	5 Medio Alto	$16.74	1,876	20.00%
	6 Alto	$17.86	2,018	23.49%
	Industria &Comercio	$16.87	1,855	33.73%
Otras ciudades	1 Muy Pobre	$4.05	709	-44.42%
	2 Pobre	$5.27	805	-32.72%
	3 Medio Pobre	$7.42	909	-12.61%
	4 Medio	$9.43	1,066	0.00%
	5 Medio Alto	$11.16	1,119	20.79%
	6 Alto	$9.78	957	26.95%
	Industria &Comercio	$14.04	1,352	34.26%

Para efecto de la estructura de costos de cada empresa, la tarifa del estrato 4 se considera que representa la estructura de costos de la misma y los subsidios que se aplican a los estratos 1, 2 y 3 no pueden sobrepasar las contribuciones que generan las tarifas de los estratos 5 y 6.

De esa manera, la factura promedio para viviendas de ingresos altos[1] seis (6), es de 18 US$ por mes, incluyendo un sobrecosto que permite establecer un subsidio a las familias cuyos ingresos son muy bajos (120 US$ por mes) cuya factura promedio es de solamente de 4 US$ por mes. El tráfico que demandan los niveles de ingreso bajos es también relativamente más bajo que el tráfico en los estratos altos.

Los resultados esta estructura son los siguientes:

CIUDADES	ESTRATOS	Cobertura Teléfonos por cada 100 Habitantes	Densidad Teléfonos por cada 100 Viviendas
Bogotá, Medellín, Cali, Barranquilla, Bucaramanga, Cartagena	1 Muy Pobre	6	29
	2 Pobre	19	85
	3 Medio Pobre	28	126
	4 Medio	34	153
	5 Medio Alto	32	147
	6 Alto	42	192
	Subtotal	29	130
Otras ciudades	1 Muy Pobre	2	11
	2 Pobre	7	30
	3 Medio Pobre	18	81
	4 Medio	15	67
	5 Medio Alto	22	102
	6 Alto	27	124
	Subtotal	13	60
TOTAL		**15**	**67**

La mayor parte de la población en las ciudades grandes (Bogotá, Medellín, Cali, Barranquilla, Bucaramanga y Cartagena) corresponde a los estratos 1, 2 y 3, cuyo ingreso en términos generales fluctúa entre 150 y 300 US$ por mes. El cuadro muestra que para los estratos bajos o familias pobres 1, 2 y 3 se ha logrado una cobertura entre 6 y 28 líneas por cada 100 habitantes. Es muy claro que a estos niveles de ingreso la cobertura media lograda, 17 líneas por cada 100 habitantes, es considerada realmente alta y bastante aceptable para un país de las condiciones de desarrollo económico como Colombia.

Por otro lado, en el estrato 6, ingresos altos, y en las ciudades grandes, se ha llegado a una cobertura de 42 líneas por cada 100 habitantes, población que no se ha visto afectada por este sistema aunque tiene que pagar un sobrecosto que contribuye a subsidiar los estratos más pobres. El cuadro muestra la situación a nivel de densidad telefónica (teléfonos por vivienda), logrando cifras del orden de 29 líneas telefónicas por cada 100 viviendas en los niveles más pobres, situación relativamente buena si se consideran los niveles de ingreso tan bajo. En ciudades pequeñas estas coberturas se bajan y en los estratos pobres llegan únicamente a ser de dos líneas por cada 100 habitantes, y la densidad por vivienda correspondiente es de solo 11 líneas por cada 100 viviendas.

[1] El ingreso del estrato 6, alto en Colombia, puede ser del orden de 2000 US$ al mes.

Lo que considero más importante es que las empresas que prestan el servicio de telefonía básica local, no han afectado su estructura de producción rentabilidad, ingresos y gastos, a pesar incluso de la apertura del mercado a la competencia en el servicio local, que vienen afrontando las empresas en Bogotá, Cali, Barranquilla y Bucaramanga.

En conclusión, este sistema de subsidios cruzados «Contribuciones y Subsidios» en el servicio de telefonía urbana permite el acceso al servicio telefónico a familias de ingresos muy bajos (130 US$ por mes), sólo de subsistencia.

3 Subsidios cruzados rurales

En el área rural el asunto se complica considerablemente cuando se habla de extensiones territoriales tan grandes como las de Colombia, 1.142.000 km^2 y se considera que los niveles de ingreso en las zonas rurales son aún más bajos que los niveles de ingresos en las ciudades. Aunque la estructura de «Subsidios y Contribuciones» se aplica también en las zonas rurales, donde las viviendas se han estratificado, no es suficiente para lograr el cubrimiento o servicio universal.

En el servicio regional[2] se permite a las empresas que ofrecen esta clase de cubrimiento un subsidio, de tal forma que puedan cobrar tarifas más elevadas en las rutas de mayor demanda para compensar los sobrecostos en las rutas de menor demanda. Así, no se afectan los resultados agregados de la estructura de costos de las empresas y se logra una transferencia para llevar el servicio de telefonía a las zonas más apartadas dentro de una misma región. El siguiente cuadro muestra el caso de Edatel en Antioquía, región que tiene una alta demanda de tráfico de comunicación en determinadas zonas, que le permite tener unas tarifas ligeramente más altas para poder subsidiar las regiones de tráfico muy bajo.

[2] En Colombia el servicio básico de telefonía se ha clasificado en *local* el que se presta en las ciudades, el *regional* que se presta en los departamentos o estados, y el de la *larga distancia* que ocurre entre departamentos y el exterior.

El cuadro presenta los ingresos en dólares por línea y el número de líneas y la actividad económica de cada región y presenta la estructura de subsidios y contribuciones entre rutas.

	Zona	US$ / Linea	# Líneas	Actividad económica
Contribuy	Uraba	310	41,500	Exportación Banano
	Oriente	290	21,000	Agricultura
	Bajo Cauca	269	18,300	Ganadería, Minería, Pesca
	Nordeste	260	17,300	Minería
	Occidente	241	19,000	Agricultura, Turismo
Subsidiad	Norte	213	21,500	Comercio Leche
	Magdalena Medio	211	14,000	Ganadería, Petróleo
	Suroeste	190	47,300	Café

4 Conclusión

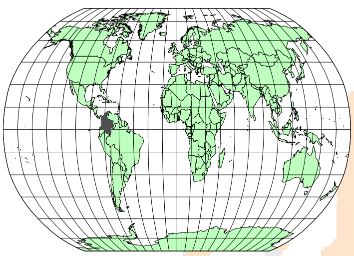
Si bien la extensión y la distribución de la población en Colombia y los niveles de ingreso familiar y personal hacen difícil llevar la telefonía a todas partes y a todos los rincones del país, la estructura de «Subsidios y Contribuciones» en el servicio urbano y rural ha facilitado un principio de solución al acceso universal, que si bien no cumple con los anhelos de todos los colombianos, sí ha permitido niveles aceptables de acceso en las regiones mas apartadas y en los grupos de poblaciones de menores ingresos.

Esta fórmula aplicada en Colombia, con mercado en competencia en todos los servicios de telecomunicaciones, puede ser aplicada en otros países en vías de desarrollo con mucho éxito y sin crear traumatismos en la estructura del mercado de telecomunicaciones. Adicionalmente, Colombia ha adoptado también la creación del Fondo de Telecomunicaciones y ha lanzado uno de los programas más importantes e interesantes de servicio universal, mediante el sistema «Compartel», que esperamos entre en servicio con los recursos de la apertura del servicio a la competencia de larga distancia y las contribuciones del servicio de celulares.

Como lograr el Servicio Universal en Países en Vía de Desarrollo

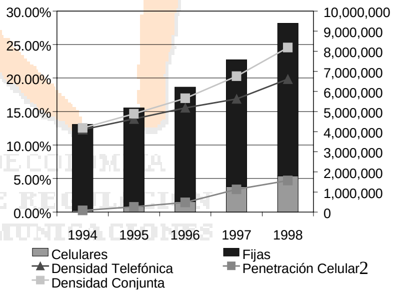
Gustavo Peña Quiñones

COLOMBIA EN EL MUNDO



Sector Telecomunicaciones			
1998	Líneas (k)	Densidad	Operadores
Local	7,593	18.62	40
Móvil	1,800	4.41	6
LD			3
Valor Agregado			164
Televisión			12
Trunking			38
Beeper			120
Radio			1,338

Datos Generales	
Población	40’
Area	1.147k km2
PIB Capita	US $ 2.367



2

Introducción

- Subsidios cruzados no siempre son malos
- En Colombia, se permiten en el servicio urbano de telefonía entre población de altos y bajos ingresos; y en el ámbito rural entre rutas rentables y no rentables; esto sin afectar la rentabilidad ni la estructura de costos de las empresas.

3

Clasificación de Viviendas

Estratos

- Se han clasificado las viviendas de acuerdo con su calidad, indirectamente del ingreso de su propietario, sistema llamado "estratificación".
- Las viviendas para efectos de la prestación de los servicios públicos se clasifican en seis niveles: el 6 el ingreso más elevado y el 1 el más bajo.
- La estructura tarifaría para ofrecer el servicio de telefonía obliga, en cada ciudad, a cobrar un sobrecosto en el servicio en los estratos altos 5 y 6 de hasta el 20%, -contribución- con el fin de subsidiar a la población de los estratos 1, 2 y 3 (tarifas de conexión y consumo fijo y variable).

4

Subsidios y Contribuciones

Urbano

CIUDADES	ESTRATOS	Factura Media US $ / mes	Tráfico - mes minuto/mes	Subsidios y Contribuciones
Bogotá, Medellín, Cali, Barranquilla, Bucaramanga, Cartagena	1 Muy Pobre	$4.39	926	-45.54%
	2 Pobre	$5.47	1,030	-36.66%
	3 Medio Pobre	$9.10	1,224	-7.13%
	4 Medio	$11.78	1,570	0.00%
	5 Medio Alto	$16.74	1,876	20.00%
	6 Alto	$17.86	2,018	23.49%
	Industria &Comercio	$16.87	1,855	33.73%
Otras ciudades	1 Muy Pobre	$4.05	709	-44.42%
	2 Pobre	$5.27	805	-32.72%
	3 Medio Pobre	$7.42	909	-12.61%
	4 Medio	$9.43	1,066	0.00%
	5 Medio Alto	$11.16	1,119	20.79%
	6 Alto	$9.78	957	26.95%
	Industria &Comercio	$14.04	1,352	34.26%

5

Situación

Urbano

CIUDADES	ESTRATOS	Cobertura Teléfonos por cada 100 Habitantes	Densidad Teléfonos por cada 100 Viviendas
Bogotá, Medellín, Cali, Barranquilla, Bucaramanga, Cartagena	1 Muy Pobre	6	29
	2 Pobre	19	85
	3 Medio Pobre	28	126
	4 Medio	34	153
	5 Medio Alto	32	147
	6 Alto	42	192
	Subtotal	29	130
Otras ciudades	1 Muy Pobre	2	11
	2 Pobre	7	30
	3 Medio Pobre	18	81
	4 Medio	15	67
	5 Medio Alto	22	102
	6 Alto	27	124
	Subtotal	13	60
TOTAL		**15**	**67**

6

Cobertura Urbana

Urbano

- Las ciudades grandes poseen cobertura entre 6 y 42 líneas por 100 habitantes, y densidades entre 29 y 190 líneas por cada 100 viviendas
- En ciudades medianas y pequeñas estas cifras fluctúan entre 2 y 27 líneas por 100 Habitantes y entre 11 y 124 líneas por 100 viviendas

7

Conclusión

Urbano

- Se ha logrado un cubrimiento aceptable a la población de bajos ingresos estrato 1 y 2, cuyo ingreso es de solo US$130 dólares por mes del orden de 20 lineas por 100 habitantes en ciudades grandes.
- En ciudades pequeñas de 9 teléfonos por cada 100 habitantes.
- El promedio nacional es superior al de la mayoría de los paises de la región

8

SUBSIDIOS ENTRE RUTAS

RURAL

- Se ha clasificado el servicio de telefonía básica en *Local* en las ciudades, *Regional*, en los departamentos o Estados y de *Larga Distancia* entre departamentos y el exterior.
- En el *Servicio Regional* las empresas, sin afectar los resultados agregados de su estructura de costos, pueden establecer tarifas mas elevadas en las rutas de mayor demanda, que compensen los sobrecostos en las rutas de menor demanda.
- Esto ha permitido llegar a sitios apartados con el servicio de telefonía.

9

Situación Edatel Antioquia

RURAL

	Zona	US $ / Linea	# Líneas	Actividad económica
Contribuyen	Uraba	310	41,500	Exportación Banano
	Oriente	290	21,000	Agricultura
	Bajo Cauca	269	18,300	Ganadería, Minería, Pesca
	Nordeste	260	17,300	Minería
	Occidente	241	19,000	Agricultura, Turismo
Subsidiadas	Norte	213	21,500	Comercio Leche
	Magdalena Medio	211	14,000	Ganadería, Petróleo
	Suroeste	190	47,300	Café

10

Cobertura Rural

RURAL

Total Municipios atendidos	**130**
Total Municipios rentables	45
Total Municipios en Punto Equilibrio	15
Total Municipios deficitarios	60

11

Conclusión

RURAL

- **Si bien la extensión territorial, la distribución de la población y su ingreso hace difícil llevar la telefonía a todas partes, se ha logrado niveles de cobertura superiores a la mayoría de los países de la región. Esta es al menos de una linea telefónica en cada municipio del país.**
- **El reto y el esfuerzo para resolver en el futuro una mejor cobertura, sigue siendo muy grande**

12

Biografía

Ingeniero Civil, Universidad Javeriana, Colombia; MSCE, Purdue University, Estados Unidos.

Integrante del grupo de estudio «Ad Hoc» sobre Tasas Contables, invitación del Secretario General de la UIT; participó como Director Académico en la Primera Conferencia Internacional de Telecomunicaciones CRT, Coordinador General de la CRT en la segunda Conferencia y presidente de la tercera Conferencia.

Publicaciones: «Colombia Ahead on Telecommunications Openning in the World», publicada en Connect World para Latinoamérica; «Internet Red de Redes, Realidad Virtual», Connect World, en prensa.

Desde 1996 Comisionado en la Comisión de Regulación de Telecomunicaciones CRT, y en el año de 1998 fue Coordinador General. Ha sido miembro - Director de varias firmas de consultoría; Asesor del Programa de las Naciones Unidas para el Desarrollo PNUD, asesoró al Alcalde Mayor de Bogotá; Director del Departamento Administrativo de Catastro Distrital; Subdirector de Operaciones de la Corporación Autónoma Regional CAR; Subdirector de Construcciones del Instituto de Desarrollo Urbano de Bogotá; Jefe de la División de Transporte del Departamento Nacional de Planeación.

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DEV.2

Market trend and technology for access networks to realize universal access in developing countries

1 Introduction

As ITU statistics show, unmet demand for basic telephony service is widespread in developing countries [1]. As per capita GDP increases so does demand, thus local exchange carriers ("LECs") are pressured to respond but struggle with the payback interval for network build-out particularly in the area of the geographically dispersed access network.

The exception to this rule is in the area of data services where there is a high-perceived value-addition and end-user willingness to pay. The success of the Internet and frame or cell-mode virtual private networks is stimulating insatiable demand for access at higher and higher bandwidths in urban, residential and business markets even in the developing countries. Coincidentally, voice services delivery architectures have come to rely on deep fiber to the curb or building and V5.2 integrated access nodes strategically located near the data consumer and capable of delivering high bandwidth services.

This paper offers a review and projection of nodal and network convergent architectures for integrated service access and their expected evolution, in the context of developing countries.

2 Telephony service demand In developing countries

Except for lower per capita income levels, the group of 63 countries defined by ITU as "Low Income" is not so different from the developed world when it comes to communications needs. Obviously teledensity is lower in this group; 9% of households in 1996 versus 40% worldwide and 103% in the 50-country high-income group. But this can be deceiving, since in large urban centers household densities were 24% in the ITU low-income group. What is striking, though, is the rapidity with which the developing countries are correcting the shortage situation with aggressive build-out of the network. In China, for example, the network has grown from 12 million to 120 million lines just since 1992. The ongoing annual growth of 20 million lines (including cellular) equals the entire installed base of California.

In these areas the majority of currently installed network is less than 10 years old and what is in place embodies the most modern of digital switching and transmission technologies, and the architectures being deployed are often more advanced than what is installed in the developed markets. *The developing countries are buying the same state-of-the-art equipment as the developed world.* Furthermore, the bulk of network equipment purchases still lie in the future when even more advanced technologies will be available. Of course purchase cost is an issue in the developing world and also scalability. Networks have to be rolled out economically into low subscriber density areas and grow smoothly over time, and yet also be able to serve some of the worlds highest urban population densities.

Since each political administration is interested in promoting telecommunications deployment and universal access, the question is how to make it economically feasible. The answer is to provide high value services to business and affluent residential customers who will willingly bear the basic costs of network infrastructure and generate service provider profits, and to recognize that once the framework for basic services are deployed, the incremental costs for high value services in the same geographic area are minimal when the right architectures are deployed. So, paradoxically, the key to universal service in the developing world is the ability to piggyback basic service on revenue generating advanced services like pay phone, second line, Centrex, CLASS, leased line and Internet access using the most modern equipment.

3 Data service demand in developing countries

Similar to the rest of the world, but even more so, the business sector in developing countries is dominated (in terms of workers and revenues) by small business employing less than 50 workers. A typical office tower is composed of many small office suites – each standing alone as a communications consumer. Each of these possesses an increasing number of desktop PCs that are most efficiently connected by a LAN and, through a router, to the wide area network. For isolated businesses, the primary wide area communications need is for Internet access driven by applications like e-mail and the World Wide Web. Business locations that are branch offices to other sites may require private network access which may be through leased line, Frame Relay ("FR"), Asynchronous Transfer Mode ("ATM") or Internet Protocol ("IP") backbones, the latter using virtual private network techniques.

A second broad segment is small-office-home-office ("SOHO") where solitary workers require voice and Internet access. With similar characteristics to SOHO, the residential data segment, though small in developing countries is growing, fueled by the availability of sub-$500 PCs.

Although both SOHO and small business segments in developing countries rely to a large extent on analog dial-up access today for Internet or other remote access needs, there is strong demand, however, to migrate to services that can support higher speed and always-on connections.

4 Network architecture trend

When describing the public communications network, it is convenient to divide it between *backbone* which supports wide area transmission and switching, and *access* which refers to the network segment between subscriber and backbone.

4.1 Backbone wide area networks

For traditional circuit switched services which encompass the Public Switched Telephone Network ("PSTN") and Integrated Services Digital Network ("ISDN"), the edge vehicle for the backbone network is the local exchange switch ("LE"). The LE extends on one side to the subscriber and on the other to a hierarchy of tandem exchanges that route calls to metropolitan, national and international destinations.

Leased lines are dedicated links between subscriber locations. Today, usually all-digital and offering 64Kbps or Nx64Kbps bandwidths, leased lines are managed by digital cross-connect systems ("DCS") which statically route, aggregate, and protect the leased circuits.

X.25, FR and ATM services use packet/cell switching techniques to establish virtual circuits between subscriber endpoints. In a sense replacing leased lines, these services provide the same privacy and guaranteed bandwidth as leased lines but offer statistical multiplexing of user data with increased efficiency for, typically bursty, data traffic.

Public and private IP services also use packet switching techniques, but unlike virtual circuit services, do not guarantee packet delivery, instead using best-efforts delivery and relying on higher-layer applications to recover lost or delayed packets. The chief advantage of IP is its ubiquity since the Internet reaches virtually everywhere, and the prevalence of IP switching equipment (called the IP Router, "IPR") has driven costs down a steep learning curve.

In order to satisfy rapidly increasing demand for larger communications capacity to support WAN services described above, Gbps region SDH optical transport systems have been widely introduced both in developed and developing countries. The most advanced optical technologies such as dense wavelength division multiplexing ("DWDM"), optical add-drop multiplexing ("OADM") and optical cross-connects/switches will extend this capability into the Tbps region in the near future.

4.2 Access networks

Access to PSTN/ISDN services has traditionally been through copper loops extending between LE and subscriber, but increasingly now the copper emanates from remote electronic terminals located near the subscriber and connected to the LE by fiber optic transmission systems. Known as fiber to the curb ("FTTC") or fiber to the building ("FTTB"), this architecture extends the range that can be addressed by a single LE and makes it possible to serve a region with a few large LEs at lower cost than if many small copper-bound LEs were used .

Historically the remote terminals were provided by the LE vendors using proprietary interfaces to the LE, but the trend has shifted to the ITU-T standard V5.2 protocol [2] which allows interoperability between vendor A's remote terminal (called by ITU-T: the Access Node, "AN") and Vendor B's LE. The competitive interplay between AN vendors drives down costs and, in addition, V5.2 brings technical advantages including dynamic bandwidth management on the back-haul circuits allowing concentration at the AN, fault recovery and the integration of dedicated bandwidth and packet switched services. With concentration a V5.2 group of 16 30-channel E1s may serve up to 5000 subscribers. Figure 1 shows the conceptual view of such access nodes in the access network.

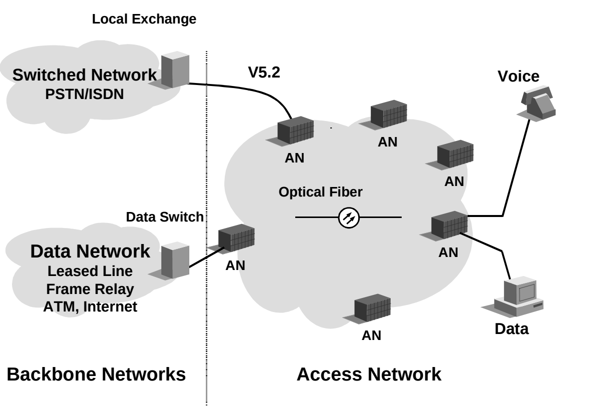

Figure 1 – Access network that links the subscriber to voice and data backbones

Dedicated bandwidth access to leased line, X.25, FR, ATM and IP services for speeds up to 2 Mbps all employ the same architecture which involves the provisioning of a fixed bandwidth channel in the access network. The AN can integrate the dedicated bandwidth services with the switched services on the same back-haul fiber. These services may appear at the subscriber's location in V.35, fractional E1, or 10BaseT Ethernet formats. However, since none of these are optimal for the last-mile copper link between the AN and the customer premises, usually a digital subscriber loop format known as IDSL (up to 128 Kbps) or HDSL (up to 2 Mbps) is used in conjunction with a Network Termination Unit ("NTU") at the subscriber's site.

Where greater than 1 Mbps packet-mode services, particularly ATM and IP are to be delivered, an interface called Asymmetric Digital Subscriber Loop ("ADSL") is gaining popularity. ADSL relies on ATM switching techniques at the AN, which, for this application, is called a Digital Subscriber Loop Access Multiplexer ("DSLAM"). The DSLAM offers each subscriber bursts of high-speed data when needed, and uses statistical multiplexing of many users on the back-haul segment to a centralized ATM switch. ADSL is predicted to be a mass-deployed medium for business and residential subscribers. It achieves low-cost by favoring down-link performance at the expense of up-link. ADSL lines can also deliver PSTN/ISDN services simultaneously with data using simple band pass filters and frequency division multiplexing. IDSL is also an excellent low-cost medium for packet-mode services at 128 Kbps. Collectively all the DSL variants are know as xDSL.

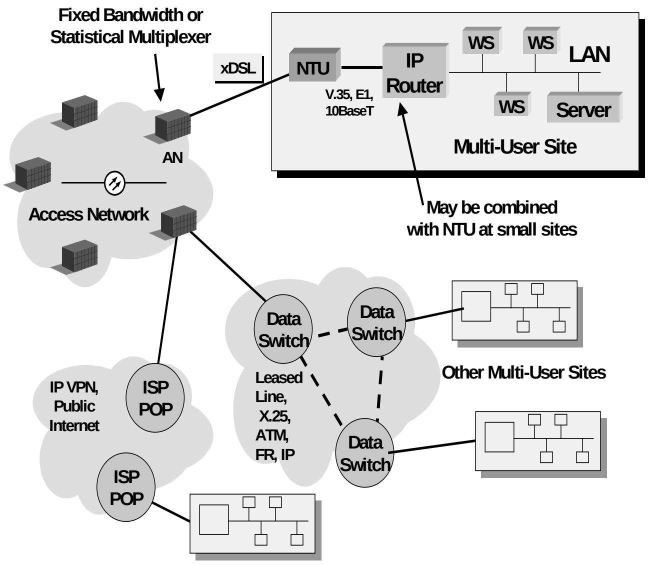

Figure 2 – Access nodes for data applications with xDSL providing dedicated or statistically multiplexed bandwidth

Although the fiber-based AN represents the dominant architecture for access networks today, other methods vie for attention and may address specialized needs. Cellular telephone offers highly valued mobility and personal access but existing technologies lack in voice quality and data throughput. Wireless transmission can substitute for fiber, especially for secondary carriers who may not have access to fiber rights of way or in low-density situations. Also for these carriers, narrow band (Wireless Local Loop "WLL") and broadband (Local Multi-point Distribution Service "LMDS") wireless links may serve the last mile to the premises. Bi-directional cable TV distribution systems (Hybrid Fiber-Coax "HFC") may be used for TV, voice and data delivery and may be attractive to existing cable TV operators. Also, looking to the future, as broadband data services become more prevalent, a technique called passive optical networking ("PON") can deliver fiber to the home ("FTTH") without the use of a copper last mile. So far, with the exception of cellular, none of these alternate methods have received the widespread acceptance of the FTTC/FTTB AN because of cost and performance limitations with existing technologies.

In spite of such variety of access network architectures, no single existing architecture can provide a solution for all of different service requirements mentioned above, in terms of functionality and cost. Thus the real issue in introducing a new access network in a developing country would be how the AN to be used in the access network can be cost-effective for its fundamental services, and how it can be flexible to accommodate new services. A new AN concept to meet this purpose will be shown in the following section.

5 A new access node architecture

The authors have considerable experience applying access network architecture to address market needs in the developing countries. Though the AN was originally envisioned in theory as a remote terminal only, practical experience has shown it useful to have remote AN-RTs, and central AN-CTs with somewhat different functionality. Usually a single AN-CT serves as a hub for multiple AN-RTs. Below are descriptions of some of the principal subsystems and organization of the newest AN architecture.

Located in an indoor or street cabinet that economically services between 64 and 1520 subscribers, the AN-RT contains integral SDH STM-1 Optics for back-haul transmission within the network. Usually AC powered, the AN-RT contains a rectifier and holdover battery. Low-cost PSTN delivery is the key since PSTN accounts for the bulk of deployed service as is explained in Section 2. PSTN and ISDN switched services are managed over V5.2 trunks which accommodate dynamic concentrated timeslot assignment, signaling, protection switching, ISDN D-channel multiplexing and other maintenance features. A Loop Test subsystem allows remote testing of the AN-RT line circuits and the copper loops to the subscriber. The AN-RT has the ability to statically cross-connect leased line and circuit-mode xDSL services, to manage transmission bandwidth and to achieve linear add/drop and ring topologies connecting with other ANs in the network. The AN-RT detects modem or ISDN dial-up Internet calls and bypasses them to special trunks which terminate on a remote access server ("RAS") at the AN-CT. For packet-mode xDSL, the AN-RT DSLAM subsystem provides ATM cell and IP Packet multiplexer that feeds them into Nx64 back-haul channels to an ATM switch in the AN-CT. An environmental monitor/controller provides telemetry of power, temperature, humidity and security factors. The AN-RT management agent uses IP connectivity to the AN-CT to permit centralized management and also supports a local management terminal.

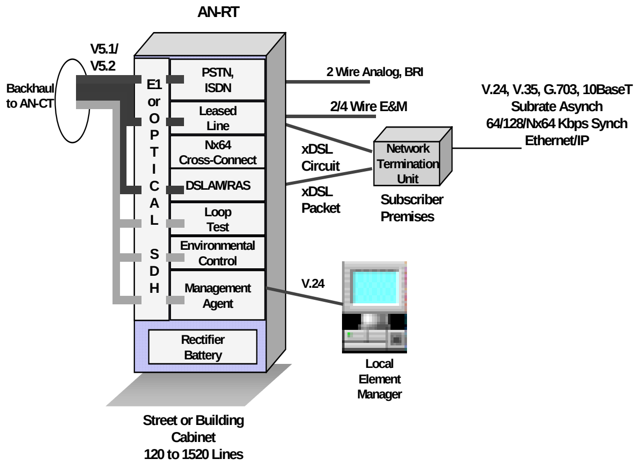

Figure 3 – AN-RT to deliver V5.2 switched traffic, circuit and packet data

The AN-CT is normally co-located in the central office along with the LE. It has the primary role of terminating the STM-1 ring to multiple AN-RTs. In the case where the LE is only able to provide 2-wire analog or BRI, the AN-CT converts these signals to a V5.2 LE-side emulation. One AN-CT can create many separateV5.2 appearances, one for each associated AN-RT. This conversion capability is valuable because it allows the LEC to deploy V5.2 ANs even if there are residual non-V5.2 switches, as the LEC migrates to the new architecture. In the case where the LE is already capable of providing V5.2, the AN-CT can provide a multiplexing function that expands a single large LE V5.2 bundle into multiple smaller ones, thus conserving limited LE resources and simplifying the provisioning of many small AN-RTs. The Nx64 Cross-Connect helps to groom many fractional E1 channels into fewer neatly filled E1s as they lead to the backbone switching network. The ATM Switch acts as an aggregator for the multiple DSLAM concentrators at the AN-RTs, and manages the virtual circuits into the backbone network using the User-Network Interface ("UNI") protocols. The IP Router aggregates remote access modem pool traffic or xDSL endpoints based on IP, and links to central office IP routers towards the Internet. The AN-CT also provides routing for IP traffic between the access network centralized Network Management System and all of the AN-RTs.

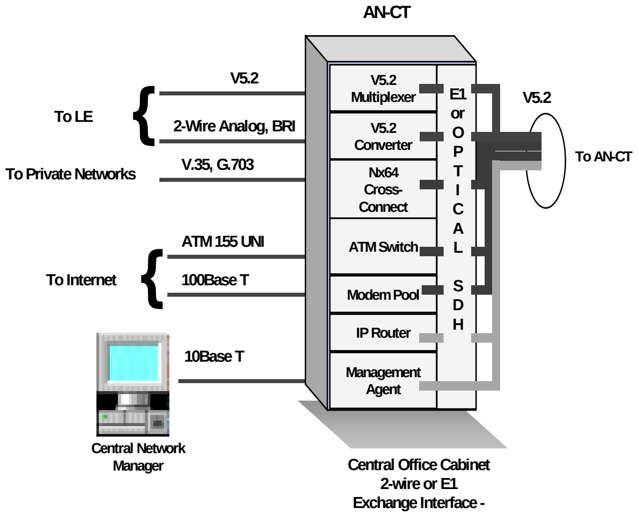

Figure 4 – AN-CT to emulate and multiplex V5.2 and aggregate circuit and packet data

6 Conclusion

The dominant access network architecture discussed here is based on the deployment of many distributed V5.2 ANs. Their basic capability is to deliver switched PSTN and ISDN services with excellent cost profiles and to promote the goal of universal access. The modern architectures embodied in the ANs also support high value and profitable circuit and packet-mode data services at incrementally small costs. This architecture therefore allows carriers to satisfy the demands of their subscribers, regulators and investors all at the same time.

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Biography

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DEV.2

Mechanisms for promoting teledensity in liberalised emerging markets

1 Introduction

Many governments in emerging markets have fostered a policy of private sector participation in telecoms, through a range of mechanisms that includes: some privatisation of government-owned teleommunications operators (TOs); the issuing of new licences to selected private companies to operate in parallel with the public sector operator; the auctioning of new licences for private sector operators. Generally, government objectives have been to:

- promote much-needed investment in infrastructure;
- secure improvements in quality and customer service;
- obtain better value for money to customers;
- stimulate innovation.

Progress towards the first of these objectives has been achieved through private investment. The other objectives are more a question of sector regulation. Governments wish to ensure that the benefits of private investment and competition are not restricted to profitable customer groups in specific geographical areas, but extend to all customers.

Governments have the task of implementing policies which will ensure an appropriate development of each sector, and yet that telecoms remains attractive to private investment.

Within privatised competitive telecoms industries, governments have used a wide range of mechanisms to promote access to telecoms networks, including:

- channelling a proportion of the licence fee payments of all operators into a fund, from which operators may receive funding for certain unprofitable activities;
- universal service or universal access auctions, whereby operators bid to undertake unprofitable activities for the lowest level of subsidy:
  - including line roll-out targets within the terms of operator licences
  - using exclusive, but geographically limited, franchise areas.

Later in this paper we review the above mechanisms through the use of case studies in some Latin American and Asian countries, and discuss the relative merits of these approaches in terms of their efficiency and their effectiveness in meeting government objectives.

Firstly, however, we review what we mean by extending the benefits of private investment and competition to all customers.

2 Universal access is an urban as well as a rural issue

The case for improving access to telephone service to rural areas is now well understood, and we need not dwell on it here[1]. Similarly, the specific disadvantages of measuring access using the traditional statistic of national teledensity (main telephone lines per hundred inhabitants) are not the subject of this paper[2]. The greater appropriateness of other measures of universal access – such as average distance and/or time from a telephone or the number of villages with a payphone – has been recognised by most emerging market regulators. Some regulators, like the South African one, have begun systematically collecting and analysing them. But despite its shortcomings, teledensity remains the principal (and sometimes the only) measure for observing trends in telecommunications development, and the one upon which much of this paper depends.

Since 1986, progress has been made in lessening the inequality between the countries with the highest teledensity and those with the lowest. In 1986, 80% of the world's main lines[3] were in countries that represented only 13% of the world's population[4]. By 1998 the situation had improved: 80% of main lines were in countries representing 29% of the population. Figure 1 illustrates the progress which has been made towards a hypothetical "equality" (in which the proportion of the world's main lines in each country would be the same as its share of the world's population).

The improvement illustrated in Figure 1 is the result of teledensity in developing countries increasing at a faster rate, on average, than that of developed countries.

Any increase in national teledensity is beneficial, as long as it is not the net result of an increase in cities and a decrease in rural areas. As long as teledensity does not actually decline in rural areas, an increase in urban teledensity represents a Pareto improvement (that is, city dwellers are better off, and no-one is worse off). Universal access is an urban, as well as a rural, issue. Analysys was among the first to raise awareness[5] that in the long run, uneconomic *customers* (those within reach of profitable networks but not, on an individual basis, profitable for the TO) are at least as much of a financing problem as uneconomic *areas* (regions of the country which are not profitable for the TO). This is illustrated by the case of the UK (see Figure 2).

The message of Figure 2 is that improving access to telecommunications networks is at least as important an issue in cities as in rural areas. This lesson is just as applicable to developing, as to developed, countries.

3 Competition and private ownership are good for universal access

Measures that make service more affordable in urban areas are an important contribution to development. For example, competition between privately-owned TOs improves the affordability of, and hence universal access to, telecommunications services in three major ways.

- Competing private TOs tend to obtain a lower cost per line from equipment suppliers than their state-owned monopoly predecessors did, by driving a harder procurement bargain.
- Competing TOs tend to introduce with greater rapidity innovations such as prepayment and flexible billing, which improve the perceived affordability of telephone service. They encourage families to sign up for phone service, and reduce the likelihood of their being cut off for non-payment.
- Competition favours the establishment of appropriate chains of supply, where geographic- or application-specific resellers can package bandwidth into products more relevant and attractive to end-users (and hence, more affordable) than a TO acting alone would manage to do.

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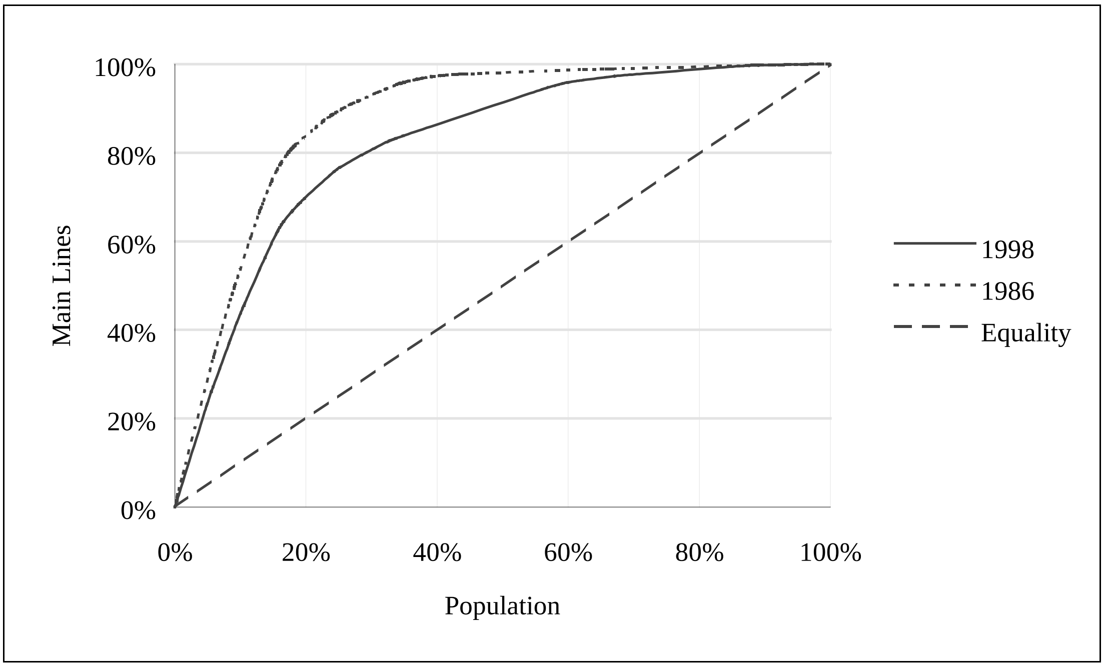
1 A summary of the political-economic arguments in favour of promoting access in rural areas is provided in Dymond, A. (1996) "Public and Private Interests in achieving Viable Rural Service: the Role of a Favourable Policy Environment", ITU Americas Telecom 96 Strategies Summit.

2 See Minges, M. (1999) "Measuring Access to Telecommunications: Universal Service and Access Indicators", 2nd World Telecommunication Indicators Meeting Geneva, 29-31 March 1999.

3 That is, exchange lines (as opposed to an extension telephone) or the equivalent.

4 According to calculations carried out by Analysys and Intelecon Research, based on processing and sorting ITU data.

5 In 1994 Analysys carried out a ground-breaking study for the UK regulator, the Office of Telecommunications (Oftel), that measured the costs of universal service and universal access obligations of TOs in developed countries. A copy of the full report is available on request from Analysys Ltd (enquiries@analysys.com).



Source: Analysys/ Intelecon Research, based on ITU statistics.

Figure 1 – Lessening of inequality in teledensity, 1986-98

Universal service or access obligation	Net cost (GBP/year)
Uneconomic customers (many in city centres)	GBP 54 million
Uneconomic areas and regions	GBP 17 million
Call boxes	GBP 17 million
Other (services for deaf, directory enquiries, etc.)	GBP 8 million

Source: Analysys project for Oftel.

Figure 2 – Total cost of universal service/access obligations in the UK

In general, the operators which will be most successful in using new technologies to improve peoples' access to telecommunications will have:

- An ability to get the best out of suppliers (rather than skills in engineering and network design).
- A tendency to innovate (rather than a tendency to avoid cannibalisation).
- A willingness to allow retailers to package and support end-user services (rather than a desire to control the whole chain of supply).

Privatisation and the introduction of competition tend to increase teledensity, as previously demonstrated by Analysys.[6] However, without the enforcement of specific regulations, the benefits of private ownership and competition can feed through mainly to cities and by-pass rural areas, as shown in the following section.

6 See, Stanislawski, S., Cleevely, D., Johnson, G. (1995) "The Effect of Liberalisation on Telecoms Development", ITU Telecom 1995.

4 Rural universal access requires regulation both of competition and of private investment

Although the general trend worldwide is for national teledensity to increase, the gap between urban and rural teledensity, which should ideally be narrowing, is in some cases widening. It might be expressed as a ratio: urban teledensity divided by national teledensity. This figure is generally not collected by any administration (even in the developed world), but a proxy – teledensity in largest city divided by national teledensity – can be readily obtained from statistics already gathered by the ITU. For most developed countries this second ratio is currently about 1.2. Figure 3 shows recent trends in this ratio for a selection of emerging markets.

In the sections which follow, we draw on the experience of some of the countries in Figure 3, to outline some pragmatic policy recommendations for accelerating teledensity, particularly in rural areas.

5 Investment targets framed in purely financial terms are not the best way to promote widespread access to telecoms services, and could even be counterproductive

Governments do not intentionally give operators targets framed in purely financial terms. But by neglecting to be specific about incentives (and penalties) for rural roll-out, a financial target can be the unintended de facto result.

During the period covered by Figure 3, the "urban-rural" gap increased in Ghana and Mali. The number of lines installed in the capital city increased (by a few tens of thousands of lines in both cases), while the number of lines outside the capital hardly increased at all. This was the result of Ghana Telecom and SOTELCO respectively investing according to traditional financial criteria in the absence of specific, enforceable rural targets.

Since 1996 (the most recent year covered by Exhibit 3) the situation in both countries has changed. Ghana sold a 30% strategic stake in Ghana Telecom, licensed a second national operator, and announced its intention to improve the infrastructure in Upper and Northern Volta and Brong-Ahafo regions. Earlier this year Mali began the process of selling a strategic stake in SOTELMA.

Selling a strategic stake (or licensing a second national operator) means, in practice, holding a beauty contest. If the contest (and the subsequent enforcement of licence conditions) places too much emphasis on levels of investment and not enough emphasis on specific volume targets for improving accessibility, the result could be that operators continue to target investment on cities, rather than rural areas, even after privatisation and/or de-monopolisation.

Given the relatively low number of lines in Ghana and Mali country, there is nothing inherently bad, in the short term, about their TOs targeting investment on cities. After all, increasing the supply of lines (and the affordability of service) should not be discouraged, even if the effects are initially felt only in cities.

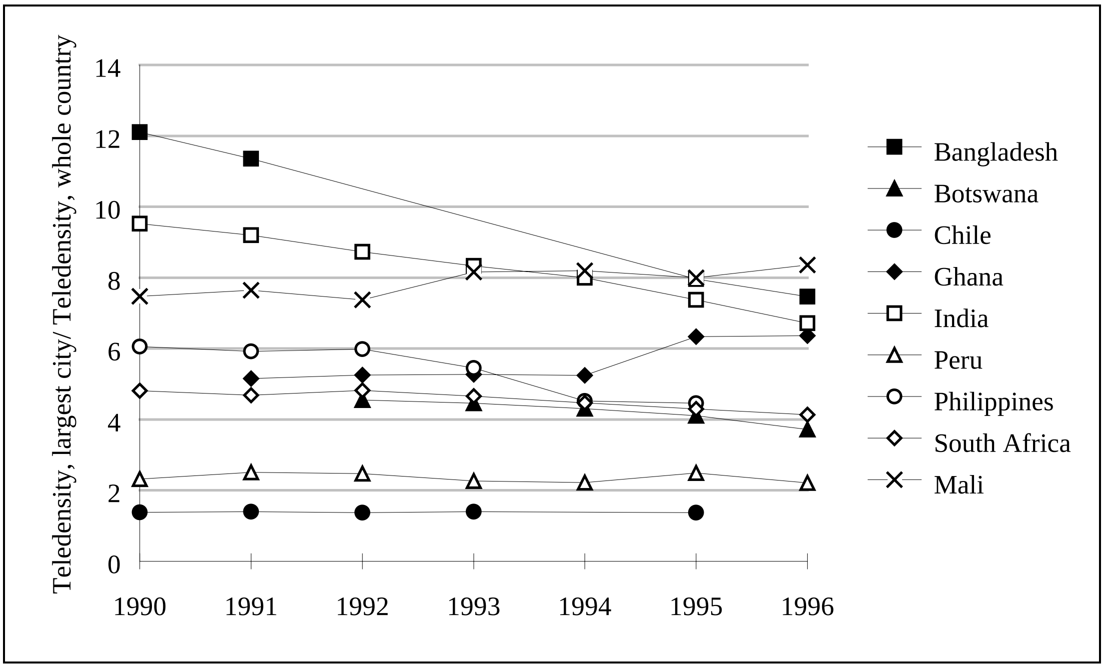
As observed earlier in this paper, privatisation and the introduction of competition tend to increase teledensity. We can therefore expect the installation of lines in Ghana and Mali to proceed more rapidly in future than it has in the past. But in order to ensure that rural areas benefit from increased teledensity, it will be necessary to enforce specific additional regulations. The most straightforward of these is a geographically specific teledensity target. The following section describes some examples where such a target has been employed.

6 A straightforward target based on number of basic telephony lines (teledensity) can be effective, especially if the targets are correctly set and are geographically specific

Teledensity in developing counties is already increasing at faster rate, on average, than that of developed countries. As Figure 4 shows, since 1992 the rate of closing the teledensity "gap" has risen considerably.

The 104 "least teledense" countries account for 70% of the world's population, but only 20% of its main lines. During the period illustrated in Figure 4, the "least teledense" countries underwent a considerable improvement: from 1993 teledensity increased at more than twice the rate of the first half of the period. In contrast, the 105 "most teledense" countries did not experience the same change in performance: their teledensity continued to increase at about the same rate throughout the period (see Figure 5).

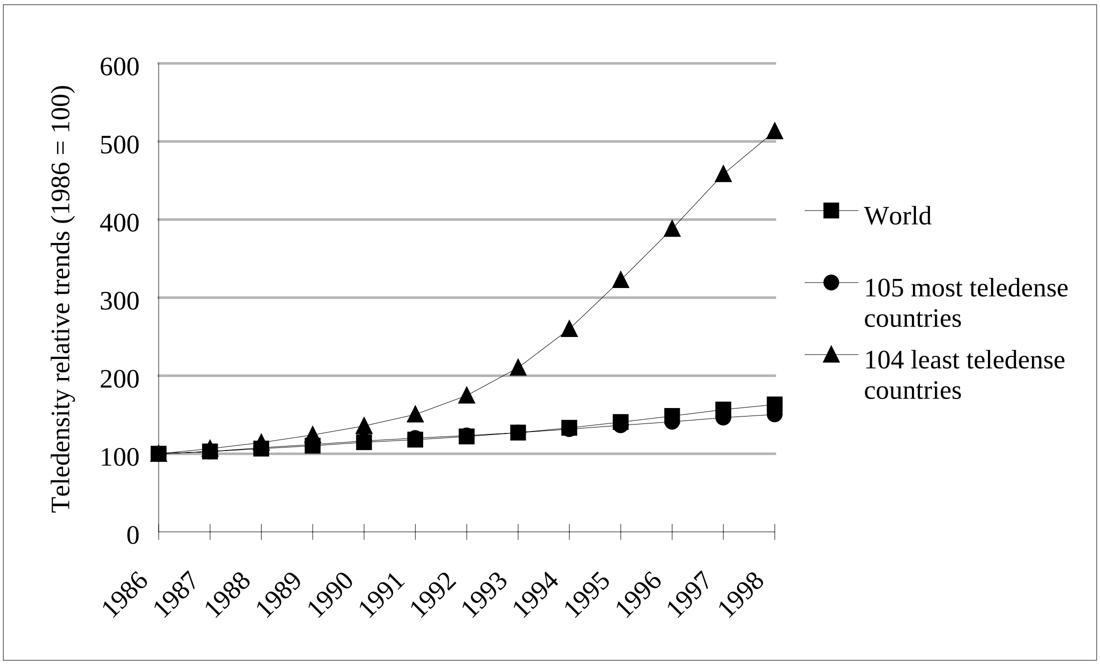
Amongst the "least teledense" countries, the Philippines offers an interesting case history. It was one of the top performers over 1992-1998 in terms of improving its teledensity – positioned fourth in Figure 6.



Complete data for 1997 onwards that would allow the calculation of the ratio has not yet been provided to the ITU by the countries in question.

Source: Analysys / Intelecon Research, based on ITU statistics.

Figure 3 – The "urban-rural" teledensity gap is narrowing in many countries, but widening in some



Source: Analysys / Intelecon Research, based on ITU statistics.

Figure 4 – Since 1992 the rate of closing the teledensity "gap" has improved

	Teledensity growth, average over 1986-1992	Teledensity growth, average over 1992-1998	Improvement
105 “most teledense”	3.5%	3.5%	No improvement
World	2.5%	5%	50%
104 “least teledense”	10%	20%	100%

ource: Analysys / Intelecon Research, based on ITU statistics.

Figure 5 – Since 1992, the “least teledense” countries have been catching up

Rank	Country	Teledensity			Increase in teledensity	
		1986	1992	1998	1986–1992	1992–1998
1	Vietnam	0.1	0.2	2.6	10%	51%
2	China	0.3	1.0	7.0	20%	39%
3	Sri Lanka	0.6	0.8	2.8	6%	24%
4	Philippines	1.0	1.0	3.2	1%	21%
5	Indonesia	0.4	0.9	2.7	14%	20%
6	Hungary	7.3	12.5	34.7	9%	19%
7	Peru	2.2	2.7	6.7	3%	16%
8	Syria	4.2	3.9	9.5	–1%	16%
9	Myanmar	0.1	0.2	0.6	10%	16%
10	Thailand	1.5	3.1	7.4	12%	16%
11	Nepal	0.1	0.4	0.8	16%	15%
12	Sudan	0.3	0.2	0.6	–1%	15%
13	Ghana	0.3	0.3	0.7	1%	15%
14	Poland	7.0	10.3	22.8	7%	14%
15	Chile	4.5	9.5	20.3	13%	14%

Note – The above ranking excludes countries with population of less than 10 million.
Source: Analysys / Intelecon Research, based on ITU statistics

Figure 6 – Top 15 teledensity improvements, 1986 to 1998

In 1992, Philippine Long Distance Telecom (PLDT) lost its monopoly. By 1998, the country’s teledensity had reached 3.2 (2.3 million lines in service for a population of 73 million), a threefold increase over six years. In 1993 the Philippine government passed Executive Order No. 109 (EO 109) requiring the dozen or so new operators to install 300 000, 400 000 or 700 000 lines each (depending on the type of licence they held) by 1999. The result was a rapid increase in the number of lines installed (almost 6 million in six years), which resulted in a threefold increase in the number of lines in service. Much has been made in the press of the failure of two of the companies (PT&T and Philippine Global) to complete their line installation target on time, causing the government to undershoot its published teledensity target in 1999 by about 5%.[7] However, overall the Philippine policy has been a successful one (see Figure 6 above). In any group of private companies there will inevitably be

[7] See, for example, “Philippines: Full Compliance with Service Area Scheme Inexistent’’, *Business World Philippines*, 22 July 1999, p.8.

underperformers: PT&T and Philippine Global suffered from a range of fairly typical project management problems (investors, suppliers, workforce, etc). The fact that the government was able to achieve 95% of its target despite the partial failure of these firms shows that its scheme was pragmatic and robust.

In addition to its success in raising its whole-country teledensity over 1992-98, the Philippine government also watched over the installation of record numbers of rural lines. EO 109 provided each operator with a monopoly territory, requiring that for every ten lines installed in the "prime" part of each territory, one should be installed in an "unserved" or "underserved" part (terminology of NTC, the regulator). NTC reported earlier this year that there are now over 1 million rural lines installed.

Poorly set targets can lead to inefficient provision of service. The Philippines ran the risk of installing lines *capacity* without lines *in service* keeping pace. Of the approximately 6 million lines installed since 1992, no more than 2.5 million have been sold. How much of a problem this will turn out to be in the long term depends crucially on *where* the private operators decided to install lines. Those operators that used modern investment appraisal and geo-marketing techniques, will find that the capacity gets used up over the coming years. On the other hand, those who did not (like some state-owned monopoly operators in Europe during the 1970s) may simply have installed lines in the wrong places (i.e. where it was cheapest to do so, rather than where the demand is) and will have an over-capacity problem for years to come. Private investors are more likely than regulators to put lines where they are in most demand. Fortunately, the Philippine regulator did not specify in detail where each operator should install its lines; had they done so, the problem would probably now be worse than it is.

7 Teledensity targets must be achievable and auditable in order to be effective

The Philippines experience highlighted another important point: private investment can only boost the number of lines when targets set are achievable. The target itself is clearly a factor: there is no point in obliging investors to increase capacity to the point that business and residential spending on telecoms do not even cover the cost of installing the lines. However there are other, more subtle, ways in which regulators can influence the achievability of new operators' targets. Interconnection is one of them. In liberalised environments, entrants have too often been left to negotiate interconnection with incumbents. Interconnection (or, as it often manifests itself, revenue sharing) is the single most important operating cost item of any entrant.[8] In some apparently promising reformed telecoms markets such as Bangladesh, uncertainty and unfairness over interconnection has led to slow roll-out and poor financial performance.

Bangladesh has one of Asia's lowest teledensity figures (0.5). The government has set itself the target of 4 by 2010. The task of providing rural coverage is primarily the responsibility of the government-owned TO, Bangladesh Telegraph and Telephone Board (BTTB), although there are two private operators with licences to cover rural areas: Bangladesh Rural Telecoms Authority (BRTO) and Sheba Telecom. During 1998 BRTO and Sheba complained that BTTB hampered their operations by failing to provide interconnection.

Another subtle way in which regulators can influence the feasibility of teledensity targets is by avoiding auctions whose sole aim is to maximise bid price. Such auctions can be unstable and distract investors from a thorough and sceptical valuation of the licence opportunity. Clearly, regulators should not attempt to write investors' business plans for them. But they should provide as much information as they can to ensure that each operator sets up realistic financing for itself. India provides a good example of how a theoretically quite exciting framework (with carefully calculated targets for new entrants' new lines) can go wrong in practice. Bidders overpaid at the licence auction, leaving operators financially strapped and unable to improve penetration at a healthy.

8 Governments should frame rural coverage targets in a technologically-neutral manner

Governments should frame rural coverage targets in a technologically-neutral manner, to give private investors the flexibility to deploy cost-effective technologies such as wireless or satellite. In particular, cellular technology has proved to be an effective enhancer of penetration in a number of countries.

- In Brazil, "Rurcel", (a fixed rural cellular system in existence prior to the privatisation of the Telebras system) covered many thou-

[8] A full treatment of interconnect policy in rural environments can be found in Intelecon (1999) "Rural Telecoms Finance: Where is the Bottleneck", Intelecon Research Forum No. 1 (www.inteleconresearch.com).

sands of farmers and communities before the PSTN network arrived. Even today, cellular is an important source of rural penetration in Brazil, and has risen over the last year to account for more than a third of rural phone connections.

- In South Africa, Vodacom has a mandated target of 22 cellular payphones to be installed in under-served areas (mostly in townships and rural communities), and again, the results have been very positive.
- The recently awarded second GSM license in Morocco includes rural mobile and/or fixed cellular coverage obligations – the operator must roll out service covering 25% of the rural population.

Technical standards should be used to ensure interoperability, but not to limit technological choice "Old" technologies can still provide cost-effective coverage of large areas: the NMT-450 analogue cellular standard, for example, has been a useful source of rural coverage in countries as diverse as Poland, Morocco and Estonia, and is under consideration for improvement of rural coverage by other Central and Eastern European countries such as Bulgaria and Slovenia.

Cellular technology can also provide useful payphone coverage. Payphones (usually located in shops or resold by entrepreneurs) have proved a success in bringing telephone service within reach of isolated communities. In India, Koshika Telecom has provided interesting "cellular payphone" coverage in villages, offering tariffs very close to those of DoT (the incumbent operator) on long-distance calls. Several other Indian cellular operators also provide rural "cellular payphone" services. In Bangladesh, Grameen Telecom (a subsidiary of Grameen Bank) is successfully implementing payphones in rural areas using cellular technology. It had 475 "village payphones" in service at the start of 1999, and plans to install several thousand each year for the next five years. A few thousand additional lines will not have much impact on national teledensity, going by the standard, inadequate definition of teledensity. But if each one provides a village with phone service for the first time the overall effect on peoples' access to telecommunications will be significant.

In the light of recent difficulties in the satellite industry, it is not surprising that cellular is probably more important than GMPCS (Global Mobile Personal Communications System) for providing affordable rural coverage. Cellular is doing a good job of extending service to areas that would not otherwise have been served, mainly because private operators are typically well capable of identifying and serving the commercially viable demand.

Despite the usefulness of cellular, regulators should resist the temptation to standardise on it as a means of improving teledensity. A wide range of wireless technologies are rapidly developing and maturing, which will be suitable for voice *and* data communications.[9] An interesting example is LMDS, with broadband radio local loops at 10, 26, 28 and 40 Ghz. This technology can offer high-speed Internet access and telephony in city centres as well as in remote areas. In the next few years there is likely to be widespread deployment of LMDS in developed countries, causing the (currently high) costs of radio base stations and receivers to fall. Some would argue that LMDS is primarily a "business" technology, unsuitable for residences. This is true today, but in the future it could be a more economic means of access then microwave radio for IP-telecentres in some regions. The important point is not whether such an economic advantage exists at today's equipment prices, but that regulators should remove barriers to deployment (by allocating spectrum) to encourage private investors and local entrepreneurs to find ways of using modern wireless technologies in rural areas.

9 Universal service or universal access auctions and other market mechanisms offer great potential

Universal service auctions and other market mechanisms offer great potential for targeting investment on less favoured geographical areas. One of the criticisms of the Philippine process (described above) was that despite the steep increases in rural teledensity, many villages still lacked access to basic telephone service. A more refined system would have given investors targets for specific villages or rural zones, linking coverage promises to subsidies via a kind of auction. Chile and Peru, for example, have both successfully implemented such schemes.[10]

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9 An overview of wireless technologies can be found in Jensen (1996) "A Guide to Improving Internet Access in Africa with Wireless Technologies", IDRC Working Paper.

10 This subject is covered in more detail in Intelecon (1999) "Funding Sources for Rural Telecommunications in Latin America", Intelecon Research Forum No. 2 (www. inteleconresearch.com).

In 1994, Chile's national telecom regulatory body, SUBTEL, established the *Fondo de Desarrollo de Telecomunicaciones* (FDT) in order to support a four-year programme to develop its rural telecommunication services. Under this programme, SUBTEL auctions the right to deploy and operate rural telecommunication networks to interested companies. The companies compete for these contracts by making the best offer, thus minimising the amount of subsidies, which are used only in those projects that require it. The auctioned contracts required tenderers to supply one public phone in each of the specified villages in the licence territories. That was the obligation. The incentive was that the tenderer had the freedom to put in as many other customer lines as desired, based on his own commercial criteria within his acquired territory. One successful bidder, for example, had a total obligation of 1583 separate village lines, under nine licences, but plans eventually to roll out 24 000 lines in total.

In the space of four years, SUBTEL assigned 149 projects out of 194, resulting in an assignment of telecommunication developments in 5261 villages out of 6847. So far, SUBTEL has allocated approximately US$ 7.15 million in subsidies, out of an available total of more than US$ 13.33 million. In other words, Chile has been able to meet 77% of its goal by spending 54% of the resources available for such purpose. Furthermore, in 656 villages deployment of telecommunication networks did not require subsidies at all – which highlights the potential profitability of rural telecommunications.[11]

Peru's organisation for the supervision of private investment in telecommunications, OSIPTEL, created *Fondo de Inversión en Telecomunicaciones* (FITEL), intended to fund ten development projects involving the provision of services to about 3500 villages, with populations of 300 to 500. The fund is distributed much the same way as in Chile: projects are auctioned to the best bidder and the resources are used in a limited time. Under the terms of the first project, OSIPTEL expects to allocate resources totalling a present value of US$ 1.7 million for the provision of 193 villages. As a result of this scheme, subsidies employed to set up a rural payphone have dropped from US$ 35 000, required before competition was introduced, to US$ 17 000.[12]

Rural fund schemes of the type successfully implemented in Chile and Peru require careful auction design to ensure that realistic conditions are set for bidders. Because targets are set at a micro-level, there is a cost of follow-up and enforcement. But micro-level targets, carefully and pragmatically designed, have a greater potential for promoting basic service provision than simple line roll-out targets, given to operators whose real interest is in urban areas, and for whom rural service is just an enforced cross-subsidy.

10 Summary of requirements for effective regulation

- Investment targets framed in purely financial terms are not the best way to promote widespread access to telecoms services, and can even be counterproductive.
- A straightforward target based on the number of basic telephony lines (teledensity) can be effective if the targets are correctly set and are geographically specific. Poorly set targets have been seen to lead to inefficient provision of service.
- Teledensity targets must be achievable and auditable in order to be effective.
- Governments should frame rural coverage targets in a technologically-neutral manner, to allow private investors the flexibility to deploy cost-effective technologies such as wireless or satellite. Technical standards should be used to ensure interoperability, but not limit technological choice.
- Universal service or universal access auctions and other market mechanisms offer great potential for targeting investment on less favoured geographical areas, but require careful auction design to ensure that realistic conditions are set for bidders. Such mechanisms have a greater potential for promoting basic service provision than simple line roll-out targets.
- In all cases where it is desired to entice new entrants into the market place to accelerate penetration or improve access in rural areas (through auction or other means), it is vital that policy makers provide a predictable and

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11 See also Vergara, D. (1998) "Fondo de Desarrollo de las Telecomunicaciones", OSIPTEL Workshop on Rural Telecoms, Lima, 19 May 1998.

12 See also Cannock, G. (1998) "Propuesta de Desarrollo de las Telecomunicaciones Rurales en el Perú", OSIPTEL Workshop on Rural Telecoms, Lima, 19 May 1998.

attractive environment through the setting of fair interconnect rules and revenue sharing formulae. Investors can be incentivised and ultimately thrive if roll-out obligations are complemented by favourable and enforceable regulations governing their relationships with incumbent operators.

Biography

Graham Johnson has 11 years' experience in telecoms. He has carried out advisory work for governments, regulators, operators and investors in Latin America, Southern Asia, South-East Asia and Sub-Sahara Africa. He is a Senior Consultant at telecoms consultancy Analysys Ltd. He has a BA and an MPhil from the University of Cambridge. He is a Chartered Engineer (MIEE) and a European Engineer (FEANI).

Graham has considerable experience of field due diligence, traffic measurement and network costings. He has assisted an investor in conducting due diligence on a Indian holding company which owns several GSM licences. The project included a valuation of the investment and a review of key factors affecting it, including company management, regulatory environment, marketing strategy, the network and internal systems.

He has worked for the telecoms regulator of a Latin American country which had recently privatised its principal TO. The project advised on the implementation of price control and cross-subsidy rules in the new, transparent regime, and prototyped practical systems. The project involved close liaison with the TO, and resulted in the delivery of tools and procedures for the regular monitoring of tariff and accounting data from the TO.

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DEV.2

Developing flexible network by Internet-oriented switch

There is no doubt that the Internet will grow continuously with increasing contents. There are many good educational contents now and they will be increased and improved year-by-year. Furthermore, medical contents may be also added in future. In this sense, the concept of “Universal Access” should include Internet access as well as voice communication. This presentation will discuss what and how this sense of Universal Access can be given to rural and remote subscribers, and how the network can evolve to a more sophisticated network. The discussion focuses on the process of network expansion and how new network technologies such as ATM, IP and Mobile technology can be effectively utilized for network development. How such a new network should/could interwork with the existing network will also be discussed. A smooth network migration is considered.

1 Introduction: Benefit of Internet

Nowadays, the Internet has become popular for personal and business communication tool, giving people access to information worldwide. Since the recent Internet explosion, the traffic ratio between voice and data is dramatically changing. There are reports from the U.S., that the data traffic has already exceeded the voice traffic.

The Internet we see today is a public cooperative and self-sustaining network using resource of the currently existing public telecommunication. Its connectionless, simple, scalable and open network architecture has gained wide acceptance. The data traffic in the Internet is transported over TCP/IP packets, which deliver us valuable worldwide information instantly. Most of us who have used e-mail and web browsers find them very useful in personal and business communication scenes. The Internet in developed countries is becoming an essential tool both in economical and social aspects.

Developing countries may also receive educational, social and economical benefits from the Internet access. Access to the World Wide Web can provide access to web pages worldwide, much similar to having access to an encyclopedia, yet much more advanced. The Hypertext Markup Language (HTML) in a web browser provides clickable audio-visual information from the world. Digital Public Library services can offer books and videos electronically to people who have limited access to such media from their home. Application such as Distant Learning assures the same quality of education to children in rural and remote areas as children living in metropolitan area. Telemedicine provides social and health care services by giving remote diagnosis for people in rural and remote areas where medical specialists are missing. Furthermore, electronic commerce realized by the Internet will allow developing countries to join the mainstream of the global market.

For those of us who has access to the e-mail, web browser and other Internet-oriented applications take it for granted. The Internet technology has already brought changes in the lifestyles and working relations in developed countries. However, we must not forget that in many developing countries, Internet access is not sufficient yet.

2 Universal Access: Information "haves" and "have-nots"

To achieve Universal Access, we must support not only basic telephony services, but also accessibility to the Internet. All countries have challenges to meet the Universal Access requirement, which ensures everyone to be able to have telecommunications accessibility.

As the growth of the Internet and associated applications increases, basic telephony services is going to be insufficient to follow the global information society for any countries. Some may fear an information gap to developed countries in the world. This may result in a sort of polarization of "information rich" and "information poor" which is often known as "haves" and "have-nots".

In order to achieve Universal Access, allowing Internet access as well as voice communication will be required. For developing countries, an effective accommodation of scattered subscribers in a wide area will usually be a major issue. Various technologies and solutions are now available today to meet these demands. The remaining issue is how to assure a right choice.

3 How to make it happen

3.1 Characteristics of IP

The best candidate for developing a low cost, open architecture network and accessibility to the Internet would be to build an IP-based network. The IP network here is independent from the underlying transmission layer network. Its transmission can be provided over technologies such as ATM, Ethernet, etc. A router-based network may be deployed for a low cost implementation, though it is still immature in terms of Carrier grade QoS (Quality of Service) and reliability. On the other hand, in terms of flexible bandwidth management, ATM could be a good candidate to build an underlying IP core network in case where high reliability and quality assurance are mandatory. The issue remains how to deploy this network in rural and remote areas.

3.2 Access Network deployment

Access network technology such as fixed (zero-mobility) wireless access may be deployed effectively in specific occasions. For developing countries, realizing a low cost, Internet-oriented network in a short installation period would be ideal. Wireless fits this requirement.

Access Gateways (AG) including analog and Ethernet access interfaces can be deployed at each rural area providing the gateway to the core IP network. Telephones and computers for Internet access will be connected to the AGs. Call Agent (CA) located in the IP core network controls the AGs for call connection and service control. There are two configurations for connecting the AGs to the core IP network: an optical transmission scheme and a network configured by IMT-2000 Wireless Local Loop (WLL). Figure 1 illustrates the two.

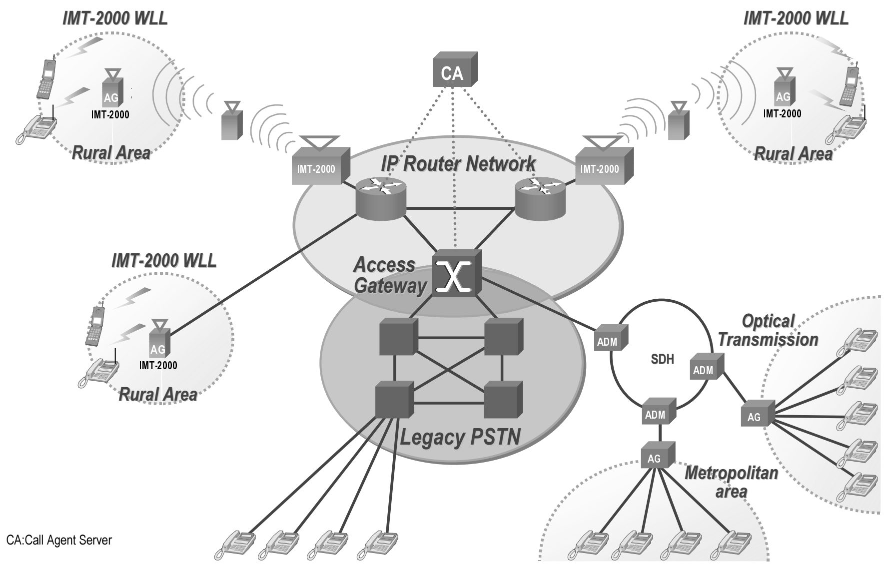

Figure 1 – Telecom Network Development

3.2.1 Network Configuration by Optical Transmission

In this configuration, AGs are deployed in the rural area connecting an ADM (Add Drop Multiplexer) in an optical transmission network such as SDH that is connected to an IP core network. One ADM will be required for each rural area.

The SDH transmission has a maximum bandwidth up to 156 Mbps for each AG shared among subscribers in a rural area. The cable installation period and the cost would be an issue in this configuration. This configuration may be suitable for highly populated metropolitan areas, rather than deployment to rural areas.

3.2.2 Network Configuration by IMT-2000 Wireless Local Loop(WLL)

IMT-2000 is currently being standardized in ITU for realization of a third-generation mobile network with broadband, packet-based transmission for text, digitized voice, video, and multimedia services over the IP network. Developing countries may apply a wireless local loop (WLL) technology based on IMT-2000. Although WLL limits the range of mobility of a wireless telephone within single cell, its wireless and wideband capability is an attractive feature, in order to provide advanced services in a shorter installation time.

By using IMT-2000 WLL, bandwidth up to 2 Mbps can be provided to an AG. The bandwidth can be shared between subscribers in a rural area. This may reduce the cost to deploy access networks to scattered areas. The wireless nature eliminates the "last mile" cable installation to home, which lowers the cost and shortens the installation period.

In practice, the access coverage radius that one Base Transceiver System (BTS) is about 20 km. The coverage could be extended through deploying radio repeaters or employing a higher antenna at the cell site with a directional antenna at the subscriber location.

3.3 Comparison

IMT-2000 WLL would provide effective deployment in developing countries and help achieve Universal Access. The comparison is summarized in Table 1.

Table 1 – Comparison of Network Configuration

	Optical Transmission	IMT-2000 WLL
Accomodation of scattered rural and remote areas	One ADM in each area	One BTS can cover 20km radius
Cable Installation	Required	Not required
Installation period	Long	Short
Bandwidth	~ 156 Mbps	~ 2 Mbps
Cost	High	Low

3.4 Consideration of Network Reliability

To minimize the hardware cost in the network, a network-based redundancy such as dual homing and load sharing function should be applied. In legacy PSTN, building a network-based redundancy is difficult to implement since the routing would be static and the billing is managed by individual switch. That is why it requires redundancy implementation at each node by duplicating hardware for its own reliability. On the other hand, autonomous packet routing, service and billing management controlled by Call Agent server in an IP-based network gives an easier treatment for the network-based redundancy (Figure 2).

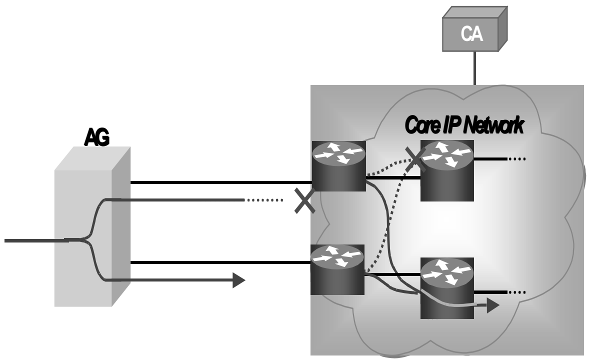

Figure 2 – Network Reliability in an IP-based network

4 Core Network and Network Evolution

Developing country's primary goal will be an access to scattered rural areas in a short installation period at a low cost with Internet accessibility. We have discussed that developing countries can achieve this by incorporating Internet capability as early as possible by deploying an IP core network with low startup cost.

As access network infrastructure becomes well established for the Internet, the Internet itself will gradually link with other network to expand its application range. As the economical and social growth comes, the demand for a new advanced applications and services will be required as well. The services will then be personalized and will have mobility that should be able to interact with other services. Therefore, the convergence of different network will be essential for achieving the Universal Services.

Developing countries will need to move from ubiquitous based communication service to an inclusion of quality assured communication service, offering high capacity transmission with guarantee of QoS. More complicated features over multi-layered network consisting of legacy telephone, Mobile, etc. will be demanded as a part of the Universal Service.

Bandwidth and QoS can be achieved by differentiating a quality assured QoS network with IP/ATM and MPLS technology. The “premium” quality service can be applied at the IP/ATM+ MPLS core network while “best effort” services may be provided in a straightforward IP router-based network. Complicated features and services can be provided through enhancement of call control capabilities in Call Agents with a principle of effectively decoupling network services and user applications from the infrastructure. Figure 3 shows the Telecom network evolution to a parallel-based quality assured network.

5 Conclusion

Deploying an IMT-2000 WLL can provide a solution for a cost-effective network access to scattered rural and remote areas, allowing basic telephony as well as Internet connection. Network-based redundancy would be an effective way to deploy a low cost network and attract developing countries in a rapid penetration of access network with minimum investment. The network can be gradually expanded to support quality services as demand variety grows. The IP-based network can accelerate the country’s economical and social growth and fill the gap between “haves” and “have-nots”. Government intervention and regulatory framework takes part in order to achieve a successful development. As for us vendors, we give our technology for the best of use and for Carriers to promote new services on a Universal Access basis.

6 Recent Activities

Fujitsu has been working with Carriers worldwide as to how to provide network solutions. We have deployed switching systems, transport systems, mobile network systems and computing network products to countries worldwide. Our experience from our worldwide activity confirms that the network evolution is moving towards an IP-oriented network. “Everything on IP” is becoming a reality today. We wish to assist network solutions and support operators worldwide.

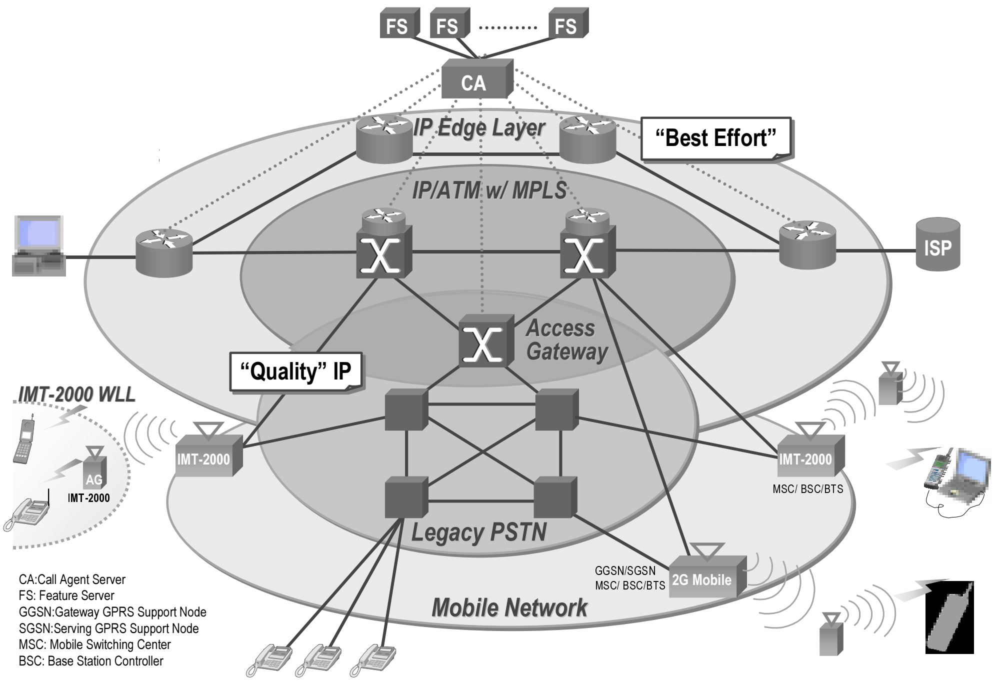

Figure 3 – Telecom Network Evolution

Biography

Harry Takeichi graduated from School of Science and Engineering, Waseda University, 1971. He joined Fujitsu Limited the same year and was engaged in core switching systems development. His work included attached processor intelligence for new services to crossbar switches, digital telephone switch hardware and software developments and system architecture planning. In 1987, Harry Takeichi was appointed as senior management at the newly established North Carolina-based company, Fujitsu Network Switching (FNS; now renamed as Fujitsu Network Communications; FNC) and moved over to Raleigh, NC. He was promoted, in 1992, to Senior Vice President who was responsible for all technical operations including systems engineering, software development and customer support. During his assignment he was fully involved in building the North Carolina Information Highway (NCIH). Harry Takeichi moved back to Fujitsu Limited Japan 1996, and became responsible for the U.S. ATM switch business and later on extends his coverage to all core switches, as a General Manager in the Integrated Systems Division. Since June 1999, he became responsible for carrier and cellular mobile businesses in the newly established Network Systems Group, which covers carrier network, LAN/WAN and cellular mobile systems.

Mr. Myron ZLOTNICK
Legal Adviser
M-Web Connect (Pty) Limited (South Africa)

DEV.2

The regulatory environment for universal service in south africa

1 Introduction

For the reader unfamiliar with the South African regulatory environment, this paper first sets out in some detail the history of telecommunications regulation in South Africa. It then proceeds to sketch the current regulatory environment within which South Africa's universal service policy is intended to be achieved. Then, with reference to arguments based on human rights, the paper assesses the prospects of challenging the chosen model. It is concluded that the model as cast in legislation is presently unassailable. However, in the final part of the paper reference is had to one encouraging decision of the regulatory authority in which human rights imperatives ranked higher than the protection of the incumbent.

2 The old monopoly

Telecommunications regulation in South Africa was governed principally by the 1958 Post Office Act.[1] The Department of Posts and Telecommunications provided telecommunications services under the control of the Postmaster General who in turn was subject to the authority of the Minister.[2] In 1992 a public company,[3] Telkom (SA) Limited ("Telkom"), was incorporated which then replaced the Department as the vehicle through which telecommunications services were provided.[4] Telkom was granted the exclusive power, monopoly, to provide telecommunications services[5] as well as the power to authorise[6] any other person to conduct telecommunications services. Thus the licensee was also the licensor (or regulator) and there was a link, in the form of the Minister, between government and the licensee.[7] This legislative framework conforms with the general pattern of regulation applied until recently throughout the world, ie: an assumption that telecommunications services should be regulated, that it should be centrally controlled by the state and that a single operator will suffice to meet the needs of the society. In the unique political context of South Africa these assumptions served the sinister motives of successive apartheid governments well and it seems there was a dovetailing of racially and economically

[1] Act No 44 of 1958.

[2] See section 2(1) of the Post Office Act.

[3] See section 4(1)(b) of the Post Office Act.

[4] For an overview of the political and economic forces that prompted the "ccommercialization" of telecommunications services see R Horwitz, "South African Telecommunications: History and Prospects", at http://www.ctr.columbia.edu:80/vii/papers/horwitz2.htm (Horwitz I) and see R Horwitz, "Telecommunications Policy in the New South Africa: Participatory Politics and Sectoral Reform", (1997) 23 (2) Communicatio at http://www.unisa.ac.za/dept/press/comca/222/horwitz.html (Horwitz II).

[5] Section 7(2) of the Post Office Act provided that Telkom: "... shall... have the exclusive power to conduct the telecommunication service..." See also section 78(1) and 78(2)(a) and (b).

[6] See section 78(5) and section 78(6) of the Post Office Act.

[7] See section 90A(2) of the Post Office Act. See also Government Gazette No 13747, Notice No R324 of 31 January 1992.

motivated policies with then internationally accepted telecommunications regulatory policies.

It is well known that the trend in international regulation has changed.[8] For example the 1996 Telecommunications Act in the United States creates a regulatory framework for the breaking down of monopolies and the introduction of competition[9] and the European Union required its members to liberalize markets nationally and internationally by 1 January 1998.[10] The obligations of the General

Agreement on Trade in Services ("GATS") and the directives of the World Trade Organisation ("WTO")[11] imposed on signatories an obligation to commit to liberalisation and free market rules that contributed significantly to changing trends in regulatory policies. There are a number of reasons why the assumptions that informed previous regulatory frameworks were questioned. In South Africa it was argued that the absence of competition for the state-controlled monopoly resulted in inadequate access for consumers to telecommunications services and inadequate service levels for those consumers who had access to services. There was therefore a need to regulate telecommunications in a different way.

This need received recognition in the White Paper on Telecommunications Policy in South Africa.[12] The central theme of the White Paper was a commitment to economic development[13] and the chosen model for a new regulatory regime was a so-called regulated monopoly. The White Paper directed that a careful balance had to be struck between the phased introduction of competition in the telecommunications sector with its emphasis on the free market on the one hand; and the protection of a regulated monopoly in order to secure access to telecommunications services for disadvantaged persons and underserviced areas on the other hand.[14] The White Paper argued that the retention of a monopoly model will best serve the expansion of the telecommunications infrastructure; that it will serve the development of universal access and that it will serve overall economic growth. In addition the White Paper states that exclusivity will be conducive to customer focus and will enhance South Africa's international capacity.[15] It may be speculated that the retention of a monopoly model was also chosen in anticipation of the sale of a portion of Telkom's equity to a private investor and that the period of exclusivity was promised to guarantee a return on investment. Indeed on 14 May 1997 the South African Government sold a 30% stake in Telkom to the Thintana Communications consortium, consisting of SBC Communications International Inc and Telekom Malaysia Berhad. Against the background of a commitment to development the White Paper required that new legislation in the sector must pay attention to the goal of universal service and put in place the necessary structures and mechanisms to give effect to the ambitions of universal service.[16] Telecommunications is seen in the White Paper as the 'leapfrog' to economic development and universal service is the catalysis for this development.[17] The White Paper thus required the establishment of a universal service agency.[18] Universal service is seen as the heart of policy[19] but the White Paper does not attempt to define universal service and leaves that task to the

[8] See Horwitz I above at 6.

[9] Telecommunications Act of 1996, Pub. L. No. 104-104, 110 Stat. 56 (47 U.S.C.).

[10] Commission Directive of 13 March 1996 amending Commission Directive 90/388/EEC, (With Regard to the Implementation of Full Competition in Telecommunications Markets) at 96/19/EC, OJ L 74/13, 22.03.96. See also the Commission Directive 90/388/EEC (On Competition in the Markets for Telecommunications Services) at http://www.ispo.cec.be/infosoc/legreg/docs/90388.html. For a summary of the European Union Telecommunications Policy refer to The Status Report on European Telecommunications Policy, Update January 1998, DGXIII/A/1 to be found at http://www.ispo.cec.be at 31-33.

[11] See http://www.wto.org. For the detailed provisions of the GATS agreement and the Annex on Telecommunications see: http://www.wto.org/wto/services/services.htm and the hypertext links on that page. The specific commitment of South Africa is at http://www.wto.org/wto/press/bt-3list.htm. See also A Henten, "Trade in Telecoms Based Services" in Melody above at 414.

[12] Government Gazette No 16995, Notice No 291 of 13 March 1996, hereafter referred to as the White Paper. For an overview of the history of the consultative process leading up to the drafting of the White Paper see Horwitz I above at 21-22.

[13] See the White Paper at 17-20.

[14] For example see the White Paper paragraph 2.6 at 12 and see Horwitz I above at 24.

[15] See the White Paper paragraph 2.6 at 23.

[16] See the White Paper paragraphs 1.12 – 1.25.

[17] See the White Paper at clause 1.4 and 1.13 and clause 1.22.5.

[18] See the White Paper at clause 1.12.

[19] See the White Paper at clause 1.19.

Agency to determine the meaning with due consideration for changing contexts.[20]

The policy as formulated in the White Paper found expression in the Telecommunications Act No 103 of 1996[21] which purported to fundamentally change the way in which telecommunications was to be regulated. The South African Telecommunications Regulatory Authority[22] was vested with the power to licence and regulate telecommunications services.[23] What is significant about the establishment of the Authority is that the regulatory authority is now separate from the provider of the telecommunications service or network operator.[24] While this is a departure from the practices of the past it does not materially interfere with the monopoly position of Telkom as set out above.

3 The new monopoly

The Telecommunications Act entrenches the position of Telkom in a number of ways. Principally, Telkom is deemed to be the holder of a licence to provide public switched telecommunications services for a period of 25 years.[25] More significantly, for the first 5 years of that period Telkom has the exclusive power to provide certain services.[26] This period of exclusivity can be extended by an additional year if Telkom meets certain obligations to install lines in certain areas.[27] The Minister determined the time periods of this exclusivity.[28] In addition to this the Telecommunications Act required that once they were set, the licence conditions could not be altered without Telkom's consent.[29] While the Telkom PSTS licence does set out the services that must be provided by Telkom and the obligations it must perform[30] there are, however, provisions that excuse non-performance and deem Telkom to have complied with its obligations under certain circumstances.[31]

Operators who provide services which do not form part of Telkom's exclusive domain such as value added network service ("VANS") and private telecommunications network services ("PTNS") are nonetheless obliged to make exclusive use of Telkom's infrastructure for the purpose of providing their services.[32] VANS operators may not carry voice calls on their networks until a date fixed by the Minster.[33] Public utilities with highly developed telecommunications infrastructures which could be used to provide services akin to public switched telecommunications services are strictly controlled[34] and in some cases are obliged to

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[20] See the White Paper at clause 1.22.2.

[21] See: Government Gazette No 17578, Notice No R68 of 15 November 1996; Government Gazette No 17817, Notice No R20 of 21 February 1997; and Government Gazette No 18074, Notice No R38 of 13 June 1997.

[22] Abbreviated to "SATRA" in the White Paper paragraph 5.16 at 52, but referred to in this paper as "the Authority" which is the terminology adopted in section 1(i) of the Telecommunications Act.

[23] See section 5(1) as read with sections 32(1) and 35 of the Telecommunications Act.

[24] See W Melody, "On the Meaning and Importance of 'Independence' in Telecom Reform", Telecommunication Policy, 1996 (21) 3 at 195.

[25] See sections 36(1)(a), 36(7)(a), 36(7)(b), 36(7)(c) and 36(9)(a) of the Telecommunications Act.

[26] The statutory basis for the licence conditions is found in sections 36(1)(a), 40(1)(a), and 30(3)(a) of the Telecommunications Act. See also section 36(3) of the Telecommunications Act as read with sections 38(1) and 39(1). The Telkom licence comprises three separate authorisations contained in Government Gazette No 17984 of 7 May 1997: Notice No 768 (referred to as the PSTS licence); Notice No 769 (referred to as the VANS licence) and Notice No 770 (although incorrectly printed as Notice No 768, referred to as the Radio licence). For the detailed provisions of the Telkom PSTS licence, see for example clause 2 of the Telkom PSTS licence. In terms of clause 3.1 of the Telkom PSTS only Telkom may provide national long-distance services, international services, local access telecommunication services, public pay-telephone services, facilities for VANS facilities, facilities for mobile cellular telecommunication services, and telecommunication facilities for private networks during the 5-year period of exclusivity.

[27] See clause A2 of Schedule A of the Telkom PSTS licence as read with clause 3.2 of the Telkom PSTS licence. See also clauses A3, A4 and A5 of Schedule A to the Telkom PSTS licence.

[28] See section 36(4) of the Telecommunications Act.

[29] See section 36(5).

[30] See the Telkom PSTS licence at clause 4.1.1(a) (basic telephony); clause 4.1.1 (b) and 4.2 (public pay telephone services); clause 4.1.1(c) and 4.3 (public emergency call services).

[31] See for example the exception to clause 4.1.1 of the Telkom PSTS licence and see clause 4.1.3 of the Telkom PSTS licence.

[32] See section 40(2) and 41(2)(a) of the Telecommunications Act as read with clause 3.1(f) and (g) of the Telkom PSTS licence. See also section 40(2) (no re-sale of VANS facilities) and section 41(5) (no re-sale of private network facilities) of the Telecommunications Act.

[33] Section 40(3) of the Telecommunications Act.

[34] Transnet and Eskom are the statutory bodies responsible for the administration and management of transport and electricity utilities respectively. See the Legal Succession to the South African Transport Service Act No 9 of 1989 and

permit Telkom to use their facilities when it so requests.[35]. Even some of the services which other operators may provide after the lapsing of the period of exclusivity will still be required to interconnect with the Telkom network thus ensuring a continued revenue stream to Telkom.[36] Telkom is also relatively unencumbered with regard to the fees it sets for its services[37] and it is permitted to cross-subsidize non-exclusive services from revenue generated by other services.[38] It is also excused from having certain accounts in place until a period of grace has lapsed.[39]

The provisions set out above are consistent with a regulatory framework affording protection to Telkom and perpetuating the monopoly that existed before 1996. In those areas where Telkom is not given exclusivity the legislation nonetheless ensures a revenue stream to Telkom by compelling operators of non-exclusive services to use Telkom facilities. Whilst the Telecommunications Act envisages a time when other network operators will be able to compete with Telkom, in the interim the monopoly and Ministerial control in important areas remains intact. The important question to ask is whether the chosen model has achieved the goals set. In this regard reference must be had to the universal service obligations of Telkom and the mobile cellular telecommunications network operators. It merits mentioning that some attention should be given to the apparent lack of transparency in the auditing process leading up to the publication of the figures that will reveal whether or not the operators have reached their roll out targets. It cannot be in the public interest that the intended recipients of universal access have little means of knowing whether they are indeed to be favoured by roll out[40] let alone whether or not roll out targets have been met.

the Eskom Act No 40 of 1987. See section 41(3)(a) and (b) of the Telecommunications Act.

[35] See section 44(1)(c) as read with sections 43(1)(c), (d), (e) and 43(4) to (8) of the Telecommunications Act.

[36] See section 38(2) and 39(2) of the Telecommunications Act.

[37] See section 45(1) and (2) of the Telecommunications Act and see clauses 7.1 and 7.2 of the Telkom PSTS licence.

[38] See clauses 8 and 9 of the Telkom PSTS licence.

[39] See clause 8.4 of the Telkom PSTS licence.

[40] Apart, perhaps, in the case of the Telkom PSTS licence of the definition of underserviced areas as well as a reference to certain geographical areas.

4 The universal access requirements of the Telecommunications Act

The South African Telecommunications Act gave expression to the policy of the White Paper by establishing the Universal Service Agency.[41] Its functions are to “strive to promote the goal of universal service” and to encourage, facilitate and offer guidance in respect of any scheme to provide universal access or universal service; to provide telecommunications services as part of reconstruction and development projects where such provision will contribute to the attainment of the objects of the project;[42] and to foster the adoption and use of new methods of attaining universal access and universal service;[43] and to stimulate public awareness of the benefits of telecommunications services.

The Telecommunications Act requires the Agency, having due regard to prevailing circumstances and obtaining public participation, to make recommendations to the Minister to determine what shall constitute universal access by all areas and communities to telecommunications services and the universal provision for all persons of telecommunications.[44] The Agency is also empowered upon request by the Minister to make recommendations in relation to policy regarding universal access or universal service.[45]

The Minister appoints the head of the Agency.[46] The Agency's operating and capital costs are to be provided by money appropriated from Parliament.[47] The Telecommunications Act also provides for the possible phasing out of the Agency whereafter such functions of the Agency will be performed by the Authority.[48]

The Agency is required to manage the Universal Service Fund[49] It is not clear exactly what “manage” means because the Telecommunications Act provides that the Fund shall be managed by the Agency subject to the control and in accordance with the instructions of the

[41] See section 58 of the Telecommunications Act.

[42] See section 59(1)(b) of the Telecommunications Act.

[43] See section 59(1)(c) of the Telecommunications Act.

[44] See section 59(2)(a) of the Telecommunications Act.

[45] See section 59(3)(e) of the Telecommunications Act.

[46] See section 60(1) of the Telecommunications Act.

[47] See section 61(1) of the Telecommunications Act.

[48] See section 64 of the Telecommunications Act.

[49] See sections 59(4) and 65 of the Telecommunications Act.

Authority.[50] The Fund is required to be credited with contributions levied as well as with money accrued from other sources.[51] All money received and credited to the Fund in the Agency's books shall be paid into the National Revenue Fund and thereafter any subsidies to be paid shall be appropriated via Parliament.[52] This is good financial control but it may detract from the independence of the Agency in implementing its plans (to the extent that the Agency can even make plans independent of the Minister). The money in the Fund is to be used only for the payment of subsidies to needy persons towards the cost of the provision of telecommunications services and to Telkom and any other licence holder for the purpose of extending network expansion to areas and communities which are not served or are not adequately served.[53] To this end every holder of a licence granted or deemed to have been granted a licence shall pay, in addition to licence fees, the prescribed annual contributions to the Fund as prescribed by the Authority.[54]

5 Telkom's service obligations

By way of background, this section of the paper sets out Telkom's general or basic service obligations. The reader can safely jump to the next section on the levels of tele-density in South Africa. The Telkom PSTS licence requires Telkom to provide to every person in South Africa who requests it and who can meet Telkom's credit test:[55]

- a basic telephone service,[56]
- the installation and connection of customer premises equipment to terminal connection equipment,[57] and
- the maintenance and repair of the customer premises equipment.[58]

It is also required to provide:

- a public pay telephone service,[59]
- access to a public emergency call service and directory information service.[60]

This obligation to deliver services is qualified by an exception which relieves Telkom of its duties:

"… [if] in the Authority's opinion, any demand for… services is, or can be met, without prejudice to any of the Roll-out Targets, by other means and that accordingly, it would be unduly burdensome in the circumstances for [Telkom] to provide the telecommunications service requested."[61]

What is not clear from this exception is what is the trigger that relieves Telkom of its obligation? The exception seems to suggest that if "other means" can satisfy a demand for services then Telkom is relieved. What is also not clear is what is meant by "other means'. Does it refer to alternative services or an alternative supplier of services? Even once that is established, it is not clear how the "other means" could plausibly make the provision of services "unduly burdensome". At least what the exception does say is that preference must be given to Telkom meeting its roll-out obligation.

Then there is a further qualification to Telkom's obligations to deliver services:

"[Telkom] shall be treated as being in compliance with [its obligation to deliver services] where, at the relevant time, [it] is in compliance with its obligations under Schedule A in an area in which, in accordance with the Roll-out Targets and the provisions of this Licence relating thereto any telecommunication apparatus or telecommunication service in that area has not been installed and become operational."[62]

As far as public pay telephones are concerned, Telkom is required to install such phones in accordance with guidelines prepared by the Authority.[63] Telkom may sub-contract this obligation to a third party which shall be deemed

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[50] See section 65(4) of the Telecommunications Act.

[51] See section 65(1) of the Telecommunications Act.

[52] See section 65(2) and 65(3) of the Telecommunications Act.

[53] See section 66(1) of the Telecommunications Act.

[54] See section 67 of the Telecommunications Act.

[55] Clause 4.5 of the Telkom PSTS licence as read with Schedule C.

[56] Clause 4.1.1(a)(i) of the Telkom PSTS licence.

[57] Clause 4.1.1(a)(ii) of the Telkom PSTS licence.

[58] Clause 4.1.1(a)(iii) of the Telkom PSTS licence.

[59] Clause 4.1.1(b) of the Telkom PSTS licence.

[60] Clause 4.1.1(c) of the Telkom PSTS licence.

[61] The exception to clause 4.1.1 of the Telkom PSTS licence.

[62] Clause 4.1.3 of the Telkom PSTS licence. Clause 13.4.3 of the Telkom PSTS licence also excuse Telkom from delivering services customers who refuse to enter into a contract or who are in default of any obligations to Telkom, or who wish to use the service for illegal purposes.

[63] Clause 4.2.1 of the Telkom PSTS licence.

to be performance by Telkom but Telkom shall be held responsible for any failure by the third party to perform properly.[64] Telkom is required to ensure serviceability levels of 90% for coin operated phones and 95% for card operated phones.[65]

Telkom may cease providing public pay phones at specific places if:

- in a period of 12 consecutive months the cost of providing the service exceeds the revenue,
- the Authority permits Telkom to install an alternative pay phone nearby,
- the Authority or other lawful authority requires Telkom to remove the pay phone,
- the Authority agrees that the specific service should not be continued for any reason, or
- continued provision of the pay phone, in the Authority's opinion, is unduly burdensome.[66]

All cases where the pay phone service is discontinued, except where the Authority has requested its discontinuance, shall be treated as if Telkom has not met its obligation to provide the service.[67]

Telkom is also obliged to use "reasonable endeavours" to meet the needs of hard of hearing persons and is required to have installed by the middle of 2002 in at least 50% of public pay telephones the necessary devices to permit hard of hearing persons to use the phones.[68]

In general these concessions to Telkom are designed to facilitate its delivery of services to under serviced areas as the White Paper was at pains to explain.

6 Tele-density – penetration figures in South Africa

The following figures reveal the pressing need for a regulatory model that advances universal service.[69] For example a study[70] conducted in December 1997, revealed that there were:

- 2.8 million residential lines,
- 1,5 million business lines, and
- 28 thousand farm lines in South Africa.

These figures represented an average telephone penetration of 9.6 telephones per 100 people in South Africa. The study reported that this figure compares favourably with the average for Africa (1,16) and sub-Saharan Africa (0,4) but still lagged far behind the industrial economies.[71] The DRA study also argues that the presence of business lines in the equation inflates the results by almost 30%.

The DRA study also revealed that there was a high correlation between tele-density (main telephone services per 100 people), tele-accessibility (public payphones per 1000 people) and poverty.[72] Also of concern was the correlation of race to poverty. Thus telephone penetration:

- in white households was 85%,
- in Asian households was 74%,
- in coloured households was 37%, and
- in black households was 14%.[73]

The DRA study also showed that:

- 96% of white, coloured and Asian households,
- 86% of urban black households, and
- 50% of rural black households

had universal access.[74] "Access" refers to all individuals having access to a telephone that they can use within a 5 kilometre travelling distance or 30 minutes walking distance.[75]

7 In stark summary:

- of 8.7 million households in South Africa, 2,8 million had a telephone,
- 55% of these telephones were in white households,

[64] Clauses 4.2.2, 4.2.3 and 4.2.4 of the Telkom PSTS licence.

[65] Schedule B of the Telkom PSTS licence.

[66] Clause 4.2.5 of the Telkom PSTS licence.

[67] Clause 4.2.5(d) of the Telkom PSTS licence.

[68] Clause 4.4.3 of the Telkom PSTS licence.

[69] "Service" is defined as the delivery of a telephone to each household or citizen. See the DRA study at 4.

[70] S Stavrou assisted by K Mkhize, "A Telecommunications Universal Service Policy Framework for Defining Categories of Needy People on South Africa", DRA Development, Durban, 1997 referred to as the "DRA study".

[71] See the DRA study at 11.

[72] See the DRA study at 12.

[73] See the DRA study at 12.

[74] See the DRA study at 13.

[75] See the Discussion Paper on the Definition of Universal Service and Universal Access in Telecommunications in South Africa published in October 1998.

- 5,9 million households have no telephone, and
- 2,1 million had no access to a telephone within five kilometres of their home.[76]

Insofar as affordability was concerned, the DRA study concluded that only 3,7 million households (42%) can afford to install and maintain a telephone without assistance. Even with the introduction of new technologies and flexible billing systems this figure will only be reduced to 39%.[77]

In a 1998 examination into the feasibility of introducing a third mobile cellular operator into South Africa,[78] it was revealed that:

- 32% of all households in South Africa have wireline telephony,
- 43% of all households have access to wireline telephony within 5km,
- 24% of all households have no access to wireline telephony at all within 5km,
- only 2% of black rural households have access to wireline telephony,
- 49% of black rural households have access to wireline telephony within 5km,
- 49% of black rural households have no access to wireline telephony at all within 5km.

A Discussion Paper on the Definition of Universal Service and Universal Access in Telecommunications in South Africa published in October 1998[79] showed that the above mentioned figures had not changed dramatically save that there it represented average telephone penetration of 10,05 telephones per 100 people.

Clearly this is inadequate. So then what mechanisms are in place to meet this pressing need?

8 Telkom's universal access obligations

Telkom is required to deliver a total of 2,69 million lines by the middle of 2002. Of these, 1,676 million lines represents Telkom's obligation in underserviced areas.[80] This is broken down into an obligation to deliver 265 000, 318 000, 359 000, 357 000, and 378 000 lines in each of the five years of the exclusivity period respectively. Should Telkom meet 90% of the total roll out and at least 80% of the underserviced roll out before the fourth anniversary of its licence then at its option it shall be rewarded with an extra year exclusivity on the condition that the total line roll out is extended to 3 million and the underserviced roll out by an proportionate amount accordingly[81] The Telkom PSTS licence imposes financial penalties for failure to meet the roll out targets[82] These penalties are mitigated in certain circumstances.[83]

Underserviced areas are defined in the Telkom PSTS licence as:

- any township (which in turn is defined as any area, formally surveyed or informally settled, predominantly inhabited by communities historically discriminated against on the basis of race),
- defined local exchange areas in which the number of residential exchange lines as a percentage of households measured as at June 1996 was less than or equal to 50%, and
- any such local exchange area measured after June 1996 provided the Authority does not object to such classification.[84]

9 The mobile cellular operator's universal access obligations

The two operators currently licensed to provide mobile cellular telecommunications services, MTN (Pty) Limited and Vodacom (Pty) Limited, are required by their licenses[85] to deliver community services in accordance with an implementation timetable.[86] Underserviced areas are defined as a city, town, township, shantytown, location, village or human settlement or any part thereof as prescribed by the Postmaster General from time to time but in any event the areas listed

[76] See the DRA study at 13.

[77] See the DRA study at 22.

[78] See Government Gazette No 18799, Notice No 563 of 30 March 1998, Notice In terms of Sections 27 and 37(2)(b) of the Telecommunications Act, 1996 (Act 103 of 1996) Inviting Representations With Regard to the Economic Feasibility of the Provision of More Than Two Mobile Cellular Telecommunications Services. This is also to be found at http://www.satra.org.za/satnotice.html.

[79] See Government Gazette No 19397 of 22 October 1998.

[80] The tables to Schedule A of the Telkom PSTS licence.

[81] Clause A.2.1 of the Telkom PSTS licence.

[82] Clause A.3 of the Telkom PSTS licence.

[83] Clause A.5 of the Telkom PSTS licence.

[84] Sv "Definitions" in the Telkom PSTS licence.

[85] Government Gazette No 15232, Notice 1078 of 29 October 1993 referred to as the NCTL licences.

[86] Clause 4 of the NCTL.

in the Implementation Timetable. Community service telephones are defined in the NCTL as services that are freely accessible to the general public which are located in an under-serviced area or community centre and charged at special tariffs.[87]The implementation timetable is not a public document, but the overall targets required to be met by the two operators before 30 June 1999, 5 years after receiving their licenses, are 7500 and 22 000 lines for MTN and Vodacom respectively.[88] The NCTL requires both parties to report to the Authority and to provide details of progress made in achieving the roll out of community services. These reports are also not public documents. Anecdotal evidence suggests that publication of the final figures has been delayed by reason of disputes about the methodology of auditing the operators' reports.

10- Best current figures available

Unverified figures for mid 1999 reveal:

- of 9 million households, over 3 million have a telephone,
- 89% of white households have a telephone,
- 77% of Asian households have a telephone,
- 43% of coloured households have a telephone,
- 11% of black households have a telephone,
- the overall percentage of people with fixed telephones and/or cell phone in their house (universal service) is 28.8%,
- 75% of blacks have access to a telephone,
- 94% of coloureds have access to a telephone,
- 98% of Asians have access to a telephone,
- 99% of whites have access to a telephone, and
- the overall percentage of people with telephones they can use within 5 kilometres (universal access) is 81.6%.

These figures apparently confirm an average telephone penetration of 10,05 telephones per 100 people. Even if one concedes that the roll out obligation of Telkom was a high price to pay for its continued monopoly and even conceding further that Telkom and the mobile cellular operators may well achieve their targets,[89] the perception is that in the two years since the granting of the Telkom PSTS licence the net gain in terms of average telephone penetration is not significant. The question this raises is whether the regulatory model, cast in stone as it is, proved to be adequate?

11 Human rights alternatives

The experience in Zimbabwe provides some insight. In Zimbabwe the state owned teleco is afforded similar monopoly protection to that given to Telkom in South Africa.[90] Thus it was not surprising that the application of a privately owned company known as Retrofit to provide a mobile cellular telecommunication service was rejected by the Zimbabwe teleco.[91] Undeterred by this Retrofit launched proceedings in the Supreme Court to challenge this refusal based on a constitutionally entrenched right to freedom of expression. The challenge was successful.[92] How does the right to freedom of expression undermine the statutorily protected monopoly of a state owned teleco? The Supreme Court reasoned that the guarantee to freedom of speech requires not only that persons be free to express themselves, but also that they are not hindered in the means of their expression.[93] The Zimbabwe Chief Justice quoted[94] from the European Court of Human Rights[95] that freedom of expression "applies not only to the content of information but also to the means of transmission or reception since any

[87] Sv "Defintions" in the NCTL.

[88] Government Gazette No 15232, Notice 1078 of 29 October 1993, the Mulitparty Implementation Agreement, referred to as the MPIA, at clause 5.

[89] For example Telkom states in its annual report for 1998 at <http://www.telkom.co.za/annual_report1998/index.htm> that main telephone services for 1997 were 4 258 639 and for 1998 were 4 645 065, a net gain of 386 426, apparently in excess of its obligations for the year under review.

[90] See Section 26(1) of the Zimbabwe Postal and Telecommunications Services Act.

[91] See Posts and Telecommunications Corporation v Retrofit (Pvt) Limited 1994(1) ZLR 630 (ZSC).

[92] In fact it took three court cases before a result was achieved. See Retrofit (Pvt) Limited v Posts and Telecommunications Corporation (Attorney-General of Zimbabwe Intervening) 1996(1) SA 847 (ZSC) (referred to hereafter as Retrofit I), Retrofit (Pvt) Limited v Minister of Information Posts and Telecommunications 1996(3) BCLR 394 (ZS). (referred to hereafter as Retrofit II), and TS Masiyiwa Holdings (Pvt) Limited and another v Minister of Information Posts and Telecommunications 1997(2) BCLR 275 (ZS) (referred to hereafter as Masiyiwa).

[93] See Retrofit I above at 858D-E.

[94] See Retrofit I above at 858E-F.

[95] Autronic AG v Switzerland

restriction imposed on the means necessarily interferes with the right to receive and impart information." The court concluded that:[96]

"… *restriction upon or interference with the means of communication, whatever form it may take, abridges the guarantee of freedom of expression.* [Thus] *any monopoly which has the effect, whatever its purpose, of hindering the right to receive and impart ideas and information, violates the protection of this paramount right.*"

This immediately raises difficult questions for policy makers – and indeed makers of law – because the court said that the focus should be on the *effect of the monopoly* and not on the purpose that it is supposed to achieve.[97] This is important because it ranks the policy that informs the choice of a model for regulation behind the empirical impact that the policy has in the provision of telecommunications services. This approach rejects bald justifications for a model and invites inquiry into the success or failure of the chosen model and therefore perhaps a reassessment of the model chosen. As encouraging as this may be for those citizens who may be clamouring for service, the decision of the court was premised on the important fact that: "... [t]he wireline telephone service [in Zimbabwe]... remains a delinquent service in need of a 'crash programme' of rehabilitation… and [t]here is a pressing need to introduce an efficient mobile cellular telephone service..."[98] So against the background of delinquent performance by the Zimbabwe teleco the court stated that the exclusive privilege to provide a mobile cellular telecommunications service[99] was inconsistent with the guarantee of freedom of speech contained in the Zimbabwe Constitution.[100]

This approach sends out a warning to the beneficiaries of a statutory monopoly but it seems that rank delinquency is required before a court will intervene. In South Africa for example, a challenge to the postal services monopoly failed because the complaining party failed to present any evidence that the statutory monopoly resulted in a sufficiently delinquent performance by the state owned postal company to justify an interference based on the right to freedom of expression.[101]. The disappointing teledensity figures in South Africa referred to above are not in themselves evidence of rank delinquency by the network operators. Indeed it may be seen that when the audited results of the roll out targets are released that the goals have been met. This will be a result, it is submitted, of the designed setting of attainable goals rather than the attainment of universal service. In this light, the underserviced citizens of South Africa may well view the eventual publication of the audited results of the respective operators' universal access roll out obligations with a jaundiced eye.

12 The triumph of human rights and the Internet

The provision of access to the Internet in South Africa has been the subject of a heated dispute between Telkom and the association of independent service providers ("ISPA").[102] The essence of the dispute which had its origins in an ISPA complaint lodged before the competition board was whether or not Telkom could legitima-

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[96] See Retrofit I above at 860B-D: Red Lion Broadcasting Co Inc and Others v FCC (No2) 395 US 367 (1969), City of Los Angeles and Department of Water and Power v Preferred Communications Inc 476 US 488 (1986) (of particular relevance within the context of Telkom making facilities available to persons who request them), Metro Broadcasting Inc v FCC 497 US 445 (1990), Belize Broadcasting Authority v Courtenay and Hoare [1988] LRC (Const) 276 (Belize CA), and NTN Pty Ltd v The State [1988] LRC (Const) 333. It is not intended to analyse whether or not these cases support the conclusion that Gubbay CJ reached, save to state that the decision in Red Lion, for example, has not always been seen as advancing freedom of speech claims, see Turner Broadcasting System Inc v FCC 512 US 622 (1994). It should be noted that the Red Lion case does support the conclusion that free speech has as much to do with positive expression as it does with the right to receive information, see Red Lion at 390.

97 See Retrofit I above at 861H-J.

[98] See Retrofit I above at 853H-J. The quality of the wireline service is best summed up by the judge as follows: "the wireline service is inadequate to meet the present communication needs of the population" (at 852E); "the extent of the shortcomings in the public switched telephone network is a source of major concern among subscribers" (at 852 H); the World Bank reported that: "the quality of service is poor" (at 852I); "the completion rate of telephone calls is unsatisfactory... below 30%" (at 852G); the Corporation's own report stated that: "[the network] is characterized by lack of connectable capacity and subscriber distribution... [which] has led to serious network congestion which inhibits traffic flow" (at 853B-C); "there is a demand for mobile cellular telephone services and that demand is increasing" (at 853F).

[99] See section 26(1) of the Postal and Telecommunications Services Act.

[100] See Retrofit I above at 400I-401A.

[101] See The South African Post Office Limited v van Rensburg and Another 1998(11) BCLR 1608 (E).

[102] For a more detailed history of the relationship between Telkom and the independent ISPs see D Kotlowitz,"Telkom, South Africa's Internet Anschluss: A Cautionary Tale", Unpublished Paper, Toronto, 1998.

tely claim that access to the Internet formed part of its exclusive domain as set out in its PSTS licence.[103] In October 1997 the Authority ruled that in the context of the Bill of Rights and the policy as expressed in the White paper, in particular the right of access to information as well as the goal of universal service, the provision of Internet services constitutes a value-added service to a telecommunications infrastructure and that Telkom had no claim to monopolise the provision of value added network services ("VANS"). The Authority was faced with an immensely difficult technological question, as this crude representation of the dispute plainly reveals. This is particularly so if one considers that the Advisory Committee[104] appointed to assist the Authority was unable to formulate a unanimous view on the technological questions.[105] Faced with this task, however, the Authority chose, it is submitted, to inform its decision on the basis of human rights contained in the South African Bill of Rights rather than on the technological niceties of the respective parties' arguments. It is submitted that the ruling reveals the dilemma that the Authority will face in future attempts at regulation in the sector. On the one hand it has expressed a desire to meet the policy objectives of the White Paper and constitutional reform in South Africa, ie: universal service based on a right, amongst others, of access to information. On the other hand it is guided by a formal legislative environment that apparently favours monopoly. It is submitted that on this occasion human rights imperatives informed the Authority's decision and that its finding on the technological grounds in favour of ISPA was orientated by result rather than by design. Thus the status quo persists and ISP's licensed under the deeming provisions of Telecommunications Act or those with interim licences issued by the Authority[106] continue to compete with Telkom in the market-place.

Telkom launched review proceedings in the High Court to challenge the ruling. The High Court agreed with Telkom that the process initiated by the Authority for the determination of the dispute was procedurally flawed.[107] However, it was also held that in the absence of any evidence of prejudice suffered by Telkom it was not prepared to exercise a discretion to set aside the Authority's pronouncement.[108] The judge accordingly ordered that the matter proceed to oral evidence for the determination of the technical issues to establish whether or not Telkom's rights in terms of its licence have been violated as a result of the pronouncement.[109]

At the date of writing the matter is still pending. This notwithstanding, it is encouraging that where the technological questions did not permit of an unambiguous answer, the Authority was influenced by normative arguments and no protection was extended to the monopoly. Regrettably, in the face of the text of the relevant legislation and licenses it must at least tentatively be concluded that the extension of this approach by a regulatory authority or a judge to the delivery of basic services will fail.

[103] See Government Gazette No 18262, Notice No 1309 of 3 September 1997 and Government Gazette No 18272, Notice No 1320 of 5 September 1997.

[104] See Advisory Committee Report Final Version 10 October 1997. Text obtained from the Internet Service Providers' Association, Johannesburg.

[105] See Telkom (SA) Limited v Maepa and others, unreported judgement of the High Court of South Africa (Transvaal Provincial Division), Case no 25840/97 of 8 April 1998, referred to hereafter as Maepa above at 16.

[106] See section 40(1)(b) of the Telecommunications Act and the interim guidelines set out in Government Gazette No 18462, Notice No 1811 of 20 November 1997.

[107] See Maepa at 14, 21, 23, and 24.

[108] In any event it was common cause between all the parties that the pronouncement did not have the force of law. See Maepa at 18.

[109] Maepa at 24-26.

Biography

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DEV.2

Acceso universal y su compatibilización con la apertura de mercados en Bolivia

1 Presentacion

El objetivo del presente documento es el de mostrar un modelo de compatibilización de la próxima apertura de mercados de los servicios local y de larga distancia a la competencia –que Bolivia tiene planificado concluir el 2001– con un objetivo irrenunciable como es el del acceso universal.

Tanto el modelo de apertura como el de acceso universal responden a un objetivo más ambicioso que es el de contribuir a la lucha contra la pobreza, asegurando a través de la expansión de la infraestructura de telecomunicaciones una mayor participación social y un acceso más amplio a los servicios básicos.

En Bolivia, durante los próximos dos años previos a la apertura de mercados, el tema central del debate en materia de telecomunicaciones, será el de la compatibilización de la liberalización de los mercados con el modelo que garantice el acceso universal.

El punto central de la formulación de este modelo está en la noción de que el acceso universal debe evolucionar al ritmo del progreso técnico y del desarrollo del mercado como factor clave de lucha contra la pobreza a través del desarrollo integral de la comunidad boliviana, garantizando además y a través de la provisión de los servicios de telefonía básica, otros servicios básicos complementarios, que permitan elevar el nivel de vida de las comunidades beneficiarias.

Esta declaración central respecto al acceso universal debe constituir la médula de una política pública en la que la idea rectora señale que los servicios de telecomunicaciones deben dejar de ser prerrogativa de una relativamente pequeña elite urbana y estar generalmente disponibles en todo el territorio del país brindando una amplísima gama de servicios fundamentales para el desarrollo de comunidades completamente desatendidas al momento.

Por supuesto, esta declaración general deberá ser desarrollada en cuestiones como la definición de acceso universal que adoptaremos, los aspectos prioritarios, la reglamentación específica del mismo que contemple mecanismos serios de supervisión, aplicación, coste, financiamiento y uso de tecnología; aspectos que irán definiéndose más claramente a medida que se realicen los estudios necesarios en el país. Sin embargo, la idea rectora está planteada en esta exposición.

De lo que no hay duda es que los retos del acceso universal, por lo menos para países en desarrollo de economías pequeñas y vulnerables, como Bolivia, quedarán para la primera o las dos primeras décadas del próximo siglo. Todo indica que el objetivo prioritario de la UIT de que toda la humanidad debe situarse eventualmente con fácil acceso a un teléfono para inicios del próximo siglo difícilmente será alcanzado.

2 Diagnóstico

Bolivia es un país mediterráneo, situado al centro del continente sudamericano y rodeado por Brasil, Paraguay, Argentina, Chile y Perú. Su territorio, de poco más de un millón de kilómetros cuadrados es de una topografía sumamente accidentada que contiene zonas andinas, valles templados y llanos tropicales, y ciudades que se sitúan a alturas que oscilan entre los 100 y los 4000 metros sobre el nivel del mar.

La población de Bolivia, con una tasa promedio de crecimiento de 2,39% durante los últimos años, ha alcanzado a fines de 1998 a casi 8 millones de habitantes. Tal como ocurre en muchos países en desarrollo, tan sólo el 55.83% vive en ciudades mayores a los 10 000 habitantes y, en cambio, hay un 19,59% que lo hace en 8793 poblaciones dispersas que no alcanzan a albergar ni siquiera 350 habitantes.

Bolivia es un país en desarrollo que, de acuerdo a sus indicadores macroeconómicos y de comercio exterior, podría ser catalogado bajo la nueva categoría de países de economía pequeña y vulnerable y presenta niveles de desarrollo humano muy bajos y, consecuentemente, altos índices de pobreza, sobre todo en el área rural. Todo esto pese a la aplicación de un programa de ajuste estructural desde 1985, a tener durante los últimos 5 años tasas de crecimiento mayores al 4%, a haber conseguido atraer un importante contingente de inversión extranjera en los sectores de hidrocarburos, telecomunicaciones, energía y construcciones, y al clima democrático en el que vive desde 1982.

Su extensa y accidentada geografía, lo reducido de la población en gran parte de su territorio y sus grandes problemas económicos, han creado en conjunto barreras difícilmente superables a la integración vial, en primera instancia y como consecuencia, a la provisión de servicios básicos fundamentales tales como la educación o la salud.[1]

El 95 % de los pobladores de las localidades de menos de 350 habitantes, se encuentra dentro de la categoría de pobreza extrema, entendiéndose por pobreza como el estado de necesidad, carencia o privación de los bienes y servicios necesarios para el sustento de la vida.[2]

Este porcentaje de población que vive en la pobreza no tiene acceso a la educación primaria, la escasa cobertura de educación se hace mediante escuelas de zonas aledañas, la calidad de la enseñanza rural esta considerada como la más baja de Latinoamérica, a ello se suma la deficiente cobertura en el servicio sanitario, limitando a unos pocos el acceso a agua potable –el alcantarillado es inexistente– y la exigua, deficiente y a veces inaccesible atención básica de salud, debido a la ausencia de profesionales y falta de equipo médico apropiado.

Este sector poblacional tampoco tiene acceso a programas de educación agrícola organizada, por tanto existe un total desconocimiento de las nuevas formas de producción que podrían mejorar su situación, no se destina a este público programas de alimentación la que está restringida a los alimentos tradicionales, menos aún tiene acceso a seguridad policial.

No cabe duda que los logros alcanzados en materia macroeconómica son auspiciosos. Sin embargo, Bolivia tiene aún problemas infraestructurales muy grandes, que sumados al alto peso de su deuda o su dependencia de los recursos naturales, muestran una situación crítica a largo plazo. Queda aún mucho camino por recorrer para solucionar problemas de pobreza y de pobreza extrema, temas en los cuales el Gobierno de la República de Bolivia está concentrando su atención.

3 Telecomunicaciones

La Superintendencia de Telecomunicaciones de Bolivia tenía en su registro a 2088 operadores legales en diciembre de 1998. El mayor número de operadores se concentra en las redes privadas de comunicación, seguido por las empresas autorizadas de radiodifusión.

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[1] Los medios de vinculación del país alcanzan al 37% de los que la mayoría son de tierra y sendas y las telecomunicaciones no han extendido su redes a estos sectores.

[2] Falta de participación activa en las decisiones colectivas, la marginación social, actitudes de desaliento y la adscripción a una escala de valores diferenciada de alguna manera del resto de la sociedad. (Altimir, 1979).

INDICADORES GENERALES	
SITUACIÓN GEOGRÁFICA	Zona central de Sud América
ÁREA GEOGRÁFICA	1.098.581 km^2
LÍMITES GEOGRÁFICOS	Argentina, Brasil, Chile, Paraguay y Perú
DIVISIÓN POLÍTICA	9 departamentos, 112 provincias, 313 municipios y 1384 cantones
ESTRUCTURA DEL GOBIERNO	Poder ejecutivo, poder judicial y poder legislativo
SISTEMA DE GOBIERNO	Democrático
CAPITAL CONSTITUCIONAL	Sucre
CAPITAL POLÍTICA	La Paz
POBLACIÓN TOTAL	7.949.933 habitantes
TASA DE CRECIMIENTO POBLACIONAL	2,39% anual
DENSIDAD POBLACIONAL	7,24 hab./km^2
PRINCIPALES CIUDADES	La Paz, Cochabamba y Santa Cruz
IDIOMAS	Castellano, Aymara, Quechua y Guaraní

PRINCIPALES INDICADORES MACROECONÓMICOS		
	1997	1998
PIB (en millones de dólares)	7880	8857[1)]
PIB PERCAPITA (en US$)	990	1040
TASA DE CRECIMIENTO DEL PIB REAL	4,36	4,75
INVERSIÓN (en % del PIB)	18,7	18,9[1)]
INVERSIÓN DIRECTA EXTRANJERA (en % del PIB)	7,40	7,30
TASA DE INFLACIÓN ANUAL (en %)	6,73	4,39
TIPO DE CAMBIO (Bs/US$)	5,26	5,52
TASA DE DEVALUACIÓN ANUAL (en %)	3,35	4,88
ÍNDICE DEL TIPO DE CAMBIO EFECTIVO REAL	118,0	119,6
DÉFICIT DEL SECTOR PÚBLICO (en % del PIB)	3,40	4,00
EXPORTACIONES (valor FOB en millones de US$)	1167	1104
IMPORTACIONES (valor CIF en millones de US$)	1851	1983

1) Estimado.

INDICADORES SOCIALES EN 1997	
ÍNDICE DE DESARROLLO HUMANO (IDH)	0,652
PUESTO EN EL RANKING DEL IDH	112
TASA DE ANALFABETISMO	20%
TASA DE MORTALIDAD INFANTIL NIÑOS > 5 AÑOS	116 por cada mil
TASA DE MORTALIDAD DE LACTANTES	75 por cada mil
TASA DE MORTALIDAD MATERNA[*)]	650 por cada 100 mil nacidos vivos
ESPERANZA DE VIDA AL NACER	61
ÍNDICE DE ESCOLARIDAD[*)]	0,76
TASA DE DESEMPLEO ABIERTO (ciudades capitales)	4,43

*) Datos a 1995.

Sin embargo, para lograr una mejor aproximación al mercado de telecomunicaciones en Bolivia, debemos aislar de todos los operadores a los proveedores de servicios al público a partir de su clasificación en servicios básicos (servicios al público conmutados de voz en tiempo real) y servicios no básicos (todos los otros servicios al público).

Los servicios básicos de telefonía local, son provistos en un 95% por cooperativas telefónicas (15 en total, una por cada área geográfica de importancia), empresas que gozan de un privilegio de exclusividad para la provisión de dicho servicio en sus respectivas áreas de operación hasta fines del año 2001. Además de las cooperativas dos empresas dan el servicio local en algunas áreas más pequeñas y tampoco están sometidas a la competencia.

Los servicios básicos de telefonía de larga distancia nacional e internacional, en cambio, son provistos en todo el territorio nacional por una única empresa, ENTEL S.A. que también goza de similar privilegio de exclusividad. ENTEL S.A. es privada, de propiedad compartida entre Telecom Italia, trabajadores de la empresa y el conjunto de ciudadanos bolivianos, representados en partes iguales por dos administradoras de fondos de pensiones (AFP).

Completan el panorama de los servicios básicos, las dos empresas proveedoras de servicio móvil celular que, desde 1996 compiten por el mercado, compartiendo a la fecha porciones casi iguales del mismo. Aunque está en marcha la licitación de una concesión para la provisión del servicio de comunicación personal (PCS), y se estima que a inicios del 2000 la empresa ganadora de dicha licitación entrará al mercado de la telefonía móvil a competir con estos dos proveedores del servicio celular.

Los servicios considerados no básicos son provistos por diferentes compañías y el rango de servicios abarca buscapersonas, televisión por cable (incluidos los servicios de televisión codificada y transmitida por tecnología MMDS), servicios de valor agregado, transmisión de datos y otros.

Los servicios de buscapersonas se operan mediante varias empresas, sin embargo hasta la fecha no existe primacía de ninguna de ellas y su campo de acción esta limitado a un área geográfica pequeña. Tampoco están muy desarrolladas las redes de las empresa de televisión codificada (por cable o inalámbricas), cuyas áreas de servicio se circunscriben a ciertos barrios residenciales de las ciudades más importantes y alguna que otra ciudad intermedia. Los servicios de transmisión de datos son provistos por empresas que tienen licencia para IBS, cooperativas telefónicas, ENTEL S.A. o por revendedores de servicio y algo similar sucede con los servicios de valor agregado.

A pesar de tan poco alentador panorama, el sector de telecomunicaciones es sin duda uno de los de mayor dinamismo en Bolivia. A partir de un proceso de reformas que ha derivado en la promulgación de una nueva Ley de Telecomunicaciones, acorde con las necesidades de mercado, y la creación de un ente regulador independiente, se han dado las condiciones de estabilidad que aseguran un mayor grado de inversión privada.

Las actividades del sector se encuentran normadas por un Sistema de Regulación sectorial conocido como SIRESE. Este sistema esta integrado por un conjunto de normas de aplicación general (Ley del Sistema de Regulación sectorial y sus reglamentos) y leyes y reglamentos sectoriales. La ley del SIRESE establece los objetivos generales del sistema, los organismos que lo conforman, sus competencias generales, normas sobre otorgamiento de concesiones, disposiciones antimonopólicas, de defensa de la competencia y mecanismos de arbitraje e impugnación.

Las leyes sectoriales, a la vez de precisar las atribuciones de los entes de regulación sectorial determinan las normas sobre organización del sector, precisan las reglas específicas en torno a concesiones, licencias y registros, instauran estándares técnicos, mecanismos de fijación de tarifas, tasas, infracciones y sanciones y norman los procedimientos de reclamos, recursos e impugnaciones. La Superintendencia de Telecomunicaciones es el ente encargado de regular el sector.

El Sistema de Regulación Sectorial tiene como objetivo el asegurar el equilibrio entre los intereses de los usuarios de servicios públicos, los proveedores de los mismos y el Estado.

Sin embargo, los pasos son todavía iniciales y los frutos pequeños. Pese a haberse duplicado durante los últimos 3 años, la penetración telefónica en Bolivia es aún muy baja a nivel urbano y casi inexistente a nivel rural.

El siguiente cuadro muestra la evolución de la penetración telefónica en el área urbana (poblaciones de 10 000 o más habitantes), de los últimos 15 años.

PENETRACIÓN TELEFÓNICA							
Año	**Población**	**Líneas fijas en servicio**	**Penetración telefónica**	**Líneas móviles en servicio**	**Penetración telefonía móvil**	**Total líneas en servicio**	**Penetración telefónica**
1985	5 550 542	158 746	2,86%	0	0,00%	150 746	2,86%
1986	5 665 761	159 774	2,82%	0	0,00%	159 774	2,82%
1987	5 783 372	164 248	2,84%	0	0,00%	164 248	2,84%
1988	5 903 425	165 296	2,80%	0	0,00%	165 296	2,80%
1989	6 025 970	169 932	2,82%	0	0,00%	169 932	2,82%
1990	6 151 059	182 686	2,97%	0	0,00%	182 686	2,97%
1991	6 278 744	204 059	3,25%	295	0,00%	204 354	3,25%
1992	6 420 792	208 034	3,24%	1 551	0,02%	209 585	3,26%
1993	7 065 211	231 739	3,28%	2 659	0,04%	234 398	3,32%
1994	7 313 939	242 823	3,32%	4 056	0,06%	246 879	3,38%
1995	7 413 834	246 881	3,33%	7 229	0,10%	254 110	3,43%
1996	7 588 392	348 595	4,59%	33 400	0,44%	381 995	5,03%
1997	7 767 059	384 530	4,95%	118 433	1,52%	502 963	6,48%
1998	7 949 933	452 568	5,69%	238 500	3,00%	691 068	8,69%

La penetración rural a fines de 1997, último dato comprobado, apenas había alcanzado la cifra de 0,16%, con algo más de cinco mil líneas telefónicas en servicio, para una población cercana a los tres millones y medio de personas.

Debe destacarse que pese a nuevas inversiones y expansiones de redes y plantas ejecutadas por las empresas de telefonía fija local, gran parte del crecimiento en la penetración a nivel urbano obedece a las altas tasas de expansión del servicio móvil celular. En la actualidad un 34,51% de la penetración está explicada por la telefonía móvil celular.

El sistema de tarifación denominado el que llama paga (*calling party pays*) aplicado a la provisión del servicio móvil celular desde fines de 1996, así como la venta de aparatos celulares a bajo precio y de tarjetas de prepago – que eliminan la necesidad de realizar contratos o la obligación de cubrir mensualmente montos fijos importantes, – a cambio de una casi obligatoria condición de ser socio de una cooperativa local con el pago de US$ 1500, para gozar del servicio telefónico, explican el crecimiento explosivo de la demanda por el servicio móvil celular.

En cuanto al servicio de telefonía pública, cuyos proveedores son los mismos que los del servicio local y de larga distancia, a la fecha, existen algo más de nueve mil líneas en servicio de teléfonos públicos en Bolivia, de los cuales únicamente 9,6% sirven en el área rural y el restante en el área urbana.

4 Acceso universal hoy

En Bolivia el objetivo de asegurar acceso a los servicios de telecomunicaciones a las comunidades rurales se vincula con la idea de acceso universal «un teléfono debe encontrarse a una distancia razonable del hogar o lugar de trabajo de todas las personas» (UIT).

En el área urbana, se ha impuesto a los proveedores del servicio local la obligación de atender a un porcentaje determinado y creciente de toda nueva solicitud de servicio en un periodo de tiempo determinado. Sin embargo, existe una demanda cautiva que no realiza la solicitud del servicio por no poder pagar el costo de ser socio o, alternativamente, no poder pagar las altas tarifas que aplican estas cooperativas a abonados no socios de las mismas. Por lo tanto, se hace necesario definir una fórmula alternativa de enfrentar la existencia de esta demanda cautiva.

En el área rural, a pesar de que no existe en las leyes bolivianas un apartado que de manera explícita se ocupe de definir el acceso universal y sus mecanismos, del conjunto normativo se puede colegir que está en vigencia una política de cobertura geográfica debido a la escasa llegada de los servicios básicos de telecomunicaciones en regiones rurales.

Como es característica de este modelo, la extensión del servicio a ciertas zonas rurales adopta la forma de metas cuantitativas de expansión de duración relativamente largas, cuyo cumplimiento deberá realizarse de manera gradual hasta que concluya el periodo de exclusividad. Sin embargo no se hace una reglamentación detallada respecto al método de financiación del coste de su cumplimiento o a su situación futura. Dicho coste se sufraga hoy con una subvención cruzada dentro de la empresa.

Las dificultades para ampliar la cobertura telefónica en el área rural de Bolivia derivan de la falta de rentabilidad de los sistemas, producto del bajo tráfico telefónico que podrían generar los habitantes de las poblaciones beneficiarias. Esto origina que la iniciativa privada no se interese por esta actividad.

Como se indicó, la reglamentación aborda de forma detallada la cantidad de poblaciones a ser cubiertas por los operadores en exclusividad en telefonía fija y del de larga distancia con un criterio netamente cuantitativo, las poblaciones de más de 350 habitantes y menos de 10 000 deben tener acceso a un teléfono en el área rural y en la zona urbana un porcentaje mínimo de las solicitudes de línea debe ser atendida en cierto tiempo por el operador.

Hasta diciembre del 2000 los operadores de la telefonía fija y de la larga distancia habrán instalado teléfonos en 1453 poblados rurales. Adicionalmente el Estado, a través de un ente específico, independiente del órgano regulador y dependiente del Poder Ejecutivo, presta servicios actualmente a 254 poblaciones del país, con sistemas HF y bajo la modalidad de red cerrada, sin interconexión.

Sin embargo dar prioridad exclusiva o muy elevada a la cobertura geográfica puede plantear cuestiones de rentabilidad versus equidad, porque en las zonas más distantes o menos pobladas el coste por línea de acceso añadida puede ser sumamente alto.

Por tanto es necesario plantear un modelo que resuelva dicha disyuntiva y que sea capaz de acelerar el progreso en general mediante el acceso universal, a nivel urbano y a nivel rural. El momento es oportuno dada la proximidad de la segunda reforma estructural del sector que se producirá con la apertura de mercados.

5 Modelo boliviano

Se ha dicho que el acceso universal es un concepto dinámico y evolutivo, íntimamente ligado al desarrollo tecnológico y económico y a la demanda de los usuarios. La extensión de su obligación debe definirse buscando siempre un equilibrio que aúne por una parte, la participación de los ciudadanos en la sociedad de la información, marco global en el que se encuadra, y por otra, la competitividad como principio rector de las telecomunicaciones.

La idea básica del acceso universal de ofrecer a todos los usuarios un conjunto mínimo de servicios e infraestructuras de telecomunicaciones comunes accesibles a una distancia razonable, está en definitiva determinada por el grado de evolución de las economías y de las redes de telecomunicación en los distintos países.

En Bolivia con motivo de la apertura de mercados se tiene previsto combinar la política de acceso universal con una política social con el sello de equidad distributiva, lo que implicará que el acceso a los servicios de telecomunicaciones deberá facilitar el acceso a servicios sociales básicos como la educación, salud, o seguridad de quienes no pueden en la actualidad ni podrán en el futuro acceder al circuito económico.

La aspiración fundamental de este concepto es la de reducir la desigualdad entre sus ciudadanos, al menos en cierto grado, y lograr la participación social de los mismos mediante el uso de tecnologías de telecomunicaciones, para romper el aislamiento de un importante porcentaje de la población, que de lo contrario cada vez estaría más alejada de los estándares nacionales e internacionales de forma de vida y producción.

Los significados del acceso universal en el modelo boliviano serían en ese marco los siguientes:

En el área urbana: Satisfacer la demanda de líneas telefónicas.

En el área rural: Cubrir zonas geográficas donde se concentran las poblaciones de extrema pobreza no atendidas con servicio de telecomunicación facilitando el acceso a servicios básicos, tales como educación, salud, sanitarios, agrícolas y de seguridad.

En general: Integrar a los bolivianos a la sociedad de la información.

El modelo boliviano de acceso universal tiene dos componentes básicos el urbano y el rural ya que en ambos la infraestructura existente es pobre e inadecuada.

6 Acceso universal en el área urbana

El acceso universal en el área urbana será solucionado mediante el modelo a ser adoptado en Bolivia para la apertura de mercados, la separación estructural, que permitirá la expansión de la infraestructura de telecomunicaciones a cargo de un operador de la red de acceso en régimen de exclusividad e incrementará la oferta de servicios de los operadores en competencia.

La futura liberalización del mercado local y de larga distancia en Bolivia no constituye un fin en sí mismo, sino una estrategia para lograr los objetivos de política social. La promoción de la competencia es emergente de la constatación, de que el mejor regulador es el mercado y por ende al generar las condiciones de libre competencia, los agentes económicos desarrollarán sus mejores habilidades para disminuir costos, mejorar el servicio y crecer rentablemente.

Bolivia analiza detenidamente que de acuerdo a las experiencias latinoamericanas, la liberalización de los mercados no ha generado otra cosa que el congelamiento de las redes y que a pesar de todos los esfuerzos realizados no se ha producido una efectiva competencia en las telecomunicaciones locales.

Debido al escaso desarrollo alcanzado en Bolivia en las telecomunicaciones locales fijas a pesar de su monopolio legal, la penetración telefónica en nuestro país medida como la densidad telefónica por cada 100 habitantes es muy baja y la perspectiva de mejorar radicalmente este parámetro no es muy halagüeña por las características monopólicas del mismo.

Considerando que:

- La apertura del mercado de telecomunicaciones a la competencia no siempre desarrolla los segmentos atrasados porque los entrantes al mercado local tienden a enfocarse a los nichos de mercado más rentables descuidando los segmentos residenciales.
- La tecnología abarató los costes de inversión en los equipos de telecomunicación permitiendo en muchos casos la competencia, sin embargo las comunicaciones en el área local cuentan con componentes de poca tecnología como cables, postes, ferretería etc. que tienen todavía costos muy altos y con tendencia a incrementarse.
- Las opciones de telefonía inalámbrica, telefonía celular o televisión por cable no se constituyen en la actualidad en servicios perfectamente sustitutivos por su limitada capacidad en cuanto a la cantidad de información que pueden transportar y al alto costo que significaría su utilización en zonas densamente pobladas, en el caso de la telefonía inalámbrica (WLL) y la telefonía celular; y por el incipiente desarrollo de sus redes, en el caso de la televisión por cable.

Se hace necesaria la segmentación del mercado local de telecomunicaciones en dos partes totalmente distintas, una que corresponda a la red de acceso y otra a la que facilita la conmutación de las comunicaciones.

Separando estructuralmente la operación de estos dos segmentos, obtendríamos dos empresas, una con características monopólicas y la otra con características competitivas. La primera empresa sería la dueña de toda la planta externa hasta el distribuidor principal, incluyendo también las edificaciones que albergan a los equipos de telecomunicaciones. La otra empresa sería la propietaria de las centrales de conmutación y todos los sistemas de atención y facturación al cliente.

Con la apertura del mercado de telecomunicaciones, los nuevos operadores competitivos del mercado local se convertirían en clientes de la empresa de acceso al utilizar sus facilidades, y todos al mismo precio. Los usuarios finales tendrían la posibilidad de elegir la empresa de conmutación de su agrado generándose de esta manera, una verdadera competencia en los servicios de telecomunicaciones locales.

Esta sana competencia generaría una mejora substancial en los indicadores de penetración telefónica y mejoraría los servicios y tarifas. Sin embargo como contraparte para garantizar el retorno de la gran cantidad de inversión que se requerirá en la red de acceso, ya que seguramente se definirán planes de desarrollo de redes e infraestructura que obligatoriamente deberán cumplirse, la empresa propietaria de la misma deberá gozar de un periodo de exclusividad, es decir que, las empresas que atienden a los usuarios finales de las telecomunicaciones locales deberán utilizar forzosamente estas facilidades.

Este requisito se hace necesario, pues de otra manera, las empresas de conmutación local desarrollarían sus redes hacia los abonados de alto tráfico y utilizarían la red de acceso de la empresa de infraestructura solamente en los abonados marginales y dispersos generándole un desbalance económico insostenible.

De esta forma:

- Se garantizaría el continuo y planificado crecimiento de la infraestructura de la red.
- El beneficio a las poblaciones marginales que aún no tienen acceso estando en la zona urbana.

- La competencia en la provisión del servicio, lo cual trae aparejado, la diversidad de productos, una tarifa de mercado y servicios de calidad.

La regulación habría contribuido de esa forma al cometido del acceso universal allí donde hay expectativas de alto crecimiento, es decir, demandas insatisfechas en áreas de alta densidad urbana.

7 Acceso universal en el área rural

Por la constatación realizada en este documento de la existencia de grandes sectores marginados y en situación de pobreza extrema, es imperativo ligar el acceso universal con los objetivos de lucha contra la pobreza de la sociedad boliviana a través de una mayor inversión en telecomunicaciones, educación, salud y desarrollo rural.

A partir de las reformas estructurales llevadas a cabo en el país, el rol del Estado ha cambiado, moviéndose de planificador y centralista, hacia un papel de facilitador y normador, dejando parte del equilibrio económico y social a las fuerzas naturales del mercado. Empero se debe lograr que los ajustes estructurales y económicos se traduzcan gradualmente en posibilidades de crecimiento para todos los segmentos de la población.

Grandes sectores rurales del país no se han incorporado aún activamente a la vida nacional y resulta impracticable la aplicación de un esquema de mercado a poblaciones que aún se encuentran muy lejos de satisfacer sus necesidades básicas, que se debaten entre la indigencia y la marginalidad, y que poseen sus propias condiciones de diversidad social, económica, organizativa y geográfica.

Los avances tecnológicos junto a los dinámicos procesos de desarrollo a nivel mundial han permitido que las telecomunicaciones se conviertan en un instrumento capaz de lograr la integración del país con los sectores rurales pobres, y más aún de permitir la aplicación de programas complementarios a distancia, fundamentalmente en las áreas de educación, salud y asistencia agrícola y alimentaria, con directo impacto de beneficio en dichos sectores, brindando así la posibilidad de encarar estructuralmente la lucha contra la pobreza.

En ese marco, en el área rural el sistema propuesto de acceso universal es el de la creación de un fondo común constituido por todas las aportaciones de los operadores que vienen siendo realizadas desde el inicio del periodo de exclusividad por concepto de pagos de derecho y uso de frecuencia, montos percibidos por licitaciones públicas, multas, etc.; las nuevas aportaciones de estos bajo el régimen de competencia y lo más importante, fondos concesionales externos.

El uso de los recursos de este fondo tendrá el objetivo de lograr el desarrollo armónico de la infraestructura de telecomunicaciones y sus servicios en las áreas rurales más deprimidas del país, que en su mayor parte no generarían rentabilidad económica.

En una primera fase el Estado será el encargado de extender la red de acceso y brindar una cobertura telefónica directa a los poblados elegibles e implementar los programas complementarios de salud, educación y otros.

En una segunda etapa de ejecución, cuando el escenario se muestre atractivo para las inversiones se tiene previsto el otorgamiento de subsidios estatales con fondos concesionales externos a operadores privados, que mediante concursos públicos sean elegibles para hacerse cargo de la operación, administración, mantenimiento y ampliación de dichos proyectos.

Los proyectos deben tener como mínimo la rentabilidad suficiente que permita el pago de su propia operación, administración y mantenimiento a operadores privados e idealmente permita el pago de la deuda contraída.

Estas condiciones serán posibles al incorporar a los ingresos provenientes del tráfico de telefonía básica generado –en la modalidad entrante o saliente– por las comunidades, el ingreso generado por el tráfico de programas complementarios de salud, educación y otros y contando al mismo tiempo con los beneficios de plazo y tasa de interés de fondos concesionales.

En el modelo boliviano de acceso universal en el área rural se advierte que éste maximiza la responsabilidad de la dirección de la empresa adjudicataria porque mide los costos y el déficit de ingresos en relación con los costes.

El acceso a las telecomunicaciones permitirá a estas poblaciones contar con el instrumento a través del cual se desarrollarán otros programas a distancia, principalmente en las áreas de educación, salud, asistencia agrícola y alimentaria y seguridad ciudadana.

Afrontar estas necesidades bajo las formas convencionales de construcción de infraestructura, se llame caminos, puentes, escuelas o postas sanitarias con el equipamiento necesario, formación de personal calificado sería excesivamente costoso en términos monetarios y tomaría demasiado tiempo.

El uso de las telecomunicaciones es a todas luces la vía más rápida y de menor costo para dotar de los servicios básicos a las poblaciones beneficiarias, apoyando y promoviendo el desarrollo socioeconómico del área rural, para mejorar las condiciones y la calidad de vida de sus habitantes y lograr integrar a más bolivianos a la sociedad de la información.

8 Conclusiones

La estabilidad económica alcanzada por Bolivia y las políticas económicas adoptadas dan lugar a un proceso de crecimiento sostenido. Los resultados recientes, a pesar de la crisis financiera internacional, permiten prever la continuidad de la estabilidad macroeconómica para los periodos futuros.

Bolivia genera un ambiente propicio para las inversiones, por la estabilidad política lograda, en el contexto de una democracia consolidada y madura; por la institucionalización de importantes sectores del Estado, fruto de reformas jurídicas y sectoriales; que brindan reglas claras de juego e instrumentos que garantizan la seguridad jurídica. En este contexto, se espera que la inversión continúe siendo la variable de demanda agregada más dinámica y que los sectores de telecomunicaciones, hidrocarburos y energía impulsen el crecimiento económico.

Asimismo, se prevé que el nuevo marco institucional y las inversiones públicas estimularán mayores niveles de inversión privada, lo que generará un crecimiento en el producto con su efecto sobre el nivel de empleo.

No obstante los logros alcanzados hasta la fecha, el crecimiento de la economía es aún insuficiente para resolver los críticos niveles de pobreza. Sin embargo, los mayores gastos sociales permitirán que la población pobre acceda a beneficios del crecimiento, con lo que se promoverá una lucha directa contra la pobreza.

Un instrumento para iniciar esta lucha es el modelo de compatibilización de la apertura de mercados de telecomunicaciones con el acceso universal, cuyos postulados, aún en desarrollo y con mucha interrogantes por resolver, se resumen a continuación:

- Existen problemas a nivel urbano y a nivel rural que exigen enfoques diferentes y soluciones específicas.
- A nivel urbano, la existencia de una demanda cautiva y el deficiente desarrollo de las redes de acceso hacen necesario el ingreso de nuevos operadores al mercado.
- La separación estructural de los servicios de telefonía local, entre operadores de acceso y proveedores de servicios de telecomunicaciones parece ser la mejor propuesta de solución al estado actual. Los primeros bajo un privilegio de exclusividad que permita y garantice el desarrollo de la infraestructura de planta externa, y los otros en un ambiente de competencia, por servicios, precios y calidad.
- A nivel rural se presenta una situación de inexistencia de servicios básicos de telecomunicaciones, educación, salud, entre otros, que difícilmente podría ser solucionada por la vía tradicional de construcción de la infraestructura apropiada.
- La creación de un fondo común constituido por todas las aportaciones de los operadores por concepto de pagos de derecho y uso de frecuencia, intereses y multas, así como de fondos concesionales externos, constituiría la base económica para encarar la solución no solo del acceso universal, sino también del problema estructural de la pobreza.
- El Estado, en una primera fase sería el encargado de extender la red de acceso brindando cobertura telefónica directa a los poblados elegibles e implementando los programas complementarios.
- Cuando el escenario se muestre atractivo se tiene previsto el otorgamiento de subsidios estatales con fondos concesionales externos a operadores privados, que mediante concursos públicos sean elegibles para hacerse cargo de la operación, administración, mantenimiento y ampliación de dichos proyectos.

Estudios de especialización

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Cargos electivos:

Senador electo de la República.

Además de su experiencia profesional, eminente y laureado dirigente deportivo, bajo cuya gestión como Presidente de la Federación Boliviana de Fútbol Bolivia accedió por primera vez al Mundial USA’94.

PALEXPO **DEV.3**

Tuesday, 12 October 1999	14:00 - 17:30

Dev.3	Wireless Access: a viable option for developing countries

Chairperson:	**Mr. Raghavendra RAU,** *Senior Director,* Business Operations, Network Sector, MOTOROLA Inc. (USA)
Keynote Speakers	**H.E. Mr. Carlos Ruiz SACRISTAN,** *Minister of Communications and Transport* Ministry of Communications and Transport (Mexico)
Fixed mobile convergence and the regulatory response to these trends	**Mr. Daniel ROSENNE,** *Director General,* Ministry of Communications Israel)
Presentations	**Dr. Robert W. KINZIE,** *Chairman and Chief Executive Officer,* IRIDIUM Inc. (U.S.A.)
Key success factors for the introduction of GMPCs in developing countries	**Mr. Rudi WESTERVELD,** Delft University of Technology (Netherlands)
Strategy for Implementation of Local Information Infrastructure in Developing Countries	**Ms. Milica PEJANOVIC,** *Professor,* University of Montenegro (Yugoslavia) Co-author: **Dr. Natasa GOSPIC,** Community of PYTT (Yugoslavia)
	Mr. Jean-Paul RANSINANGUE, *Director General,* Actipole (France) Co-author: **Mr. Xavier David BEAULIEU,** Actipole (France)
	Mr. Dan THOMAS, *Vice President Sales and Marketing,* Telemobile Inc. (U.S.A)

VSAT provides impetus for Rural Telecommunications Development

Mr. Erez ANTEBI,
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Gilat Satellite Networks Ltd. (Israel)

Mr. Iqbal Z. QUADIR,
Co-Founder,
Grameenphone Ltd. (Bangladesh) (U.S.A.)

Published

The correlation between economic and telecommunications development in Mozambique

Mr. Khaya DLUKULU,
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ICO Global Communications (South Africa)

Tuesday, 12 October 1999	14:00 - 17:30

Dev.3	Wireless Access: a viable option for developing countries

Satellite and terestrial wireless access technologies for fixed and mobile users have developed to the extent that makes almost all of them at least a viable option to consider when planning to build new telecommunication networks in developing countries or to enhance the existing ones. In order to achieve the best economic results it is necessary to take into account the special geographical and socio-economic conditions of individual countries. Quite often it is also necessary to adjust the existing regulatory framework if it is inherently prohibitive for the introduction of new telecommunication technologies.

The best approach to deployment of wireless access technologies usually varies from country to country. Besides discussing the advantages and disadvantages of technologies as such it is the intention of this session also to present successful examples of using these access technologies in several developing countries around the world.

Mr. Raghavendra RAU
Senior Director, Business Operations, Network Sector
MOTOROLA Inc.
(USA)

DEV.3

A viable option for developing countries

President Nelson Mandela in his opening speech at TELECOM'95 said that, "In the 21st century, the capacity to communicate will almost certainly be a key human right". Those were prophetic words.

People in developing countries, like anywhere else in the world, want to communicate. Residential users want phones on demand, business users need modern services, including internet connectivity, to compete in the global economy and rural communities at a minimum required access to phone services. Yet to a large extent these needs are not being met and telecommunication penetration levels continue to be low and competition limited.

Part of the problem lies in physically wiring up the developing world – digging up roads to lay cable in congested cities or traversing the lengths of the country to reach rural communities. Compounding the problem is the massive up front investments and on going maintenance issues involved with traditional wireline infrastructures.

Fortunately, advances in wireless technologies both satellite and terrestrial, increased bandwidth capabilities and rapidly declining costs – now offer exciting alternatives to developing countries to substantially increase telecommunication penetration levels and foster economic development. Today there are over a million users who use wireless phones as their only phone.

In this session, we look forward to hearing from our galaxy of distinguished speakers about some of these wireless access technologies and examples of how they have been successfully used in several countries around the world.

Biography

Mr. Rau is Senior Director of Business Operations in the Network Solutions Sector of Motorola, Inc. based in Chicago. He has a Bachelors degree in Engineering, and a Masters degree in Business Administration. Mr. Rau has over 26 years of international business experience, the last 12 of which have been in the telecommunications industry. He has held assignments in Asia, Europe and the U.S.A. Mr. Rau has guest lectured at reputed universities worldwide, and spoken at numerous industry conferences.

In his present position he oversees the development of wireless access networks around the world.

Mr. Carlos RUIZ SACRISTAN
Minister of Communications and Transport
Ministry of Communications and Transport
(Mexico)

DEV.3

Biography

Carlos Ruiz Sacristan was born on October 27, 1949 in Mexico City. He is married and has one daughter. He graduated in Business Administration from Anahuac University; and has a Master's Degree in Finance from Northwestern University, in Chicago. Since then, most of his career has been in the public service of his country.

From 1974 to 1988, Mr. Ruiz Sacristan worked at the Mexican Central Bank (Banco de México), serving as trader, head of the office of foreign exchange and investments, assistant manager and manager of international operations, treasurer, advisor to the General Director and, finally, fiduciary delegate of the governmental trusteeship to insure from exchange rate risks (Fideicomiso para la Cobertura de Riesgos Cambiarios (FICORCA)).

In the period 1988-1994, he was appointed to a series of senior positions in the Secretariat of Finance and Public Credit: general director of Public Credit, undersecretary for Norms and Budgetary Control and undersecretary for Budget.

At the beginning of the current Administration, he held the post of Director of the state oil company (Petróleos Mexicanos, PEMEX). Mr. Ruiz Sacristan was appointed Secretary of Communications and Transport on December 28, 1994.

Also, Mr. Ruiz Sacristan was professor at Universidad Anahuac from 1979 to 1982, and he has been a member of the Institutional Revolutionary Party (PRI) since 1974.

Mr. Daniel ROSENNE
Director General, Ministry of Communications
(Israel)

DEV.3

Fixed-mobile convergence: Regulatory point of view

Abstract

The term "Fixed-Mobile Convergence" holds a different meaning for different people: for some it is convergence, for others it is integration. From a regulatory point of view, it should be described as competition.

This paper describes the market realities underlying competition between mobile and fixed services operators, and emphasizes the need for unified regulation, applying the same competition rules in both the fixed and mobile markets. By way of example, the case of Israel is discussed.

1 Fixed-Mobile Convergence – Different Meaning for Different People

The "Fixed-Mobile Convergence" approach is based on the theory that customers want a single supplier and a single bill for all their telecommunications needs. Is this a real customer requirement? Is it true for all markets?

The term "Fixed-Mobile Convergence" holds a different meaning for different people. For the incumbent fixed operators it means bundling of services, providing customers with a single telecommunications supplier – and a single bill. For the new mobile carriers it is a matter of positioning their services to replace the fixed services. From a regulatory point of view, it is all about competition between fixed and mobile carriers, between incumbent and new operators.

As mobile networks mature, mobile operators compete for migration of customers and minutes from the fixed network. By implementing better coverage and quality of service, new marketing ideas stimulating usage (as opposed to stimulating customer growth), new tariff schemes (home-zone billing, for instance) and new services (such as unified messaging, Virtual Private Networks, data services, such as GPRS, and more), mobile operators are in the process of positioning their services as an actual replacement for the fixed services.

The fixed operators are responding to the new mobile challenge. Typical strategies on their part include quality-of-service improvements, new narrowband services (such as call waiting, camp on busy, calling line identification, personal numbering, unified messaging), broadband services and new tariffs plans, thereby re-positioning the fixed services as a vital connection and increasing interconnect minutes from the mobile operators.

2 Market Realities – Mobile Versus Fixed

Although we are facing a phenomenal growth in mobile networks, the fixed networks are "alive and kicking". Fixed networks continue to grow, not only in the number of direct exchange lines, but also in the number of voice minutes per each direct exchange line[1]. Fixed networks also offer advanced broadband data capabilities, which are lacking at present from the offerings of mobile providers.

The reason for fixed growth alongside explosive mobile growth is simple – as yet, mobile does not offer a true substitute for fixed. Mobile has higher tariffs, in comparison to fixed tariffs, and high-speed data capabilities, comparable to the fixed 56 kbit/s analog modems, 128 kbit/s ISDN or 2 Mbit/s G.Lite capabilities of the fixed network, are absent.

Mobile tariffs are interesting phenomena. Mobile marginal investment per customer is less than US$ 500, compared to fixed marginal investment of US$ 1000 - 1500 per fixed direct exchange line. The operating expenses are similar. Why are mobile tariffs higher than fixed tariffs?

Different explanations are possible. Some say that the return period for mobile networks is 5 to 7 years, compared to the 10 to 15 year return period commonly used for fixed networks. Others point to short depreciation periods for mobile networks, allowing for the rapid technological advancement. Some point to the fact that regulation of mobile tariffs is usually minimal, in comparison to regulation of fixed tariffs. Do these distinctions explain this price difference?

The truth of the matter is that customers are willing to pay for the added value of mobility and personal communications, and the limited competition in mobile services is not sufficient to push down mobile tariffs.

Will additional competition in mobile services bring down mobile tariffs, creating true competition to fixed services?

3 The Future: Unified Regulation for Mobile and Fixed

In most of the world, fixed services are supplied by an entrenched monopoly in a heavily regulated environment, and mobile services are provided by limited number of new competing carriers, of which at least one is controlled by the fixed incumbent operator. The origin of the regulator's dilemma is the tight regulation over the fixed monopoly, compared to the lighter regulation of mobile operators.

[1] The actual traffic figures are usually masked by the growth of Internet access traffic on the fixed network.

In the world of fixed-mobile convergence, regulators should ensure that the same regulation is applied to both fixed and mobile operators, in order to assure the fair competition and non-discriminatory behavior which is essential to protect customers' interests.

Although the general tendency is liberalization and lighter regulation as competition evolves, Several key regulatory issues should be implemented in a uniform way to both fixed and mobile markets. The key issues are:

Cost- based Interconnection

Interconnection rates to the fixed network are usually regulated, using cost-based methods (Such as the TELRIC method). Interconnection rates to the mobile networks are usually non- regulated. This results in severe market distortions, as long-distance operators, new mobile operators and fixed customers, are overcharged. Regulators should find a way to impose the same interconnections rules and rates to all networks, fixed and mobile.

Non-symmetrical "airtime"

In a calling-party-pays[2] (CPP) environment, the common practice of charging higher "airtime" for calls originated from the fixed network and terminating in the mobile network, in comparison to "airtime" charged for calls originated from the mobile network, is discriminatory and unfair practice, and should be eliminated by regulation.

Access to value-added service providers

Value-added service providers are important to the creativity and vitality of the telecommunications industry, and allow customers to enjoy the benefits of modern networking. It is essential that value-added service providers be allowed non-discriminatory, fair and reasonable access to all networks, fixed and mobile. Regulators must ensure this access.

Prevention of discriminatory bundling

Although bundling of fixed and mobile services can be seen as beneficial to customers, it is susceptible to cross-subsidies and discriminatory practices. Regulators must ensure that bundling is done in a transparent manner, according to non-

[2] In some countries mobile subscribers must pay for incoming calls. In countries where CPP has been introduced, the caller pays for the called party's incoming mobile calls.

discriminatory practices, which cover all issues of service provision and tariffs.

One example of market reaction to distortions resulting from the absence of regulatory intervention, is the growing use of “fixed” mobile terminals, by private customers as well as by value-added and long-distance operators, used to bypass high “airtime” and interconnection rates, imposed on fixed to mobile calls.

4 The Case of Israel

Israel, with high penetration of fixed services, supplied by Bezeq, the incumbent fixed operator (2.8 million direct exchange lines, equal to a penetration rate of 47%), and high penetration of mobile services (2.5 million mobile customers, penetration rate of 42%), provides a good example for discussion of regulatory issues.

Mobile growth in Israel has been stimulated by keen competition and low tariffs. Calling party pays (CPP) was introduced in 1994, opening the gates to the mass market. Mobile services are presently provided by three competing operators: Pele-Phone (50% owned by Bezeq) relies on narrowband, advanced mobile phone service (NAMPS) technology, and is in the process of upgrading to code-division multiple access (CDMA) technology. Cellcom preferred time-division multiple access (TDMA) technology, and is now in the process of upgrading from IS-54 to IS-136 technology, featuring EFRC (Enhanced Full Rate Coder). Partner/Orange is using GSM technology. The different technologies of the mobile operators reduce churn to less than 5% per annum, low in comparison to other markets.

In order to prevent cross-subsidies and non-competitive practices, “structural separation” was introduced, between Bezeq, the parent company, whose business is monopoly fixed services, and its subsidiaries, who supply services in competitive markets. All the fixed services and interconnection services are provided by Bezeq to all mobile operators in a non-discriminatory manner. Interconnection rates to Bezeq network are set by the regulator. Since April 1999, the tariff for the termination or origination of a call in the fixed network is US cents 0.8/min for a local connection, 1.3/min for an urban toll connection and 2.5/min for national toll connection.

Mobile usage in Israel is high. Currently, mobile use in Israel is, on the average, approximately 300 minutes per month[3]. Since the introduction of mobile competition in January 1995, the number of mobile customers grew from 125,000 to 2.5 million. 1998 was the first year in which mobile revenues exceeded fixed revenues.

Bezeq had responded in a major marketing campaign, competing for voice traffic. The average fixed usage was 700 minutes per month during 1998, 680 minutes per month during 1997 and 690 minutes per month during 1996, compared to 5-6% annual growth in the years before the mobile boom.

For the Israeli regulator, the meaning of Fixed-Mobile Convergence is allowing mobile operators to compete for fixed-substitution services, while making sure that the incumbent fixed operator does not engage in anti-competitive behavior. At the same time, the regulator is supportive of Bezeq’s effort to reposition its tariffs, changing from meter pulses to time per minute, from a complicated 3×3 tariff matrix (3 time periods, 3 distance zones) to a simpler tariff matrix, with fewer time periods and distance zones.

In general, unified regulation for fixed and mobile providers is applied, in areas such as non-discriminatory practices, access to value-added service providers and access to international long distance services, including issues of dialing parity and pre-selection rules.

There are still some pending issues, including the introduction of cost-based interconnection rates to the mobile networks, and charging the same “airtime” rates for mobile originated calls and fixed originated calls. We hope that these issues will be solved by cooperation between the regulator and the mobile operators, without the need for unilateral regulatory action.

5 Conclusions

The regulator’s role is to foster competition for the ultimate benefit of consumers. In the context of “Fixed-Mobile Convergence”, the regulators’ role is to ensure that none of the dominant operators (usually – the incumbent fixed operator and the veteran mobile operators) will abuse their market power by discrimination and unfair practices. If bundling of mobile and fixed services

[3] The United States, by comparison, at year-end 1996 had approximately 40 million subscribers, for about 25 percent penetration, with an average mobile telephone use of roughly 125 minutes per month.

is offered, it should be made available, on equal terms, to all other operators.

The regulator should foster competition, not only by being a watch-dog for anti-competitive behavior, but by pro-active efforts to enhance competition and lighten regulation. Regulators should impose the same interconnection regime for both fixed and mobile networks, ensuring access to value-added service providers and eliminating discriminatory practices.

It should be emphasized that mobile will not provide a reasonable substitute for fixed services as long as mobile tariffs are not comparable to fixed tariffs. A dramatic decline in mobile tariffs is predicted, but the key for this development is more competition, and regulators have a major role in creating the competitive environment. One of the issues is frequency spectrum availability for mobile operators, allowing for additional mobile providers and additional service offering by existing operators.

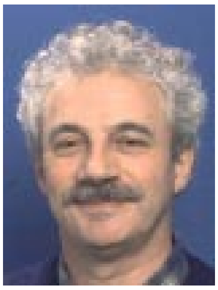
Contemporary regulation is seeking to move on from convergence to integration, by initiating uniform rules and principles for the regulation of fixed and mobile. This, in turn, will encourage the development of mobile and fixed technologies and services, in a manner that will enable the one to offer significant substitute services for the other. Once this is achieved, we can expect a re-alignment of the competitive positions of incumbent and new operators, and of fixed and mobile service providers, thereby further unifying the conditions of competition in our ever-changing market-place of telecommunications.

Biography

Daniel Rosenne serves as Director General of the Ministry of Communication as of March 1997, responsible for all aspects of telecommunication regulation.

Before joining the Ministry of Communications he founded and was President and CEO of Bezeq International, Israel's incumbent facility based international service provider (100% owned by Bezeq, the incumbent operator). His previous experience includes positions as Corporate Vice President for Technology and Business Development at Tadiran Telecommunications Ltd., a major telecommunication manufacturer, and Vice President for Engineering and Planning at Bezeq, the Israel Telecommunication Corporation Ltd. He also served for 25 years in the Israel Defense Forces, retiring with the rank of Colonel.

Mr. Rosenne received a B.Sc. degree in electrical engineering from the Technion – Israel Institute of Technology, Haifa, Israel (1969) and an MA degree in business administration from the Hebrew University of Jerusalem, Israel (1984).



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DEV.3

Key success factors for the introduction of GMPCS in developing countries

Abstract

Now that at least one of the proposed satellite systems for mobile personal communication has become a reality (Iridium has started its service in November 1998), the high potential of these systems for the developing world is stressed in many fora.

This paper gives an overview of developments in satellite systems, both narrowband and broadband. And will also elaborate on technical issues, economical, service related and regulatory problems involved with the introduction of these systems in the practical reality of the developing world.

1 Introduction

During the 1996 World Telecommunication Policy Forum (WTPF'96), Geneva, many issues related to the development and implementation of mobile satellite systems were discussed in great detail. These satellite systems are collectively known as Global Mobile Personal Communications by Satellite (GMPCS). They represent a new breed of communication systems that promise seamless global communication with services like mobile fax, messaging, data and voice. They all are scheduled to come into operation before or shortly after the end of the decade. Global services will be provided, surpassing the existing local telecommunications infrastructure.

Future GMPCS system operators (international consortia) speak about the potential of the new systems to help to bridge the telecommunication gap in the developing world, allowing nations to overcome their access problems to the local and global telecommunications infrastructure.

This paper discusses the following issues that have to be resolved before a successful deployment can be guaranteed.

First of all is there the regulatory framework that is not yet ready for the introduction of such systems in many countries. Points of discussion are sovereign control of information flows (unauthorized use), frequency spectrum management, gateway authorization and the question of domestic network bypass.

Another major issue is the affordability of services through GMPCS for users in developing countries. Managed community telephone services can bridge the gap between cost of these communications systems at world market prices and domestic buying power of the developing world.

Seamless interconnection to the domestic system (interconnection, numbering plan and billing) including existing terrestrial cellular mobile networks has to be accomplished. And as many of the proposed systems are owned by international consortia the issue of revenue sharing with local operators has to be resolved.

Complicated cost structures for a basic domestic call that has to routed via one or more satellite links, international terrestrial networks and domestic distribution networks demand for creative solutions to be viable in developing countries.

Through newer broadband systems access to more than voice telephony alone can be realized. These new information services like Internet (e.g. E-mail and WWW) can open up interesting facilities specifically useful in developing countries (e.g. health care and tele-learning). Main access to GMPCS on earth will be through a dedicated mobile or fixed terminal. How can user terminal standardization be guaranteed with the advent of so many different technical proposals. More very practical questions have to be resolved also, like how to supply reliable power to the terminals (solar battery charger?). How to provide distribution, installation and maintenance for the very sophisticated pieces of electronic equipment involved in remote areas?

2 GMPCS

The acronym "GMPCS" was first used to refer to mobile satellite systems operating in non-geostationary orbits and offering voice communications and other narrow-band services on a global basis using frequencies above 1 GHz. These systems were also called "Big LEO's", even though not all of them use satellites in low earth orbit. As proposals for new systems continue to emerge it was recommended that the scope should be broadened to include all systems providing telecommunications services directly to end-users from a constellation of satellites on a trans-national, regional or global basis.

2.1 World Telecommunication Policy Forum 1996 (WTPF'96)

At WTPF'96 the following kinds of satellite systems were considered for a common set of policy and regulatory discussions [1]:

a) existing and planned global and regional satellite systems providing mobile personal communications voice and low-speed data services and operating in the geostationary orbit (GEO), called GEO Mobile Satellite Systems (MSS);

b) existing and planned satellite systems operating in non-geostationary orbits (NGEO) and providing mobile narrow-band services, excluding voice, on a global or regional basis (i.e. "Little LEO's"or "Little" NGEO MSS);

c) satellite systems planned to come into operation in the next two to five years in order to offer mobile narrow-band services, including voice and relatively low-speed data, on a global or regional basis and to operate in non-geostationary orbits – including Low Earth Orbits (LEO's), Medium Earth Orbits (MEO's), and Highly Inclined Elliptical Orbits (HEO's) – (i.e. NGEO MSS);

d) satellite systems planned to come into operation in the next five to ten years in order to offer fixed and transportable, multimedia broadband services on a global or regional basis and to operate either in geostationary or non-geostationary orbits (GEO and NGEO Fixed Satellite Systems (FSS)).

The distinction in these four categories is led by the developments in the field of satellite systems design and advances in recent years. In an overview of satellite systems [2] most proposals of systems of category a), b) and c) were already present. They included system names like Iridium, Globalstar, ICO, Odyssey and Ellipso. Only the Iridium constellation has up to now been able to start to provide world wide service. Globalstar has been delayed as they lost several satellites when a launching rocket exploded. Other projects like Odyssey have been discontinued.

In category d) can be found the, so-called "Internet-in-the-sky", broadband access systems like Teledesic and Skybridge. Teledesic, an ambitious system with many hundreds of LEO satellites was proposed by Craig McCaw and Microsoft Chairman Bill Gates and is still under development.

In their publications [3] Teledesic stresses the important role for the developing world:

> *"The one-way information dissemination made possible through broadcast technologies has created a means for nearly all of the world to view the benefits of advanced technology. Now the people living outside of advanced urban areas desire access to these benefits. Increasingly, even a sole proprietor in Bangalore, India will need to be connected to the "Global Village". Through schools, community centers and home access, individuals are beginning to use broadband connections for services such as telemedicine, Internet access, videoconferencing, distance learning, telecommuting and many other applications. We need to create the two-way network links that allow people to participate economically and culturally with the world at large without requiring that they pick up and move to places with modern telecommunications infrastructure."*

Reference is made here to contributing to a solution for the migration problems in the developing world. However especially in rural areas facilities and purchasing power are very limited. Home access will be out of the question for most people. Even access through community centers might be very difficult to achieve, in a situation where i.e. many university campuses in Africa still lack Internet access and can only use E-mail through poor performing dial-up lines.

3 Economic issues

3.1 General benefits

Benefits can be distinguished according to the services they deliver to different user groups. Here we direct our attention mainly to those benefits that regard the public interest in developing nations. Apart of the potential benefits in general it is interesting to know how wide the range is of users that would benefit. Some general remarks can be made [4].

Satellite technology enjoys a comparative advantage over other forms of telecommunication whenever the application involves more than one of the following:

– Service to mobile users; or service for locations and/or traffic flows that change rapidly;

– Service to remote or geographically isolated areas;

– Service to areas where the "density" of customers and traffic per square kilometer is low, so that the fixed costs of terrestrial infrastructure are excessive in relation to achievable revenues;

– Connectivity to numerous locations for the same application.

3.2 LEO systems

LEO systems have a particular advantage in above mentioned situations the satellite system is used to extend the coverage of cellular mobile systems (cellular extension). It then meets the first three of the four mentioned criteria. Isolated areas are served; users are mobile; and satellites make it possible to serve those areas that would be difficult to serve economically by terrestrial ways. Benefits can be distinguished in economic efficiency and also how they ensure equity. The first indicates how the economy as whole will benefit. The second concerns whether the benefits are widely or fairly distributed [4]. In both areas will these satellite systems contribute in the following ways: more locations will have access, completion of coverage gaps in terrestrial systems and lowering of capital cost of providing cellular service in remote low-density areas. In this way a cost effective manner is found to reach out with telephone coverage in towns and villages, that would have been difficult with only terrestrial means to provide service to. The isolation of rural areas is also reduced this way and equity is served.

3.3 Benefits to operators

There are not only pitfalls for national operators in this game. They too can benefit from contracts with the new global satellite consortia. Traffic and revenue will increase for the Public Switched Telephone Network (PSTN). Looking at the similar mobile cellular traffic one can see that only a very small portion of the traffic originates and terminates on a cellular phone (less than 5%). When this is also the case with GMPCS the bulk (95%) will originate or terminate on the PSTN. This will generate a lot of interconnection revenues for the national operator. And as this traffic would not have been generated in absence of these new systems it will contribute to the expansion of operation of the PSTN.

3.4 Benefits to local communities

Even if the national operator is not challenged by the above sketched opportunities, local communities have also a possibility to provide sustainable telecommunication services through rural communities corporations or cooperatives [5] However governments have to address the issue of enabling rural corporations to own and operate their own service and bulk purchase national and international interconnect from the lowest bidder. Barriers that have been preventing these rural service corporations to strive, have to be lifted. This involves regulatory bodies, national telecom operators and international carriers to really address rural needs.

Another advantage of this approach is, that revenues generated by local communities will stay in the rural economies and affordable telecommunications services will have a multiplier effect in their economic growth.

3.5 Low cost access for the developing countries through GMPCS?

Most of the enterprises that propose the new satellite systems stress the fact that they will provide service to developing countries at minimal cost and for non-commercial use sometimes even for free. It is known however that one of the main issues is, to get licenses for providing satellite based telecommunication services in developing countries. So some people suggest that these benevolent offers are “a mild form of bribery”.

The main target for their business operations is the developed world, aiming at the “high end” markets. However as the satellites will orbit the entire world anyway, GMPCS operators can as well make the system available to developing countries in a useful way.

3.6 Low cost access is not the only issue

This looks quite beneficial for the developing world, however the cost of providing service to customers in the field is not only taken by the network and access cost. When we look to business cases from terrestrial cellular wireless networks one can see that the network cost is only a relatively small part (i.e. 10%) of the total business plan. Sales, marketing, interconnection fees, operation and billing take the main part of the total cost. This will also hold for a local operator in a developing country.

Especially for rural areas the burden falls back on the local operator to undertake all necessary actions to provide access to the end user, even when the network comes just falling from the sky. They have to distribute, install and maintain the terminal equipment. There has to be reliable power supply. Service initiation and termination, billing and revenue collection etc. have to be organized in a proper way.

Why would this all go any easier with a satellite network backbone than with a existing terrestrial one?

3.7 GMPCS too costly for individual access

Most of the proposed systems are still prohibitively expensive for individual rural users in developing countries. Even when the price for a mass produced terminal would come down to US$ 800, for a person living in the Central African Republic, who is earning US$ 400 per year, this would mean to have to spend the total amount of two year incomes, to be able to buy such a handheld satellite telephone. At a service cost of US$ 3.00 per minute it would take 16 working hours to pay for a one-minute phone call.

So for the near future the rural markets that one can really aim at are: Public services (health, emergency, government, security forces, international organisations); Community services (village phone, phone shops and public call offices) and bigger companies (oil and mineral exploration firms).

4 Services

4.1 Which services are needed?

The newest systems promise broadband access anywhere in the world. The older proposals only will provide voice and low-speed data services. The access cost of these narrowband systems however is already totally unaffordable for most individuals in the developing world.

Thus one can expect that only a ‘village phone’ or ‘phone shop’ type of installation can generate sufficient revenues to permit profitable exploitation [2]. This will also hold for more sophisticated types of services like i.e. Internet access. Here the real need at the moment might be identifiable only for specific applications (i.e. tele-education, telemedicine) and still for a limited group of end-users.

In some countries experiments are on its way to establish so called “telecenters”. They can provide more than just universal access to the telephone network. Included are basic Internet access for the use of Electronic Mail (E-mail) and sometimes even Web access. In one example [5] the community of Mamelodi, South Africa, will be provided with a “One-stop-shop” providing the following services at a reasonable and affordable fee: Information provision (Internet, information kiosk and local directory service), Communication (E-mail, document typing, printout, fax, photocopying and public telephone shop) and Computer training (computer literacy classes and training on how to use the Internet and E-mail).

Another project in Costa Rica is called “intelligent community center or digital town center” [7]. They incorporate Health and Environment, Education (computer classroom), Teleconference/ Entertainment Center, Communications and Information Center; and Banking and E-commerce. The center will be housed in a refurbished 20-foot cargo container. It will provide access to the world wide communications infrastructure through satellite links or wireless fixed access. It can provide further telecommunication access for the community as a relay station through a wireless local loop system. The target cost per family in a remote community for the system is US$ 100 and will provide telephone, E-mail and Web services.

5 Regulatory Issues

On WTPF'96 opinions on five main points were adopted:

– the role of GMPCS in the globalization of telecommunications;
– the shared vision and principles for GMPCS;
– essential studies by the ITU to facilitate the introduction of GMPCS:
– establishment of a MoU to facilitate the free circulation of GMPCS user terminals;
– implementation of GMPCS in developing countries [7].

5.1 Voluntary principles

A set of voluntary principles was offered. They are here presented in a condensed way:

- Early introduction; under certain conditions, States may wish to facilitate the early introduction of GMPCS.
- International Cooperation; in developing domestic policies and harmonization of those policies through action at the international and regional level.
- Global Service availability; within the limits of spectrum availability and the framework of national policies, policy makers should consider maximizing competition in the provision of GMPCS services.
- GMPCS regulation; national regulators should consider the benefits of creating a simplified, non-discriminatory and transparent regulatory environment (for service licensing, gateway station authorization, interconnection arrangements and user terminals).
- Investment participation.
- Unauthorized use; each system operator shall take steps to inhibit the use of the system in any country which has not authorized GMPCS service.
- User terminal approvement and free circulation.
- Universal access; provision of service at reasonable cost by both GMPCS operators , gateway operators and others involved in the provision of GMPCS services.
- Interconnectivity; National policy-makers and regulatory authorities and GMPCS operators should cooperate in ensuring appropriate interconnectivity between GMPCS and other public networks.
- Further cooperation between all parties involved with a view to facilitating coordinated solutions in matters relating to the full implementation of GMPCS.

An enormous task is still ahead to implement these principles. Establishing a common policy on a global level is not easy. An example is the debate in ITU and UN in the 1960's that did not result in an international consensus on international treatment of transborder satellite broadcasting [9]. Also regarding terminal approvement, if individual licenses are required for these, history shows that either the licensing rules will be ignored or the service will not develop.

Another issue at stake is the need to regulate the technical characteristics of the different services to minimize interference. Satellite operators PanAmSat and Intelsat raised a dispute recently about interference involving Skybridge, one of the new proposed constellations for broadband access. Even a joint task force of 20 nations has failed to solve the problem quickly.

Also global standards must be harmonized for satellite-based terminals. Here radiation safety may become an issue as it is already in cellular networks.

5.2 Licensing cases

The Iridium constellation is an example of a constellation that is more complicated regarding licensing. In their information they come up with quite some analysis of how to solve these problems [10].

The radio path is build up of three segments the gateway links segment, the space segment and the end user segment. In order to operate the subscriber segment in a country, Iridium must obtain, from the government of that country, a radio license to permit the operation of earth terminals within the country. Depending on the nature of the regulations and licensing process in a country, there may be up to three aspects to the required license:

a) authorization for use of frequencies requested;

b) the authorization for the equipment (terminals) to be used;

c) the authorization for the service to be provided

One can have doubts about the effective enforcement of a ban on the use of services or terminals in large countries from a space based telecommunication network. However Iridium affirms that they will not provide service to customers whenever they are located in a country where no licence was issued. They also state that it is technically possible to locate an end user that is requesting service in a radius of 10 km on earth through their geo-location system. Therefore the system will know where the request came from and a service authorization check procedure can be performed. When necessary, service can then be denied.

5.3 Local Bypass

Also one has to take care not to challenge the authority of local regulators by providing world wide access bypassing local networks and their international interconnections through inter-satellite links. The more basic configurations using the “bent pipe” principle might have an advantage here.

Another problem may be found in the integration of local numbering plans with the one used by the satellite systems. Especially when wide spread domestic use is intended.

Many developing countries are also concerned about national sovereignty. Will globally operating satellite consortia not jeopardise national sovereignty? A lot of tough negotiating has to be done in this field.

To make clear that the discussions on regulatory issues, in particular about licensing and access to gateways, is not an academic one, the following news item might be of interest [11]:

> *“A Nigerian government ban on all private Very Small Aperture Terminals (VSAT) satellite communications is threatening to break the back of 13 newly-licensed operators and leave large corporate customers using inadequate leased lines. The government imposed the total ban after discovering that three of the VSAT operators had hubs in South Africa and another two had hubs in Gabon. The government's regulatory agency, the Nigerian Communications Commission (NCC), cited regulatory reasons, saying that under Nigeria's current telecommunications law, only the state-owned monopoly operator NITEL can provide international telecoms service”.*

5.4 New technologies and its impact on commercial and regulatory environment

The impact of the introduction and utilization of new technologies on the commercial and regulatory environment of telecommunications has been part of discussion in Study Group 2 of the ITU Telecommunication Development Bureau [12]. Important issue is the availability of both the financial and the human resources required to upgrade and sustain the infrastructure with the introduction new technologies and services. New technologies can provide new and valuable capabilities. However the introduction should be properly linked to the existing infrastructure and service portfolio. The policy and regulatory framework should be sufficiently reflective of the technology and service evolution. This may include innovative licensing, tariffing and regulatory arrangements. At the end of the day the most important factor are the revenue/cost relationships of the new technology capabilities and new services. Also it is clear that offering new and better communication capabilities at lower cost can pose a threat to existing infrastructures and could even result in “cream skimming”. High margin services and high revenue customers are drawn away from existing local operators.

6 Concluding remarks

The problem is not in the first 10.000 miles (or more), but lies in the last miles. It is relatively easy to “drop” access links from the sky with new advanced satellite systems. However the transfer into a reliable and affordable service for rural users in developing countries is not a trivial task, as has been proven in the past. Regulatory, administrative, technological and organisational hurdles have to be taken first. With the advent of new access possibilities through GMPCS, opportunities arise to at last address the needs of many people in developing countries. The necessity to provide a sustainable service to rural areas puts a big burden on the back of local operators, administrators and communities. The provision of the service can only be accomplished there and not “from the sky”.

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Biography

After receiving his Master's degree at the Electrical Engineering Department at Delft University of Technology (TU Delft) (1969), he worked at the particle accelerator lab of the TU Delft as an electronics and instrumentation engineer. In 1971 he joined the Teaching Laboratory Group, designing laboratory courses in measurement and electronics. From 1977 he lectured in Electronics, Instrumentation and Telecommunication at Eduardo Mondlane University in Mozambique, Africa. There he also participated as a consultant in different telecommunications projects.

In 1981 he returned to TU Delft joining the Telecommunications and Traffic Control Systems Group in 1984 as an assistant professor in telephony switching and networks and to work on rural telecommunication systems. From 1987 till 1993 he also supervised the TopTech MBT post graduate telecom course.

In 1994 he joined the School of Systems Engineering, Policy Analysis and Management to lecture in Information and Communications Technology.

His research interests are in the field of wireless communication systems, in particular access networks for rural areas in developing countries.

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DEV.3

Strategy for implementation of local information infrastructure in developing countries

Abstract

Possibilities for providing local information infrastructure, necessary for Information Society introduction in developing countries, are considered. Taking into account basic driven forces, formulation of an adequate strategy is proposed. The paper presents four main correlated segments of such Strategy regarding users requirements, government tasks, access technology and financial possibilities. Segment of access technology is analysed in details resulting in definition of an algorithm which can be very usefull for making decisions about fast, cost-effective and reliable technological premises for new services implementation.

1 Introduction

World is facing a paradigm shift caused by new abilities to transfer real word in virtual world. Creation of different services and applications support this virtualization moving activities off the physical world to the virtual areas. Developing countries are in difficult situation. The reality is not in favor to get easy connection with new world paradigm but the choice to get poorer or in time envisage the pace to Information Society (IS) can not be avoid. Thus, an urgent action against "info-elitism", either on global or other levels, must be taken. The more people having access to information and communications infrastructure, the richer is the society. Of course, there are many obstacles in obtaining open and easy access to end users. When developing countries are considered, it is very specific that the process of removing those obstacles transparently shows many benefits of IS deployment: social, geographical, financial, educational, technological.

Building Information Society in developing countries is driven by almost standard driving forces: market needs, technology and outside environment. It is very important to be aware of the fact that there is no universal model for such process. Basic principles, as well as different experiences, must be combined with existing social, economic, technological, regulatory, circumstances in every particular country. At the same time, in defining its' own IS strategy every developing country should has an approach which gurantees that its specific national vision converges into a shared global vision.

A key challenge for developing countries is to build the infrastructure neccessary to capture the full social and economic benefits of IS deployment. Today, such efforts have been hampered by the lack of either information or telecommunication underlying infrastructure and human resources. Thus, National Information Infrastructure (NII) must be oriented towards development of the most appropriate model for bandwidth-rich information networks capable of handling advanced digital applications: Internet, network computing, telecommuting/remote access, multimedia applications. For that reason, this paper deals with possibilities for obtaining neccessary infrastructure at local level what is considered to be traditional "bottleneck" in IS implementation.

The guidelines for choosing appropriate access method are presented as a part of Strategy for implementation of information infrastucture at local level. Apart from that, neccessary policy and regulatory actions are also identified in order to create environment which will foster LII (Local Information Infrastructure) implementation. The objectives are to lead decision-makers to consider different options and choose the optimal one and help regulator to direct network modernization.

2 Concept of LII Strategy

A common characteristic of developing countries regarding the development of telecommunication infrastructure, and specially introduction of new telecommunication services, is uncoordinated planning as a consequence of lacking the strategy. There are several reasons for that: lack of financial resources, limited number of sufficiently qualified personnel, undefined regulations which primarily in regard to new services have no chance to match the international standards and, by historical inheritance, monopoly of incumbent Public Telephone Operators (PTO).

When the concept of IS is concerned, it is very difficult to define it, especially in developing countries. The outlined visions are transformed differently into strategy and policy frameworks, depending on the situation in the particular country. It is clear that in developing countries, at this moment, rapid integration into Information Society can not be planned, but definition of a strategy which in some later implementation stage will make this integration easier must be considered on time. Implementation of LII represents very significant part of such national IS strategy. Its consideration includes a number of components which must be analysed:

- existing situation in the core network (core segment),
- existing situation in the access network (local segment),
- demands for new services,
- available technologies,
- available human resources to apply new technologies,
- financial capabilities.

On the basis of such analysis, an adequate Strategy for building local telecommunications infrastructure capable of supporting IS applications in developing countries, must be defined through the following main segments, muttually correlated in a manner illustrated in Figure 1:

1) Recognition of end users' requirements
2) Government and regulator actions in creating an environment favourable for IS
3) Identification of appropriate access technology.
4) Implementation of financial techniques necessary for new investments.

Such Strategy must be a part of an overall governmental policy regarding other aspects of IS deployment, which should be institutionally managed.

3 Elements of LII Strategy

3.1 End Users' Requirements

It is well known that most of telecom users in developing countries are voice services oriented and have not yet the requirements for using and handling other types of informations. But the emerging deployment of computers by the existing telephone subscribers, establishment of many small and medium-scale companies, using information systems for business support, pose new demands to all involved in services provision. This new type of users expect:

– easy access to information, entertainment, education possibilities, and communication,
– cheaper communication,
– possibility of choice between different service and content providers and last but not list,
– to have other choice than leased lines to access NII, or even Global II.

Thus, users are circled by decisions and solutions been drown by government, regulator or operators, as well as service and content providers. Therefore, starting Strategy of LII implementation segment, must capture existing knowledge and experience of users' behaviour and needs, as well as their motivations for LII. In that way, information on potential customer bases, attractiveness of different services and economic aspects of users' requirements, will be provided. It will enable exact understanding of user position and will be used for supporting and guidance of other Strategy segments.

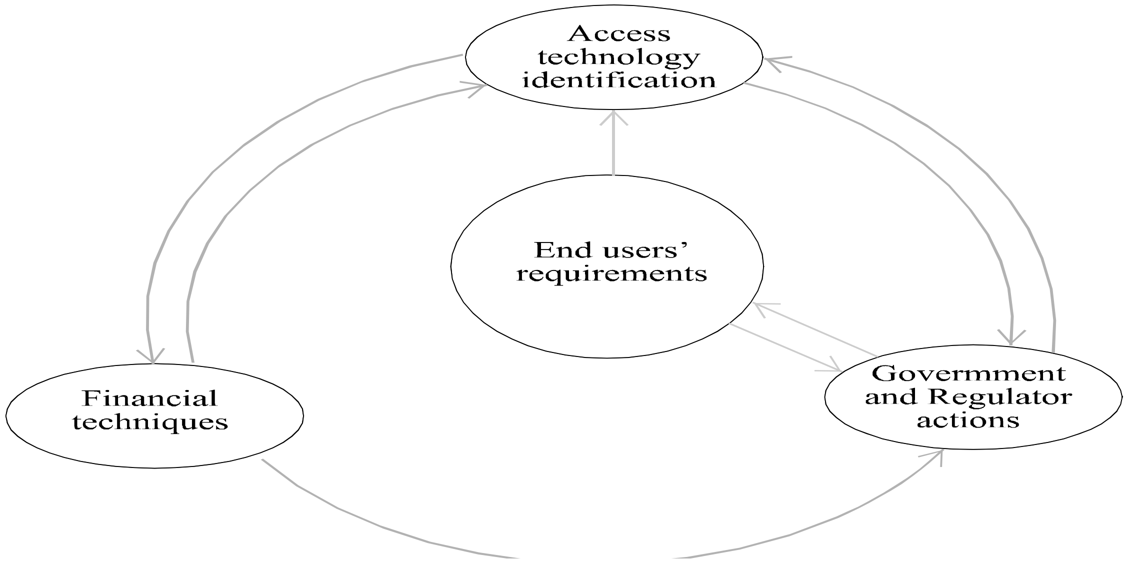

Figure 1 – Segments of LII Strategy

3.2 Role of Government and Regulator

Developing country governments must view the process of IS implementation as a chance for modification of the country economy structure. The government, at the first place, has to realize that the IS economy paradigm is driven by knowledge-intensive sectors which directly utilise information and communication technologies. Thus, it is neccessary for the government to intensify activities on promoting such multimedia industries which, on the other side, could contribute to attract investments and create employment. Also, encouraging market development is one of the main preconditions for that process which has to be government initiated.

To achieve these goals government has to define its own national info-communication policy based on:

– Encouragement of private sector investments.

– Promotion of competition.

– Creation of a flexible regulatory environment with independent regulator.

– Promotion of a strategy for Universal Service Obligations (USO).

The last bullet is of special interest for developing countries. Usually, universal access is understood as obligation imposed to PTO to provide telephone access to every one who asks for it, for the same access fee everywhere in the country in the certain time period. The role of the regulator is to assure this obligation. On the other side, regulator should be aware of new user's requirements and considered changes in regulation towards new definition of Universal Service supporting advance services for users being able to pay for it. For that reason, a full understanding of:

- the needs of customers or communities for infocommunication,
- the means of meeting these needs with new technical and service solutions,
- the validation of the use to which the communications is put,
- which infrastructure (the existing or new) will support the implementation of infocomunication services and,
- which sequences and timing are required to provide new type of universal access for advance services,

will help to formulate appropriate approach for implementing Universal Service and Universal Service Obligation. Depending on the situation in the country, approach in supporting new entrants at the local level, may vary from strict Universal Service Obligation to no USO.

Apart from that, regulator has a number of other tasks in preparing adequate environment for IS promotion and its implementation from local to national level:

– creation of flexible regulation framework in order to facilitate entrance for new network operators,
– promotion of access to info-communication services by creating suitable tariff policy,
– preparation of standards to enable easier network and service modernization towards implementation of new LII and national/GII,
– implementation of contract principles between interconnected partners in case of multi-network strategy in local loop.

3.3 Access technology identification

It is well known that IS applications, becoming easier to use, require more bandwidth. Even in developed countries this represents serious constraint, since their networks have difficulties to cope with increasing end user's demand for local-access bandwidth. Of course, the problem they have could be used in developing countries to help prevailing the Strategy which is based on "leapfroging", thus eliminating entire stages of local networks development in setting up an adequate infrastructure avoiding unnecessary delays.

Table 1 illustrates various access networks, presently available for high-speed (wide-bandwidth) digital (data) access. For long time, analog modems were the only available solution for obtaining access towards backbone networks. When developing countries are concerned, it is still the technology with the highest deployment. Fortunately, modems' speeds have increased, approaching 56 kbit/s downstream and 33 kbit/s upstream, with standardized 34 kbit/s modems still dominant for dial-up remote access.

However, in past few years new access technologies emerged, providing full-duplex high-speed access at speeds of several Mbit/s and offering new perspectives especially for developing countries. These are: xDSL networks, cable modem networks, various optical networks, wireless networks and satellite networks. Table 1 also shows typical speeds obtained using specific type of access network.

Basically, it is obvious that access technologies could be classified into two categories: wireline and wireless. Each of them could be separately analysed regarding specific requirements, resources, availibility in developing countries. In order to adopt access technology necessary to meet the chalenges of IS implementation, apart from already given, the following criteria also have to be considered:

– already existing network structure (core and local);
– costs of implementation;
– capability of delivering broadband services;
– technological complexity of access network;
– performance of services offered by certain access technology;
– ease of planning;
– ease of network growth through modularity;
– ease of access from the end user side.

Figure 2 illustrates an algorithm based on technical performance criteria which can be used in the process of appropriate access technology identification, taking into account dominantly voice oriented. The proposed algorithm includes all possible scenarios and could be of significant help in obtaining an optimal choice and management of the network modernization. A significant correlation between the choice of access technology and the other segments of LII Strategy is obvious, what additionaly makes the choice very difficult. Still, using given criteria, comparison of all relevant wireline and wireless solutions will show that some of them have significant advantages when developing countries are concerned. For example, WLL represents one of the most suitable new possibilities for fast, cost-effective and performance satisfying, broadband IS applications delivery to end users. Its advantages could be summarized as:

– lower initiall investments,
– lower operational costs,
– broader range of arhitecture over single platform,
– faster deployment,
– better network flexibility.

3.4 Financial techniques implementation

It is the fact that an unprecendented amount of capital investment will be necessary even for the first stage of IS deployment in developing countries. Although governments still have significant ownership of existing info-communications assets in developing countries, investments financed from that sources are decreasing steadily. Therefore new techniques for obtaining necessary capital must be identified. Basically, success of that process will depend, first, on business fundamentals and economic market conditions, but also on innovative financing techniques and structures. A number of such techniques can be employed including project finance and they are mainly oriented towards private sector capital involvement:

- joint ventures,
- BLT (Build-Lease-Transfer method), particularly applicable for projects which involve additions to existing networks,
- BOT (Build-Operate-Transfer method), with the possibilities to turn the ownership of the project to other local owner,
- vendor and supplier financing, used for equipment financing,
- high yield debt, suitable for institutional investors in high risk market portions.

To create this shift from traditional public sector operators and government funds, developing country government has responsibility to remove many present constraints which might limit the full benefit of these new financial arrangements. Therefore, to attract financing from private sector the government has to ensure:

– open and stabile market economy,
– regulatory framework that reduces unpredictability for investors,
– true competition at the local level as well as on higher network levels,
– competitive procedure for licensing,
– adequate tariff policy.

Thus, it is clear that this segment of LII Strategy strongly depends of government and regulatory actions taken in fostering IS deployment. On the other side, success in obtaining neccessary capital will determine possibilities for implementation of access technology chosen on the basis of technical performance criteria.

4 Conclusion

The paper deals with the question of obtaining necessary premises for IS deployment in the local loop which is considered as traditional “bottleneck” for fast, cost-effective and reliable broadband services delivery. A concept of local information infrastructure strategy is formulated based on necessity of understanding main driving forces towards IS implementation in developing countries. It is proposed that the Strategy has to include four correlated segments regarding specification of users’ requirements, definition of government role, identification of the most appropriate access technology and introduction of new financial techniques for capital attraction. Each of these segments is described with all constraints and actions needed for their realization.

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Table 1 – Characteristics of different access technologies

Access technology		Provided services		
		Voice	**Data**	**Video**
Dial-up PSTN + modem		1 channel	9.6 kbit/s to 33.6 kbit/s	Slow
BR-ISDN (Basic rate- ISDN)		1 channel	64 kbit/s or 128 kbit/s	Video conference
Cable modems		Possible	2 Mbit/s to 10 Mbit/s (one-way)	Broadcast
XDSL	HDSL	30 channels	2 Mbit/s	Video conference
	ADSL	1 channel	640 kbit/s –upstream 6 Mbit/s – downstream	On demand
Optical fibre		up to 100,000 channels and over	up to 10 Gbit/s	multi-HDTV, interactive
Wireless	Cellular and PCS	Variable	up to 128 kbit/s	Depending upon type
	Digital WLL	Depending upon type (64 kbit/s to 155 Mbit/s)		
Satellite		Depending upon type (128 kbit/s to 40 Mbit/s)		

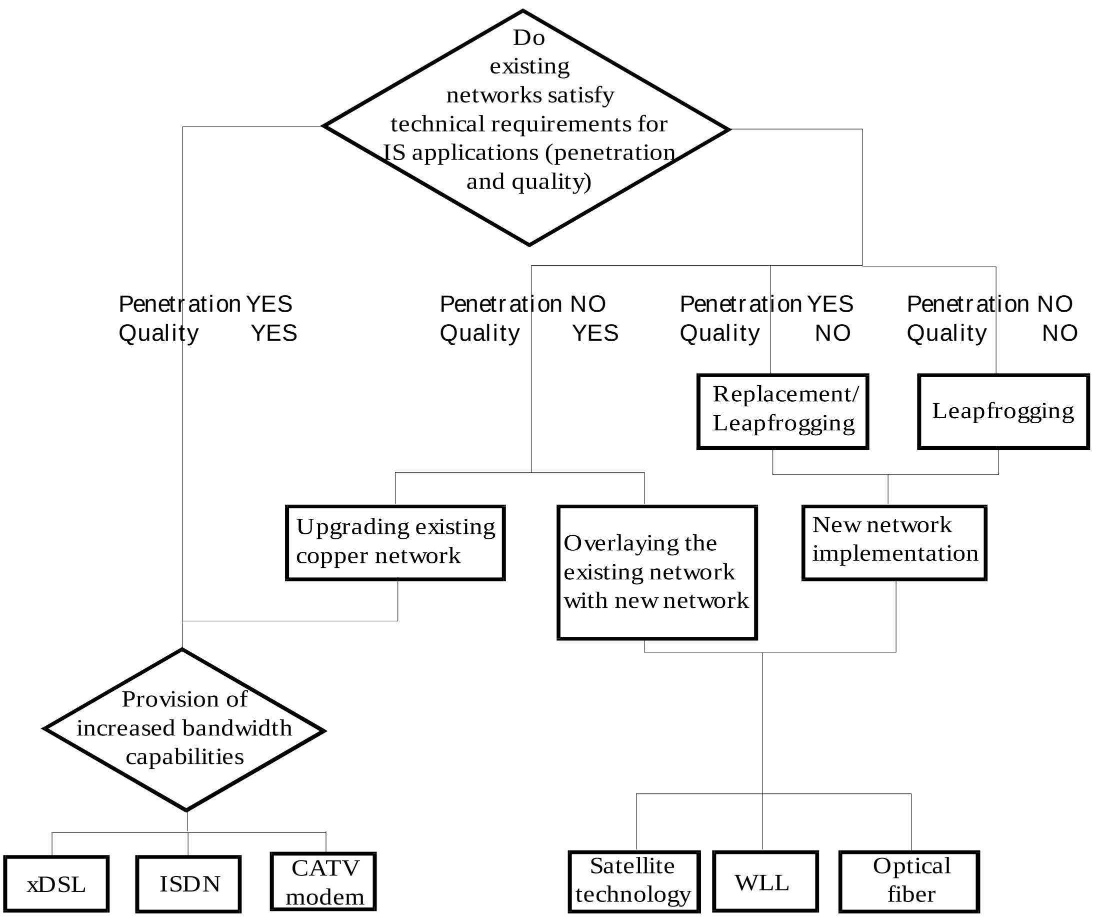

Figure 2 – Algorithm for identification of appropriate access technology

Biographies

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Prof. Dr Milica Pejanovic is full professor at the University of Montenegro, Faculty of Electrical Engineering, Podgorica. From February 1999. she is President of Telecom Montenegro Management Board.

Mrs. Pejanovic graduated in 1982 at University of Montenegro with BSc degree in Electrical Engineering. She has got MSc and PhD degrees in Telecommunications at University of Belgrade. Prof. Pejanovic has been teaching at University of Montenegro basic telecommunications courses on graduate and postgraduate levels, as well as courses in mobile communications and computer communications and networks, being the author of three books and many strategic studies. She has published more than hundred scientific papers in international and domestic journals and conference proceedings. Her main research interests are: wireless networks performance improvement, broadband transmission techniques, optimization of telecommunication development policy.

Prof. Pejanovic participates in ITU-D Study Group 1 projects concerning telecommunications infrastructure development and Internet promotion. She is leading the Government of Montenegro team of experts working on telecommunications sector restructuring, including the intended Telecom Montenegro privatization.

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Dr. Tatasa Gospic is the director of R&D and director of International PTT Affairs in Community of Yugoslav PTT, Belgrade. She received her Ph.D degree from the Faculty of Transport and Traffic Engineering in Belgrade. She is engaged in the work of ITU as a consultant in CEE countries, former USSR countries and other developing regions. Within the UNDP programs she made several sectoral missions and built up extensive experience in political, cultural, legislative and technological areas influencing telecommunications. She is the author ando co-author of two monographs and 35 scientific and expert papers for national and international conferences.

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DEV.3

Transmetteur optique atmosphérique
Une nouvelle technologie pour le développement des réseaux numériques haut débit…

1 La boucle locale optique

1.1 Qu'est-ce que l'interconnexion ?

Pour comprendre la place de notre technologie dans le marché des télécommunications, il faut d'une manière générale comprendre comment s'interconnectent les réseaux.

L'interconnexion désigne le raccordement physique des différents utilisateurs, avec ou sans fil, entre eux afin de permettre à l'ensemble de communiquer librement.

L'interconnexion fait appel à des investissements considérables d'infrastructure, inscrits sur le long terme (20-25 ans) et réalisés en majorité par les opérateurs télécoms.

Concrètement, ces infrastructures correspondent à l'installation d'autocommutateurs organisés en réseau (plusieurs dizaines dans une même ville), d'où partent et arrivent des liaisons filaires ou sans fil raccordant les abonnés. Ces câbles sont installés en creusant des tranchées dans les rues ou par l'utilisation de fourreaux déjà en place, mais rares et chers.

Toute une gamme de matériel amont et aval est nécessaire au niveau de l'autocommutateur ou de l'abonné pour la gestion des communications (répartiteur, modem, multiplexeur, etc.).

C'est pourquoi l'interconnexion entre les réseaux longue distance des nouveaux opérateurs et la partie locale du réseau de France Télécom – pour la France, par exemple – est longue à mettre en place. L'opérateur historique reste indispensable pour acheminer les communications des abonnés des nouveaux opérateurs sur l'ensemble de la distance couverte.

Le schéma suivant montre que le parcours est complexe: la communication emprunte des voies physiques de natures bien différentes, avec des voies à grande vitesse (fibre optique) et des voies à petite vitesse (paire cuivre), chez des intermédiaires multiples.

1.2 Qu'est-ce que la boucle locale?

On appelle boucle locale, les liaisons interconnectant les usagers d'un quartier à l'autocommutateur de proximité où arrive l'accès distant (souvent fibre optique) qui achemine les communications venant d'un autre pays, d'une autre ville, ou d'un autre quartier.

Ces communications sont regroupées par cet autocommutateur qui va les distribuer par des câbles (paires téléphoniques dans l'immense majorité des cas) soit chez des professionnels, soit chez des particuliers ou groupe de particuliers (immeuble).

C'est à cet endroit du réseau que les goulets d'étranglement se manifestent.

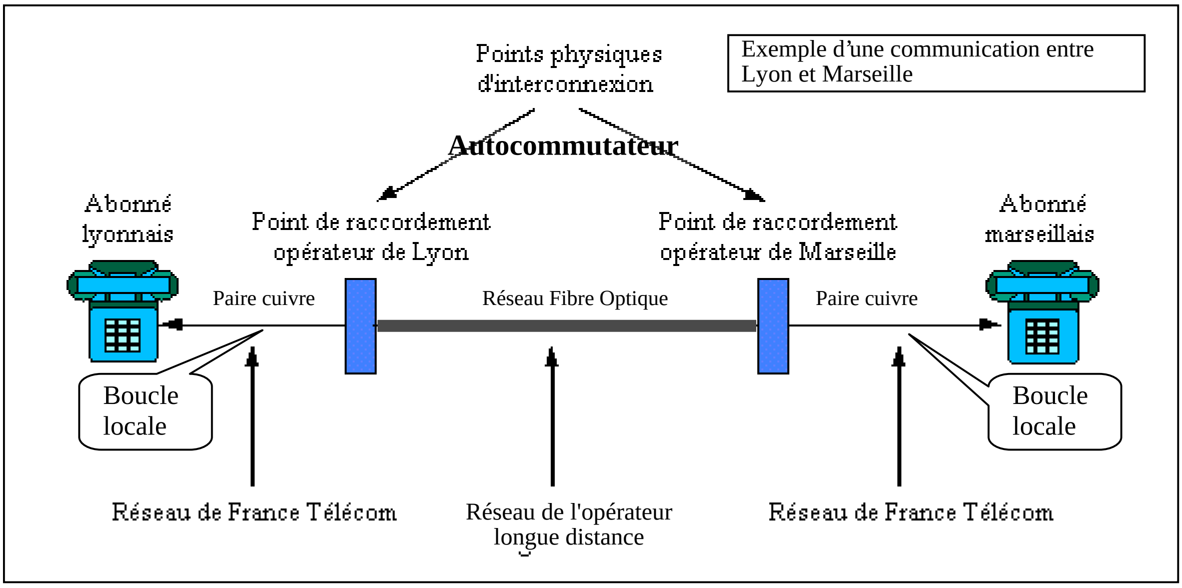
L'interconnexion des réseaux et la compatibilité des débits sur toute la chaîne sont l'enjeu actuel du marché des télécommunications.

Six types d'interconnexion sont en cours de construction:

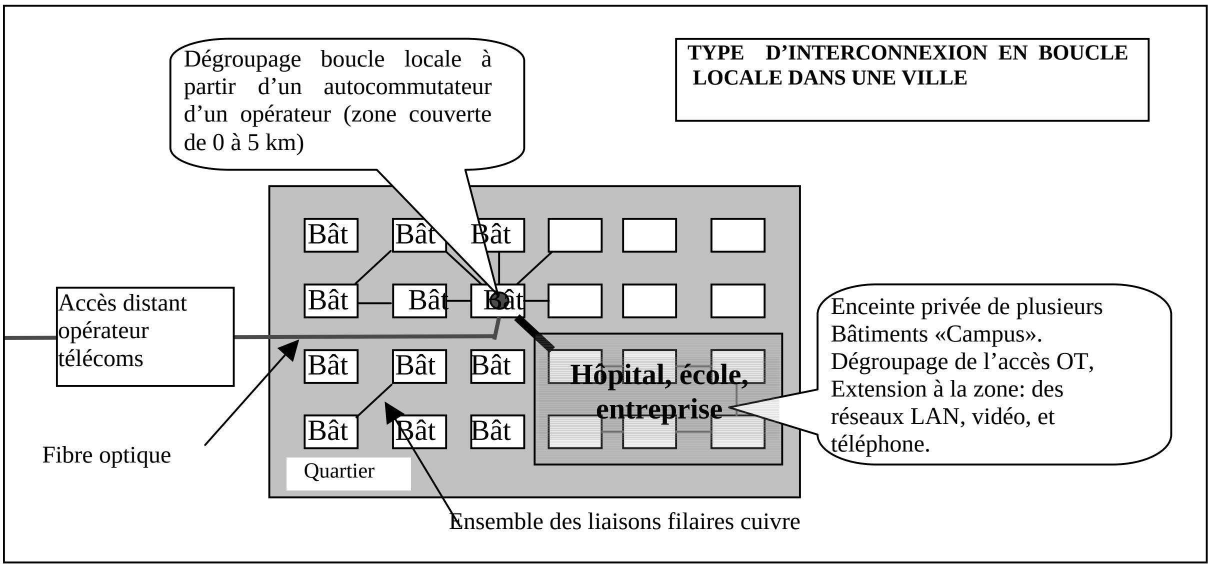
- L'interconnexion transcontinentale.
- L'interconnexion de pays à pays.

- L'interconnexion de ville à ville.
- L'interconnexion téléphonie mobile – réseau filaire.
- L'interconnexion d'immeuble à immeuble.
- L'interconnexion d'immeuble sur site privé.

Les trois derniers types sont appelés communément la boucle locale (distance moyenne de liaison physique de 0 à 5000 m).



Source: site Web ART.



Source: Actipole.

Tableau 1.1 – Les technologies en compétition sur le marché de la boucle locale

Filaire	Sans fil
Câble cuivre	Radio
Câble coaxiale	Hertzien
Câble fibre optique	Satellite
	OPTIQUE

Tableau 1.2 – Les technologies concurrentes sur le marché de la boucle locale en France

Technologie	Débit max.	Coût
Le dégroupage	1,5 Mbps	5 à 10 kF
Le xDSL	1,5 Mbps	13 kF / an
Le réseau électrique	1 Mbps	5 kF / an
Le câble	10 Mbps	5 kF/ an
Le satellite	20 Mbps simplex	14 kF/ an
La boucle locale radio	2 Mbps	plusieurs kF par mois
La boucle locale fibre	155 Mbps	Génie civil + autorisation

Source: 01 Informatique n° 1550 02/07/99.

La liaison optique	155 Mbps	80 kF une fois

1.4 *Données financières sur le marché de la boucle locale*

Ce marché propre est difficile à estimer tant en terme de recette pure qu'en investissements à lui consacrer.

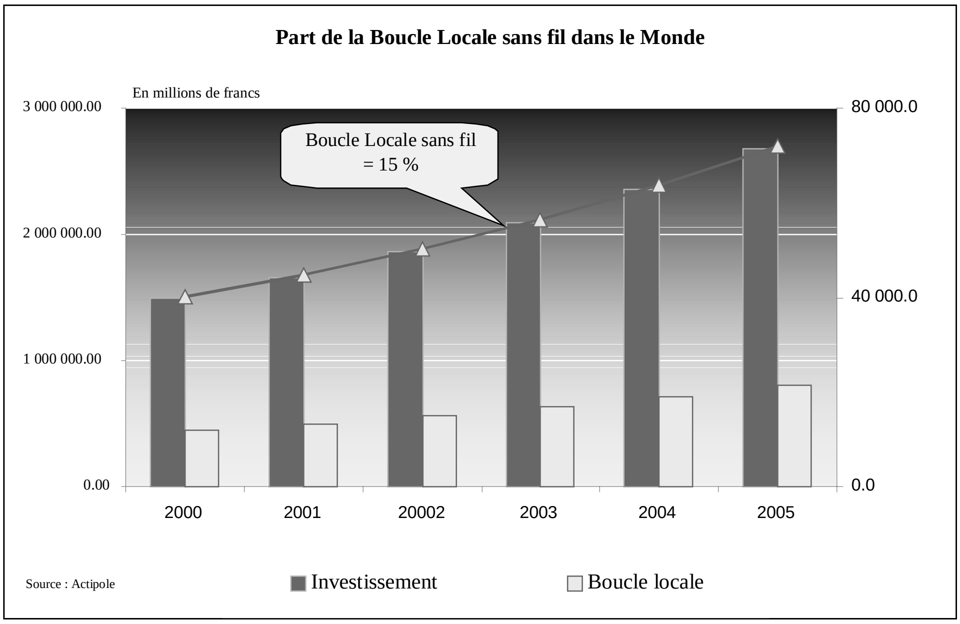
La boucle locale est essentiellement détenue dans les grands pays industriels, par les opérateurs d'origine qui ont réalisé le câblage progressif des abonnés, durant ces cinquante dernières années.

Le parc mondial de lignes téléphoniques sera de plus de 970 millions en 2000, dont la moitié pour les 10 pays les plus riches. Par contre, ce parc ancien pour la plupart des lignes déjà installées, n'est pas apte à supporter les besoins en haut débit, la reconversion en est donc inéluctable.

Tableau 1.3 – Prévision de la part des investissements qui seront consacrés à la boucle locale dans le monde

En million de F	2000	2001	2002	2003	2004	2005
Afrique	6 597,0	6 900,2	7 217,2	7 548,8	7 895,6	8 258,4
Amériques	84 244,9	87 031,8	89 910,9	92 885,2	95 957,9	99 132,3
Asie	244 715,5	289 227,7	341 836,4	404 014,3	477 502,0	564 356,6
Europe	103 167,3	106 581,4	110 108,4	113 752,2	117 516,5	121 405,4
Océanie	8 159,2	8 298,6	8 440,3	8 584,5	8 731,2	8 880,3
Monde	446 883,9	498 039,6	557 513,2	626 785,0	707 603,2	802 033,1
dont France	11 842,0	12 233,9	12 638,7	13 057,0	13 489,1	13 935,4

Source Actipole: Extrapolation des données de l'UIT.



Le montant des investissements qui devra être consacré à la construction du réseau boucle locale est estimé entre 30 et 50% de la totalité des investissements, ces chiffres sont ceux retenus par la majorité des opérateurs télécoms.

Ils englobent les équipements d'extrémité qui représentent un tiers des investissements d'interconnexion, le deuxième tiers est absorbé par le coût de la fibre et le dernier par le génie civil.

Sur ce marché de la boucle locale, la part du marché du sans fil est appréciée différemment par les observateurs.

Sur le site de l'ART – Autorité de Régulation des Télécommunications – (http://www.art-telecom.fr) une réponse s'inspire, pour quantifier le marché de la boucle locale, d'une étude réalisée par le cabinet Ovum, en 1996. *En 2005, 15% des nouvelles installations «professionnelles» et 25 % des nouvelles installations «résidentielles» se feront par voie sans fil.*

S'agissant du marché français, peu d'intervenants se risquent à en mesurer le volume. Un des acteurs estime qu'en 2006, le marché de la boucle locale pour les nouveaux opérateurs représentera 60 milliards de francs dont 25 milliards – soit 40% – en sans fil.

Pour notre part, nous avons retenu dans le tableau 1.4 ci-dessous une estimation prudente de 15% pour la prévision des investissements qui seront consacré à la boucle locale sans fil des investissements totaux de la boucle locale dans le monde.

Tableau 1.4 – Evolution du marché européen de la boucle locale sans fil

En million de F	2000	2001	20002	2003	2004	2005
France	1 065,8	1 101,0	1 137,5	1 175,1	1 214,0	1 254,2
Allemagne	2 827,7	2 921,3	3 017,9	3 117,8	3 221,0	3 327,6
Royaume Uni	1 027,8	1 061,8	1 097,0	1 133,3	1 170,8	1 209,5
Italie	887,4	916,7	947,1	978,4	1 010,8	1 044,2
Espagne	534,1	551,8	570,0	588,9	608,4	628,5
Autres	2 942,3	3 039,7	3 140,3	3 244,2	3 351,6	3 462,5
Europe	9 285,06	9 592,32	9 909,76	10 237,69	10 576,49	10 926,49

Source Actipole: Extrapolation des données de l'UIT.

Tableau 1.5 – Prévision de la part des investissements qui seront consacrés à la boucle locale sans fil dans le monde

En million de F	2000	2001	20002	2003	2004	2005
Afrique	593,7	621,0	649,5	679,4	710,6	743,3
Amériques	7 582,0	7 832,9	8 092,0	8 359,7	8 636,2	8 921,9
Asie	22 024,4	26 030,5	30 765,3	36 361,3	42 975,2	50 792,1
Europe	9 285,1	9 592,3	9 909,8	10 237,7	10 576,5	10 926,5
Océanie	734,3	746,9	759,6	772,6	785,8	799,2
Monde	40 219,6	44 823,6	50 176,2	56 410,7	63 684,3	72 183,0
dont France	1 065,8	1 101,0	1 137,5	1 175,1	1 214,0	1 254,2

En synthèse et dans une hypothèse réaliste, **le marché de la boucle locale français représentera 13,9 milliards de francs en 2005, le marché européen 121.4 milliards de francs et le marché mondial 802 milliards de francs**.

Les technologies émergentes *sans fil* – en particulier l'optique qui présentent des avantages déterminants (rapidité d'installation, haut débit, prix, redéploiement rapide) – devront conquérir progressivement la majeure partie de ce marché.

Les chiffres annoncés ont été calculés d'après les données chiffrées, communiquées par l'Union Internationale des Télécommunications dans son «*Rapport sur le développement mondial des télécommunications*» publié en août 1998 (http:/www.itu.int/publications), relatives à 206 pays de plus de 40 000 habitants. Le tableau 1.1 est issu de l'annexe A-67 (16. Recettes de télécommunications) et de l'annexe A-91 (22. Prévisions). Le tableau 1.2 est issu de l'annexe A-71 (17. Investissements en télécommunications) Les tableaux 1.3, 1.4 et 1.5 sont issus de l'extrapolation des données des annexes A-71 et A-91.

2 La lumiere comme vecteur de transport

2.1 Une idée pas si nouvelle

L'étude de la lumière a été un des sujets favoris des intellectuels, de l'antiquité à nos jours. De nature philosophique avec les anciens, elle est devenue science avec Descartes et Galilée. Longtemps sous l'emprise de la mécanique newtonienne, elle a basculé au début de ce siècle avec les théories d'Einstein sur la relativité, dans le domaine de la mécanique quantique.

Ce nouveau domaine de la physique ouvre des perspectives insoupçonnées et la maîtrise dans les temps à venir des *bizarreries quantiques* risque de révolutionner totalement nos modèles actuels de communication.

L'usage de la lumière pour la communication, verbale ou symbolique, n'est pas une idée nouvelle en soi. Elle a souvent été employée dans l'imagerie ancestrale.

La lumière divine de la religion, la lumière de la connaissance des philosophes ou la lumière de Van Gogh dans la peinture participent toutes d'une forme de communication.

En marge des représentations symboliques, l'homme a domestiqué la lumière pour une communication plus concrète, plus verbale, plus immédiate.

Les signaux lumineux codés binairement (allumé, éteint) ont toujours été mis à profit par les anciens pour *télé communiquer*, par exemple, en utilisant la réflexion du soleil sur un morceau de verre chez les phéniciens ou par des nuages de fumée chez les indiens d'Amérique.

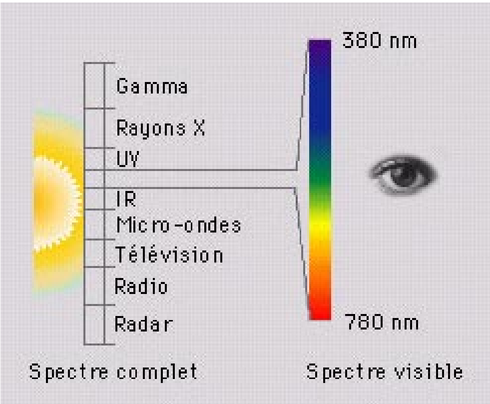
Nous avons dans un roman de Wilbur Smith – A la conquête du royaume – une description de l'ancêtre du transmetteur laser, l'héliographe:

«*Quelque chose étincelait sur ces lointaines collines, un point de lumière blanche pareil à une luciole ou au scintillement de l'étoile du matin. Les officiers, dont le petit groupe se tenait derrière le trépied de l'instrument, mettait au point leurs longues vues sur le lointain point lumineux. L'opérateur de l'héliographe [...] se pencha vers le prisme de l'instrument et effectua une petite mise au point, orientant le premier miroir de façon qu'il reçoive les rayons solaires et le second afin qu'il les réfléchisse vers les* *collines. Il saisit ensuite la poignée, et l'obturateur cliqueta à mesure qu'il coupait et libérait le rayon lumineux, transmettant instantanément le message en morse à cent kilomètres à travers la plaine».*

Les Liaisons Optiques Atmosphériques (L.O.A.) prennent leurs racines dans cette tradition, et nous nous inspirons aujourd'hui encore, les techniques millénaires du morse optique.

Il y a cependant une différence majeure: nos séquences *allumé-éteint* se réalisent à l'aide d'une source lumineuse artificielle, le laser, que nous allumons et éteignons 155 millions de fois par seconde.

2.2 Que la lumière soit



On appelle lumière la partie visible d'un vaste groupe de radiations, qui vont des rayons cosmiques aux ondes radar.

Toutes ces ondes sont de même nature (électromagnétique) et se déplacent dans le vide à la même vitesse: environ 300 000 km/s.

Elles diffèrent par contre les unes des autres selon leurs longueurs d'onde (ou fréquences) et l'énergie qu'elles transportent, qui devient très grande dans le cas des rayons cosmiques.

2.3 Une onde porteuse d'avenir pour les télécommunications

La lumière est une onde porteuse d'avenir car sa fréquence, de l'ordre de la dizaine de terahertz, est environ 10 000 fois plus rapide que les ondes traditionnellement utilisées en télécommunications (radar, radio, TV, etc.). La justification est dans sa nature physique même.

En simplifiant, et comparée à un train de marchandises, la lumière ne va pas plus vite, elle peut déplacer potentiellement beaucoup plus de marchandises, d'informations.

La problématique des réseaux de télécommunication en place, tient dans leur incapacité à fournir un débit d'information tel que l'image animée sur nos écrans soit perçue avec la même qualité que l'œil humain regardant une scène réelle, c'est-à-dire avec une sensibilité commençant à partir de 5 ou 6 photons reçus.

Une seule image panoramique fixe captée par l'œil représente des milliards de pixels (nom donné à la plus petite taille d'information constitutive d'une image), alors que notre meilleure image artificielle (TV, écran informatique) se mesure à peine en millions.

Cette simple illustration montre bien que l'enjeu est là.

Cette possibilité d'utiliser la lumière en tant que vecteur physique n'a été rendue envisageable que très récemment avec l'apparition de deux inventions très importantes: le laser, en 1960 et la fibre optique, en 1974.

2.4 Une technologie incontournable: la fibre optique

Comme nous l'avons déjà dit, les débits nécessaires à l'acheminement de l'ensemble des informations, autrement appelé bande passante, sont de plus en plus considérables et évoluent avec l'augmentation des services proposés en ligne qui eux-mêmes se créent, lorsque la bande passante augmente.

La paire téléphonique standard, installée à plus de 99% de la totalité du réseau, accepte un débit de 64 kbit/s en standard, les dernières technologies en terme de dopage de ligne cuivre (VDSL) annoncent un débit maximum de 25 Mbit/s pour une portée de 500 m maximum.

Quand on sait qu'en télévision seulement une séquence numérique non compressée nécessite un débit de 166 Mbits/s, ou de 5 à 6 Mbit/s pour une bonne définition en version compressée, on comprend vite que la paire cuivre est au bout de ses possibilités et qu'elle sera fatalement remplacée à court ou moyen terme.

La seule alternative technique possible est son remplacement par de la fibre optique qui offre les débits nécessaires, en gigabit aujourd'hui et demain en térabit.

Cependant la mise en service de liaisons fibre dans le cadre de la boucle locale (maillage de bâtiment à bâtiment) représenterait un investissement si considérable qu'elle n'est retenu par aucun opérateur comme solution viable.

D'autre part, les délais nécessaires seraient tels qu'ils bloqueraient l'évolution du réseau.

Seul le «sans» fil peut présenter une solution acceptable dans un tel marché.

2.5 Son corollaire: la Liaison Optique Atmosphérique (L.O.A.)

Un transmetteur optique atmosphérique doit pouvoir être considéré comme une fibre optique virtuelle en ce sens que la lumière, au lieu d'être guidée par le verre, se déplace dans l'atmosphère.

L'optique en espace libre reste une discipline nouvelle, peu expérimentée où ACTIPOLE joue à ce jour, un rôle de précurseur.

Le laser, hormis quelques rares domaines militaires et spatiaux (ex: guidage des bombes au laser, télémétrie, communications satellite/satellite, etc.) a surtout été utilisé en espace clos ou alors pour des applications ponctuelles dans le temps, comme la prise de mesure par théodolite, et assez rarement le domaine de la télécommunication en espace libre.

L'expérimentation est fondamentale en la matière car les théories n'ont pas toujours de correspondance directe sur le terrain. Nous avons pris de l'avance dans de nombreux champs d'investigation qui, pour beaucoup d'autres, restent encore à défricher.

Les contraintes de performances et de fiabilité du produit sont données essentiellement par l'alternative hertzienne disponible ainsi que par les matériels actifs installés en amont. Le modèle imposé est donc un fonctionnement 24 heures sur 24 heures, 365 jours par an, quelques soient les conditions atmosphériques.

Maîtriser les L.O.A, sous-tend la maîtrise de plusieurs disciplines:

- l'optique;
- l'électronique;
- la mécanique;
- le logiciel.

Toutes ces techniques doivent être réunies dans un matériel installable à l'extérieur, soumis à tous les aléas météorologiques. Notre cœur de métier est là.

Optique

Un des sujets majeurs analysé est la propagation d'un faisceau monochromatique dans l'atmosphère. Autant les lois s'appliquant à la lumière dans des milieux identifiés, sont parfaitement connues et maîtrisées, autant celles s'appliquant à l'air qui nous entoure restent chaotiques. La panoplie de composants optiques existants permet toutefois de correctement s'en affranchir.

D'autres études ont été faites sur les longueurs d'onde utilisables, les émetteurs, les photorécepteurs, les optiques de projection et de collection.

Electronique

Les circuits électroniques sont directement issus de la technologie fibre optique la plus récente. L'optoélectronique est un secteur clé du futur, où l'innovation apporte chaque jour des nouveaux composants toujours plus rapides et plus performants.

Mécanique

Un des éléments clés du succès de cette technologie est certainement la mécanique. Elle doit d'abord permettre l'alignement des faisceaux à plus ou moins quelques milliradians, mais aussi en assurer le maintien dans la durée.

L'optomécanique dont certains principes s'inspirent de l'optique photographique et des technologies disque laser, permet elle de s'assurer de la divergence du faisceau projeté ou du rapport signal/bruit au photorécepteur.

Logiciel

L'intelligence logicielle du système doit permettre d'assurer en temps réel les corrections inhérentes à ce type de transmission (dépointage, altération du faisceau, etc.) tout en stockant les évènements significatifs.

Nous pourrions parler aussi de l'ergonomie, du design, de la compatibilité amont, du contrôle de qualité, de l'auto-maintenance, mais ces différents chapitres font aujourd'hui partie intégrante de toute conception initiale de produit, dit *de haute technologie*.

2.6 La sécurité des L.O.A.

2.6.1 Rupture de liens

Une liaison optique atmosphériques ne peut être rompue que par le passage d'un obstacle suffisamment volumineux pour occulter la totalité du tube lumineux unissant les deux extrémités. Mis à part quelques cas fort peu probables, les passages d'oiseaux restent non significatifs et de toute façon ne durent que quelques microsecondes largement sécurisées par les protocoles utilisés.

Alors que pour les communication hertziennes, la pluie constitue l'ennemi majeur, les L.O.A. travaillant sur des longueurs d'ondes plus courtes, peuvent être gênées par le brouillard, lorsque celui-ci atteint une densité telle, qu'il absorbe une trop forte proportion du flux photonique, phénomène assez rare dépendant fortement de facteurs très locaux.

2.6.2 Dangerosité

L'utilisation des appareils à laser est réglementée par une norme européenne (NF EN60825-1 de 07/94). La dangerosité d'un faisceau laser s'évalue par rapport à sa longueur d'onde, la puissance émise, la dimension de la source, sa divergence, et la distance à laquelle on l'observe.

Il est relativement aisé de s'éloigner des seuils de dangerosité; une combinaison judicieuse dans le choix de la longueur d'onde, du diamètre de la pupille de sortie, de la puissance moyenne, à quoi on ajoute un faisceau projeté toujours divergeant, garantissent l'innocuité du dispositif.

2.6.3 Discrétion

La lumière d'un faisceau n'est visible que par un observateur placé derrière une des extrémités du lien (souvent en façade ou toiture d'immeuble), et dont le regard est dirigé vers le cône de lumière. Pour tout autre observateur le faisceau est invisible.

L'interception d'une communication ne peut être obtenue que par un équipement placé entre les deux extrémités; lequel ne manquerait de couper la communication devenant ainsi lui-même sans objet! …

3 Le transmetteur optique AL.COM

ACTIPOLE, société française spécialisée dans la transmission optique, a consacré plus de trois ans de recherche à la mise au point d'un système de Liaison Optique Atmosphérique (L.O.A.) par diode laser appelé AL.COM.

AL.COM est un transmetteur laser, conçu pour permettre tout échange de signaux numériques (son, image, données) en duplex intégral. D'un point de vue fonctionnel, il peut être considéré comme une fibre ayant une bande passante de 200 MHz numérique à 850, 1300 ou 1500 nm.

Son fonctionnement est indépendant des caractéristiques du signal à transmettre (protocole et débit). Lors d'une connexion, aucun paramétrage particulier des périphériques n'est à faire.

Idéal pour les distances inférieures à 1000 m, il offre une totale liberté d'exploitation (aucune autorisation préalable n'est nécessaire) ainsi qu'une installation et une mise en œuvre immédiate. Sa technologie lui confère une grande souplesse d'utilisation qui lui permet d'être adapté: aux sites à risques (foudre, IEM), aux environnements électromagnétiques chargés (aéroports, usines) aux sites classés ou de prestige dans lesquels un câble et son support viendraient dégrader l'esthétique en cas d'obstacles à franchir (autoroute, canal, relief) ou encore dans les cas de liaisons temporaires ou de secours.

3.1 L'ergonomie

Le métier d'installateur de AL.COM, n'existant pas encore, il nous a fallu le créer. La facilité de pose et de maintenance du système est donc une constante forte dans nos bureaux d'études.

Une connexion V24 permet de superviser et de piloter les principales fonctions d'AL.COM depuis un PC grâce à un logiciel spécifique. Peuvent être ainsi surveillés ou pilotés en permanence des paramètres tels que:

– l'amplitude du signal arrivant par l'air et par la fibre;
– le débit de ces signaux;
– la consommation de la diode laser pour anticiper sa fin de vie;
– le contenu d'une mémoire non volatile, contenant d'une part l'historique de différents événements ainsi que les consignes de fonctionnement;
– les positions des objectifs d'émission et de réception, etc.

En option, un système d'acquisition par caméra CCD, intégré au AL.COM, permet de piloter le support motorisé X/Y. L'alignement initiale à l'aide d'un simple joystick devient alors très aisé.

3.2 Le AL.COM pourquoi et où?

Par sa polyvalence, AL.COM est économique car il s'adapte à tous les types de transmission. Les transmetteurs peuvent être réemployé sur des sites différents pour des applications diverses en fonction de l'évolution des besoins. Ses faibles besoins en énergie autorisent son alimentation par batterie ou panneau solaire sur des sites isolés. Il est bien sur, complémentaire d'autres moyens de transmission pour réaliser les éclatements locaux de liens longue distance.

La lumière elle même n'étant pas polluante en termes d'IEM, les liens par AL.COM ne payent pas de taxe de licence, ne nécessitent pas d'autorisation d'exploitation limitées dans le temps, sont utilisables de plein droit y compris dans le domaine public.

En cas d'indisponibilité, chaque transmetteur est interchangeable sans reconfiguration d'où une grande rapidité de remise en service.

AL.COM constitue un investissement dont le rapport coût/débit n'a pas d'équivalent. Par sa souplesse d'utilisation, ses performances et son coût, il devient l'outil indispensable pour réaliser les liens sans fil à haut débit et à courte et moyenne portée.

4 Le futur

Si les liaisons hertziennes ont plus d'un siècle de développement derrière elles, les L.O.A., elles, ont à peine quelques années. Il ne fait aucun doute qu'à plus ou moins brève échéance, la voie optique aura la place qu'elle mérite à coté du hertzien.

De par la diversité et l'importance du marché de la boucle locale, il est certain que les L.O.A. seront à court terme incontournables. De la même manière que l'antenne hertzienne s'est imposée sous une infinité de formes dans notre quotidien, l'antenne optique viendra la compléter, voire la remplacer demain.

Le défi à relever n'est pas seulement technique, il est aussi humain. Le laser avec tout son cortège de peur irrationnelle et d'ignorance technique, provoque souvent des interrogations dans l'esprit de nos interlocuteurs.

Le laser appartient encore à l'hérétique quand il franchit la porte du laboratoire.

L'avenir passe aussi, et pour beaucoup, par la compréhension de la mentalité et de la subjectivité de nos interlocuteurs.

Nous sommes donc très fréquemment amenés, dans nos rapports commerciaux, à montrer et à démontrer l'aspect naturel, parfaitement inoffensif de ce type d'appareils, à expliquer l'intérêt de leurs développements massifs pour l'avenir.

Quand nous prédisons que dans les villes de demain, de nombreux rayons lasers voyageront en liberté, dans tous les sens pour transporter notre voix, notre image ou nos pensées, nous inquiétons, naturellement, mais pas plus que l'électricité à pu inquiéter en son temps.

Biographie

Fondée par Jean-Paul Ransinangue et Xavier David Beaulieu, ACTIPOLE était à ses début spécialisée dans l'identification de véhicules en mouvement par moyens optiques (dispositif SIMI).

Très vite, la place que pouvait prendre l'optique dans le cadre de l'interconnexion locale s'est imposée. De quelques Kbps au début, à 1 Mbps, puis 10 Mbps jusqu'à 200 Mbps maintenant, le produit AL.COM tel qu'il existe aujourd'hui représente *le chaînon manquant* dans ce qu'il est convenu d'appeler la boucle locale.

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Mr. Erez ANTEBI
Vice President, Marketing
Gilat Satellite Networks Ltd.
(Israel)

DEV.3

VSAT Provides impetus for rural Telecoms development

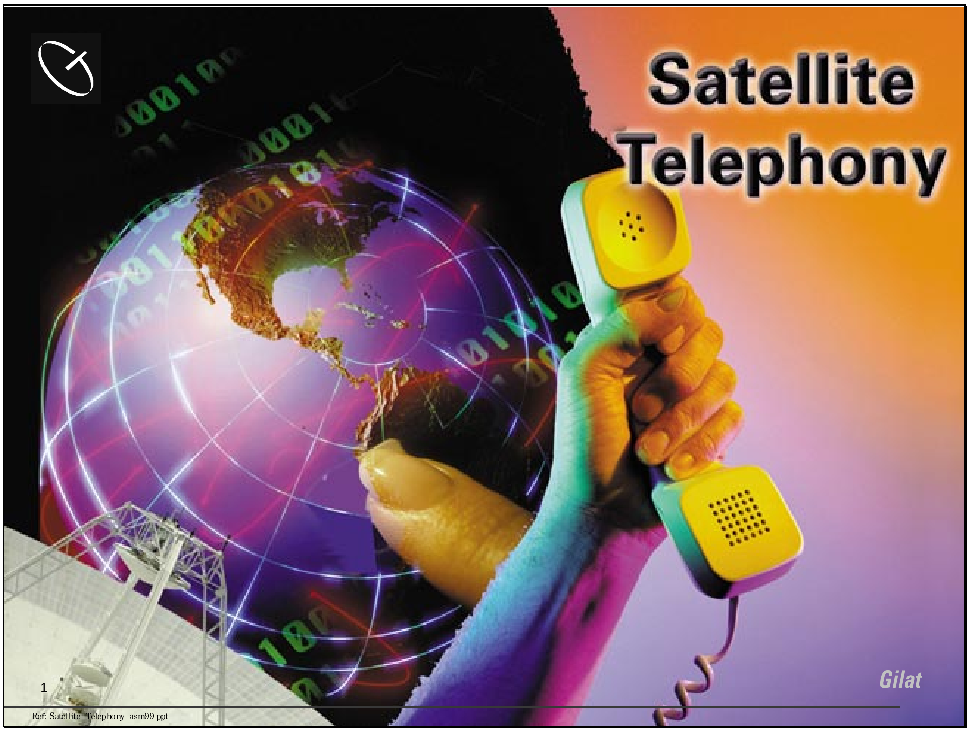
Biography

Mr. Erez Antebi, is Vice President for Marketing of Gilat Satellite Networks Ltd.

Prior to Mr. Antebi's current position, he served as the Vice President and General Manager of Gilat Inc. in McLean, VA, USA from 1994 to 1998. From 1993 to 1994 he was Vice President of Engineering and Program Management and from 1991 to 1993 was Product Manager for the SkyStar Advantage VSAT product.

Before joining the company, Mr. Antebi worked for a private importing business from 1989 to 1991 after having served from 1987 to 1989 as marketing manager for high frequency radiocommunications for Tadiran Limited, a defense electronics and telecommunications company. From 1981 to 1987 he served as a radar systems development engineer at Rafael the manufacturing and research and development arm of the IDF.

Mr. Antebi received a Bachelor of Science degree and Master of Science degree in electrical engineering from the Technion Haifa, Israel.



Outline

INSERT "SATELLITE TELEPHONY" PICTURE

- Rural Telephony market
- Available rural technologies
- Segments for VSATs
- VSAT telephony market and trends
- Gilat telephony solutions
- Satellite telephony case studies

2

Gilat

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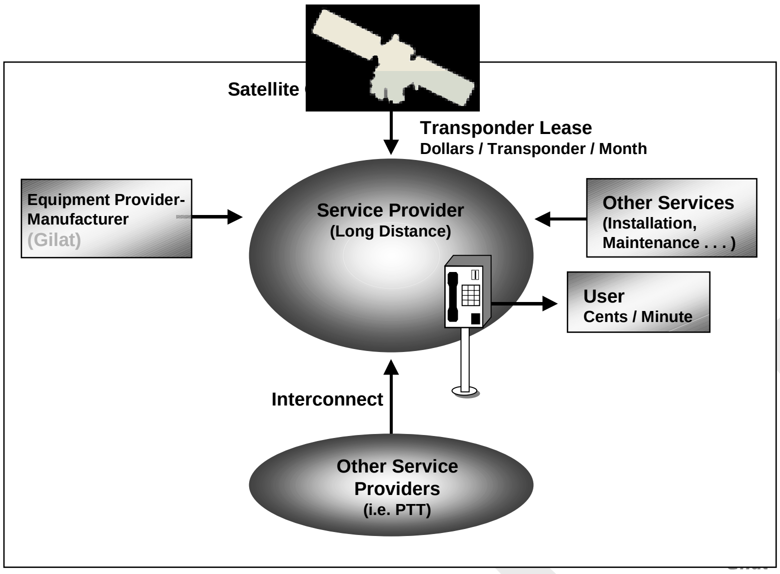
Telephony VSATs - Public Network Model



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Rural
Telephony
Market

4

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Rural Telephony Market
Social-Demographic Mission

Basic telephony services at low prices

- **Low teledensity countries (India, China, Africa ...)**
- **Developing countries (South/ Latin America - Chile, Mexico ...)**
- **Scattered population (Indonesia ...)**
- **Harsh environment (Peru, Nepal ...)**
- **Political / economic / social drives to provide basic telephony <u>quickly</u> to remote rural areas (South Africa, Argentina...)**

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Ref: Satellite_Telephony_asm99.ppt

Rural Telephony Market
Statistics

- **Difficult to penetrate - main barrier is low income**

  - Typical annual GDP is $300 to $600

- **In the past received low priority from PTTs**

  - 1 to 2% of GDP for rural telecom

- **Typical traffic generated per line**

  - 40 to 70 mErlang
  (60 to 100 minutes per day)

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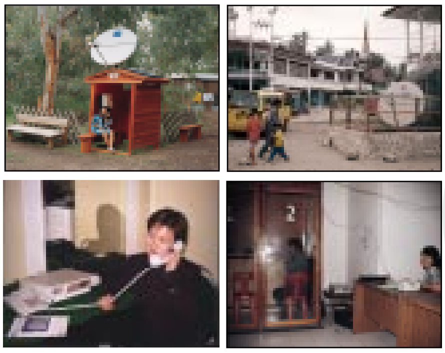
Rural Telephony Market

Required Services



- Voice as a first step service
- Preferably by payphones in Public Call Offices (PCO)
- Fax/Data at low rates as a second step
- Provision for Internet connectivity (e-mail , e-commerce services)
- Voice mail for incoming calls to Payphones

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Ref: Satellite_Telephony_asm99.ppt

Gilat Telephony VSATs

- All DAMA, Mesh / Multi-Star / Star topology VSATs
- All have central Hub station and remote VSATs

- 1- 3 channels
- Public telephony with IP
- Mainly used for PCO's and small business users

- 2 - 32 channels
- Corporate / Public Telephony with bandwidth on demand
- Mainly used for Corporate Telephony and Public Infrastructure (exchange interconnection)

- Multiple E1 / T1 trunks
- Satellite Frame Relay for Data + Telephony
- Mainly used for Trunking, Video Conferencing, Cellular base station interconnection

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Gilat

Ref: Satellite_Telephony_asm99.ppt

Gilat VSATs Incorporates

- **DialAway / FaraWay**
  - Multiple lines per VSAT
  - Lowest power consumption
  - Voice with Internet overlay
  - Ease of expansion (low incremental cost)
  - Field upgradable
  - Experience and market share
  - Toll quality with 6.4 / 8 kbps
  - Highest proven MTBF

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Gilat

Ref: Satellite_Telephony_asm99.ppt

Global Village Telecom

- **Service operators, specializing in telecommunications services in Latin- America utilizing primary VSATs**
- **First round of financing: April 1998, US$40M by outside investors**
- **Operations in Chile and Peru:**
  - **Chile:** 1200 sites installed, 1700 till year end
    - Private lines initiative
  - **Peru:** 220 site till year end
    - International & National long distance licenses
  - New public tenders in both countries
- **Future targeted countries: Guatemala, Colombia, Brazil**
- **Delicate coordination with Gilat Florida . . .**
- **Headquarters relocation in summer 1999 to South Florida**

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Gilat

Ref: Satellite_Telephony_asm99.ppt

Available Rural Technologies

- **Fixed satellite telephony**
  - VSATs
- **Copper, microwave**
  - Unreliable
  - Congested
  - Distance dependant
- **Wireless local loop**
  - Designed for Urban / Semi Urban, not optimized for Rural
  - Distance dependant
- **Mobile Satellite Telephony (I.e. Iridium)**
  - Designed for mobility, not optimized for Rural
  - ~ 2,000 $ / handset - unit
  - 1 to 6 $ per minute call
  - New - not proven

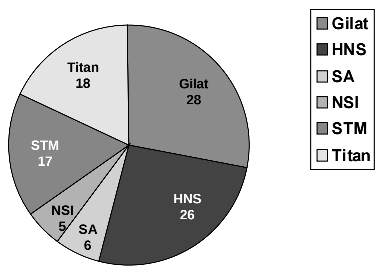
1

Gilat

Ref: Satellite_Telephony_asmf99.ppt

Gilat World Market Share

Telephony VSATs - Rural Sector 1998



Rural Telephony Market Share by Terminals

Source: Comsys UK 1999 (Page 67)

- **Cumulative satellite telephony terminals sold ~ 43,000 (75% mesh, 25% star)**
- **Rural telephony sector is 48% of the market**
- **Major Players: - Gilat, HNS, STM, Titan**
- **Major unknown factor - Star VSAT effect on Mesh VSAT sales**
- **Gilat leads in Rural Telephony market for Star and Mesh terminals**
- **Gilat's largest telephony deals**
  - Telkom South Africa 3000 DialAway
  - GVT Chile - 1750 DialAway
  - ETC - 300 FaraWay
  - KTC - 300 FaraWay

12

Gilat

Ref: Satellite_Telephony_asmf99.ppt

VSAT Telephony Market
Facts and Trends

- Yearly sales reached ~ 12,000 VSATs
- Rural telephony sector- main one in growth, still small
- Star VSATs boosts the growth in the rural sector
- Average number of lines is decreasing, 3 lines/VSAT
- In the Corporate arena - require more data services
- Corporate networks usually less than 50 sites
- In the Rural arena - compromise features for price
- Mass market - offerings of VSAT / WLL combination for the rural public and residential subscriber

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Gilat

Ref: Satellite_Telephony_asm99.ppt

FaraWay VSAT

- **Applicable for**
  - Corporate Networks
  - Public Networks
- **Incorporates:**
  - Up to 8 lines per normal site
  - Toll quality voice, fax
  - Combination of voice and variable rate data
  - Medium rate data (up to 128Kbps)
  - Data on demand (fixed rate and destination)
  - DAMA operation
  - Full Mesh
  - Data on demand (any rate, any destination)
  - High bit rates with external modem (up to 2 Mbps)
  - PSTN interoperability

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Gilat

Ref: Satellite_Telephony_asm99.ppt

The DialAway VSAT

- **Applicable for Rural Telephony**
  - Public call offices
  - Payphones
- **Incorporates**
  - Up to 3 lines per site
  - Toll quality voice, fax , modem data
  - DAMA
  - Mesh and Multi-Star topology
  - Large scale network
  - Lowest power consumer VSAT
  - Build in AC/DC
  - Internet (IP) inherent support
  - Expansion without site changes
  - Indoor or Outdoor
  - PSTN interoperability

15 Gilat

Ref: Satellite_Telephony_asm99.ppt

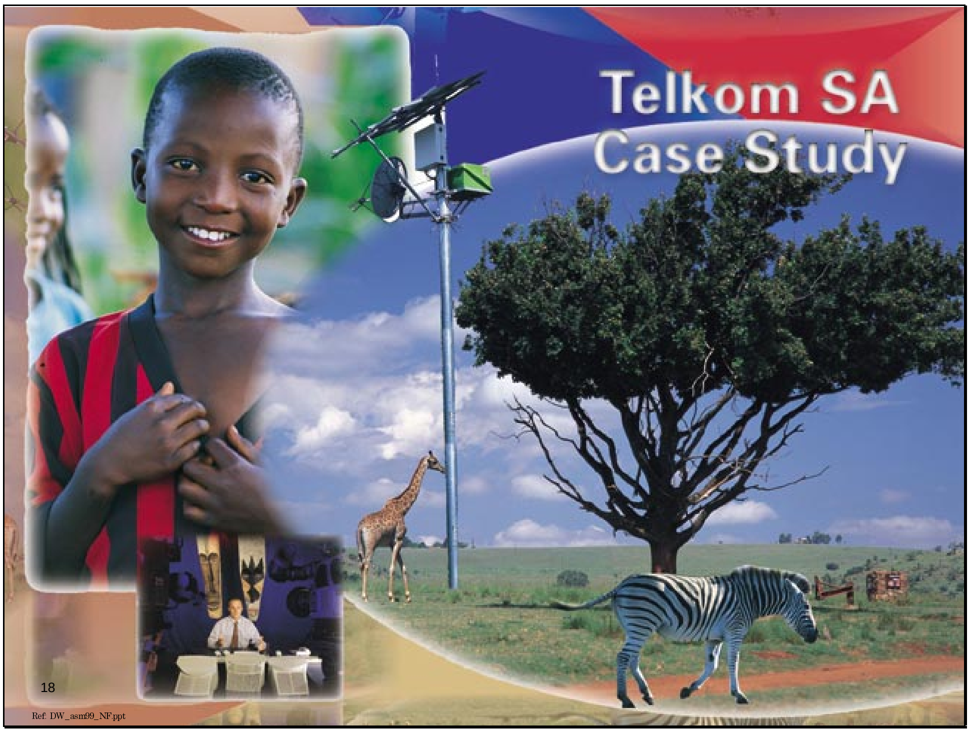
DialAway / FaraWay Largest Networks 1999

Country	End User	Operator	Terminal Ordered	Applications
South Africa	Small business + PP	**Telkom S.A.**	3,000	Rural public telephony and Payphones
Chile	Payphones	**Ipanema/GVT**	1,700	Small villages - Public payphone users
Kazakstan	Kazaktelkom	Kazaktelkom	300	National telephony, rural switch interconnection
Ethiopia	ETC	ETC	500	National telephony infrastructure and Rural public telephony
Guatemala	Payphones	Telephonos del norte	600	Public payphone users
Indonesia	PCO's (Wartels)	BSI , C&W Mitratel	360	Public Call Offices
India	Various	Comsat Max	140	Banking, distribution, telephony

16 Gilat

Ref: Satellite_Telephony_asm99.ppt


Case
Studies
Gilat
17
Ref: FaraWay_asm99.ppt


Telkom SA
Case Study
18
Ref: DW_asm99_NF.ppt

DialAway VSAT for Telkom SA

Network Design

- **RFP requirements**
  - 3000 VSATs over Intelsat Ku spot
  - Integration with SA PSTN
  - Turn-key project , quick network roll-out
- **Multiple channels**
- **Uniform installation solution**
  - 0.98m Ku-band antenna
  - Pole mount, All Solar, All outdoor
- **Integration with the PSTN in 5 terrestrial switches**
- **PSTN compatible services for rural subscribers**
- **Payphone support**

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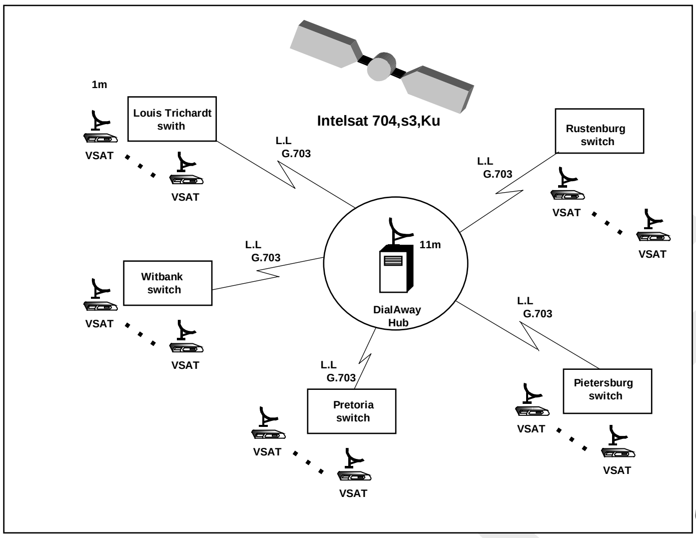
Gilat

Ref: Satellite_Telephony_asm99.ppt

DialAway VSAT for Telkom SA

Network Layout



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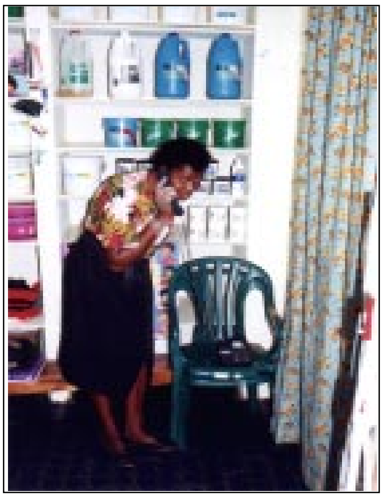
DialAway VSAT for Telkom SA

Network Implantation and Services



Implementation

- **Most of the installations in Northern Province (400 x 400 Km)**
- **350 people , 60 local installation teams**
- **Average of 250 sites per week**
- **50 % of the sites deployed in 10 weeks**
- **Total turn key project ~ 15 M$**

Services

- **Voice ITU-T G.723**
- **Fax - 4.8 Kbps**
- **Modem data - 2.4 Kbps**
- **Pay-phone metering and supervision**
- **Internet provision - SW upgrade**

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Gilat

Ref: Satellite_Telephony_asm99.ppt

DialAway VSAT for Telkom SA

Main Advantages to Telkom

- **Available and proven VSAT solution**
- **Ready for massive, quick roll-out**
- **VSAT with lowest power consumption (< 30 W) , integrated solar power solution**
- **Seamless line expandability 1 to 3 lines**
- **Rural subscriber service transparency to the PSTN**
- **Feature expandability, Telephony to Internet**
- **Affordable price**

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Gilat

Ref: Satellite_Telephony_asm99.ppt

Kazak National Operator KazakTelecom

ҚАЗАҚТЕЛЕКОМ
OPEN JOINT - STOCK COMPANY

Network Requirements

- **Providing national satellite transmission between rural switches**
- **Replacing Microwave unreliable, widely spread, difficult to maintain infustructure**
- **Providing over 250 remote sites with telephony, fax and data**
  - 10 regional stations - switching centers
  - 240 remote sites
- **Disaster recovery - geographically redundant Hub (Almaty & Akmola)**
- **Turn Key , Fast deployment**

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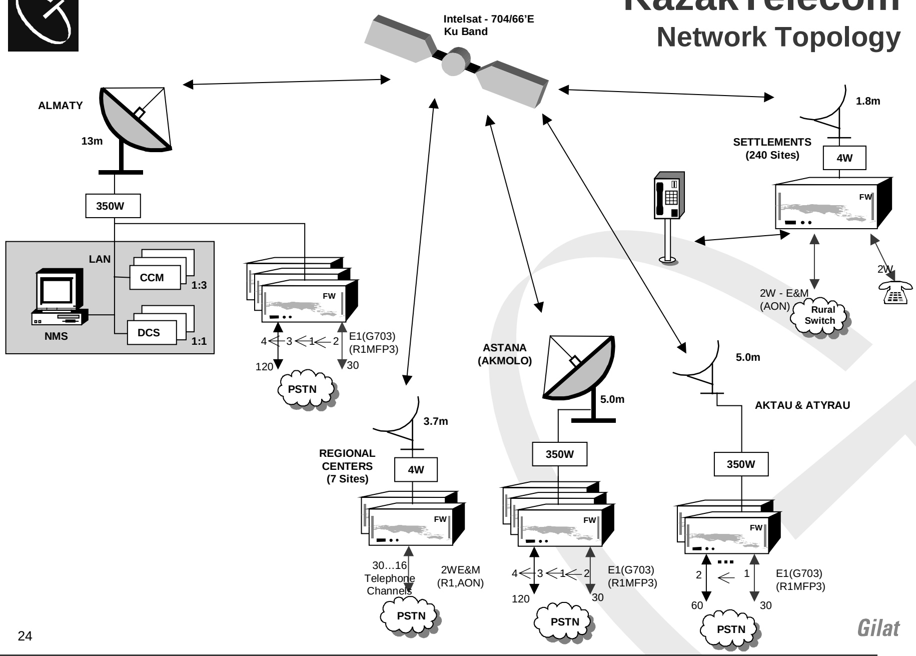
Ref: Satellite_Telephony_asm99.ppt

KazakTelecom

Network Topology



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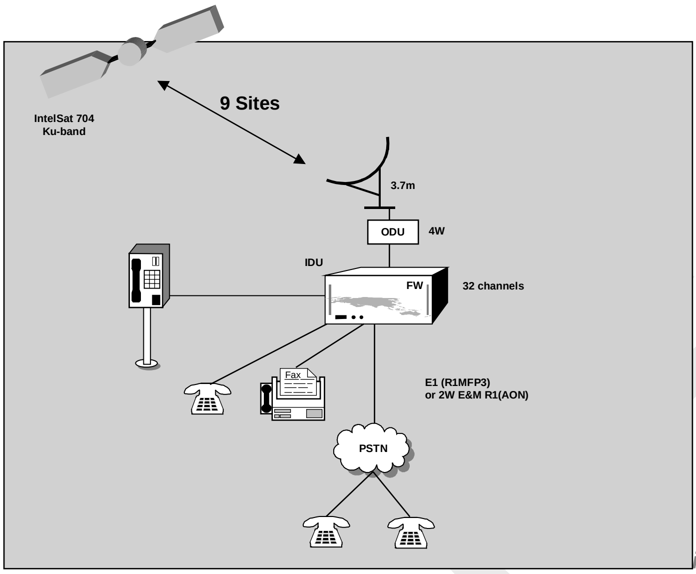
Gilat

Ref: Satellite_Telephony_asm99.ppt

KazakTelecom
Typical Regional Center Site



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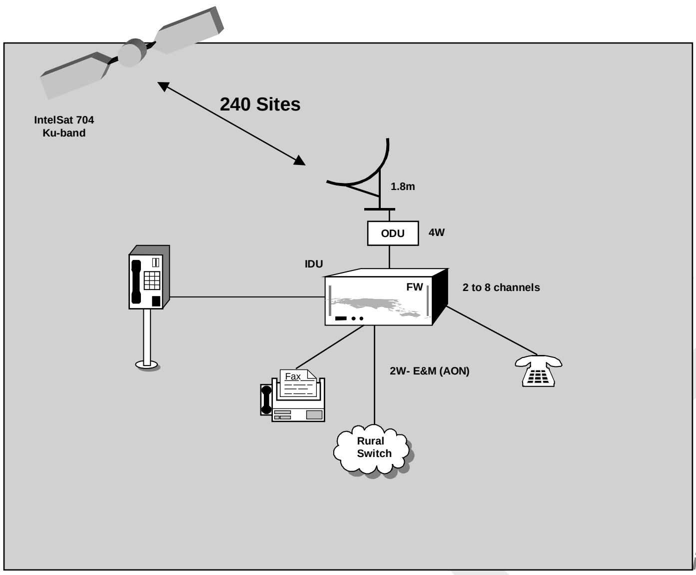
KazakTelecom
Typical Remote Site



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Ref: Satellite_Telephony_asm99.ppt

COMSAT MAX (India)

- Joint venture Comsat International & MAX India
- Shared hub for corporate networks
  - City Bank
  - Lloyds (Insurance)
  - Whirlpool (Mfg. & Distribution)
- Corporate Telephony and Intranet services
- Typical site includes:
  - 2 voice channels
  - 16 - 32 kbps PAMA data
- Over 200 FaraWay VSATs and growing

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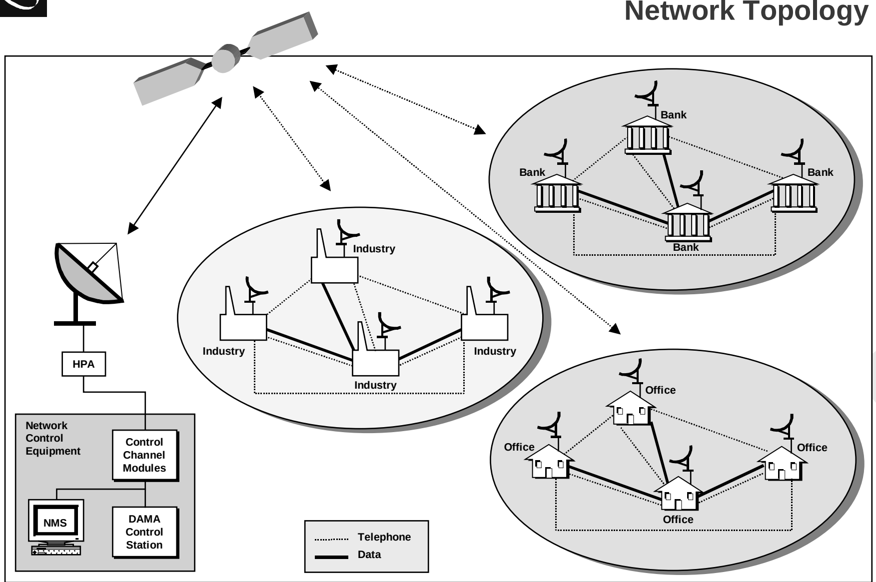
Ref: Satellite_Telephony_asm99.ppt

COMSAT MAX (India) - (Cont.)

Network Topology



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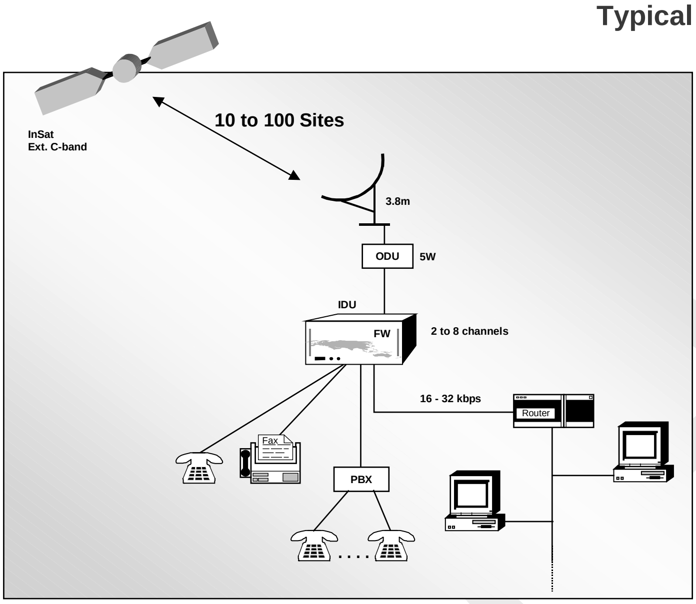
Gilat

Ref: Satellite_Telephony_asm99.ppt

COMSAT MAX (India) - (Cont.)

Typical Site



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Gilat

Ref: Satellite_Telephony_asm99.ppt

Mr. Khaya DLUKULU
Regional General Manager (Africa)
Commercial ICO Global Communications
(South Africa)

DEV.3

The correlation between economic and telecommunications development in Mozambique

1 Introduction

The linkage between economic development and telecommunications infrastructure is well documented. Telecommunications is now unquestionably considered an essential requirement for sustained economic development in all countries, and can be viewed as a key-enabling factor in any economy of the developing world.

In war-ravaged countries such as Mozambique, in dire need of economic development, massive investment in telecommunications becomes a top priority. The cost of traditional telecommunications networks is, however, prohibitive. In the case of Mozambique, this cost, combined with a very low GDP per capita, and a widely dispersed rural population, render the installation of traditional wire line networks unfeasible in many areas.

The question arises whether new types of telecommunications service, particularly GMPCS (Global Mobile Personal Communications Services), will provide the instant infrastructure necessary to ensure sustained economic development.

2 Overview of Mozambique

2.1 History and status of economic development

After winning independence from Portugal in 1975, a civil war lasting nearly two decades left the country ravaged. The post-independence government of President Samora Machel of Frelimo (Frente de libertãçao de Moçambique) installed a socialist political system, the policies of which included nationalizing the economy. The combined effect of these socialist policies and the war with Renamo (Resistencia Nacional de Mozambique) finally left the country's economy in ruins.

From 1990 onwards, Mozambique moved toward a market economy, and the government signed the Rome Accord in 1992, ending the war. Since that time the government has moved steadily to reform and develop the economy.

Reconstruction of all aspects of Mozambique's infrastructure, including telecommunications, has been a strong focus of the current government.

With a GNP per capita of US$ 90 compared to a world average of US$ 5,130, Mozambique is one of the world's poorest countries. All is not gloom, however. Mozambique has demonstrated one of the developing world's fastest levels of economic growth over recent years (albeit off of a very small base), and continues to show annual growth rates of 5%+ in GNP.

Additionally, the country has attracted considerable international investment over this time period, notably in the mining, agriculture and telecommunications industries. Mozambique has also received substantial sums from the international donor community, as has been named as a likely recipient of debt relief. Investment incentives such as Industrial Free Zones for export oriented companies are also encouraging development.

2.2 Geographic and population indicators

Mozambique has a population of 17.4 million people. It is a relatively large country, with a land area of 784,000 km^2. The population density is 22 people per km^2 compared to a global country average of 44, making the country relatively sparsely populated. Estimates of the proportion of the population living in urban areas range from 22% to 36%.

3 Status of telecommunications development in Mozambique

3.1 Overview

Mozambique's tele-density is 0.35, the lowest in the Southern African region where the average is 3.18. Given these low levels, satisfied demand of 77% gives an indication of the extremely limited spending power of the population of Mozambique. However, the telecommunications sector has recently been the focus of a significant development effort. Investment per line is of the order of US$ 1,013, far above the regional average of US$ 367. Revenue per line is also above US$ 1,000 and tariffs are relatively low compared with the African average.

3.2 Policy and regulation

Telecommunications infrastructure and services are provided by the national operator, Telcomunicações de Moçambique (TDM). Instituto Nacional da Comunicações de Moçambique (INCM), the telecommunications sector regulator, was established in 1992. Issues being examined by INCM include liberalization of service, privatization of TDM, the exclusivity period for TDM, the TDM performance contract, interconnection and a review of license fees. In October 1997 an announcement was made indicating a clear intention to privatize TDM in the short term.

INCM can seek to change the sector set-up by proposing measures to the Ministry of Transport and Communication. There are no conditions for granting licenses at present and no new licenses for basic and cellular service are envisaged. When planned liberalization is in place, priority for licenses will be given based on several criteria, including investment, social obligations offered local shareholding and rollout plan.

3.3 Fixed line services

TDM is 100% government owned and has a legal monopoly. The organization is managed under a performance contract with the government, which contains stipulations relating to financial self-sufficiency, universal service and new investment, which are subject to criteria of profitability.

TDM's investment strategy is focused on increased access, development of the transmission backbone, modernization of transmission links, general increased capacity and building and expanding international routs. The organization is also involved in telecommunications through several subsidiary companies created in association with international partners. These include M-Cel, managed by Telecomunicaçõe Moveide Moçambique (TMM) for cellular service, Televisa for external network (local loop), Teleserve for paging services (TeleBip) and Teledata for data communication and Internet services.

TDM also has investment with INMARSAT, RASCOM and INTELSAT. Mozambique is currently applying state-of-the-art technologies in expanding its backbone infrastructure and universal access, the implementation of SMS cellular technology for mobile public telecommunications service and participation in international initiatives to attain a high level of regional and global connectivity.

Mozambique Telecommunications Performance Indicators perhaps tell the story best:

Telephone lines	
Capacity	104,556
Connected	61,175
Teledensity	0.35
Digitalization of switching	95%
Cellular phone capacity	50,000
Cellular subscribers	1,500
Public telephones	1,600
Internet accounts (1998)	3,500
X.25 (ports)	15
Revenue/line US$ PTO	1,018
Revenue/staff US$ PTO	26,101
Investment/connected line US$ PTO	1,013
Tariffs	
Connection US$	51.00
Per month	7.00
3-min local call	0.04
International call	2.91

Source: BMI-TechKnowledge.

3.4 Cellular services

Cellular services are provided by TDM subsidiary M-Cel which is owned 76% by TDM and 24% by Detecon (Deutche Telekom). Capacity is 50,000 but only 1,500 connections have been made in Maputo. Cellular subscribers account for 2% of total voice lines, while the PSTN accounts for the remaining 98%.

M-Cel has international roaming agreements with: MTN SA, TMN, Vodacom SA, Telecel, France Telecom and Vodaphone UK. Agreements are planned with TIM Italy, CellPlus Mauritius, Telefonica Spain and D1&2, Germany.

3.5 Data services

As with the majority of the rest of Africa, data services are underdeveloped in Mozambique. Data services available include X.25 and leased lines. ISDN, VSAT, radio paging and frame relay are planned. Full Internet services have been available since 1995. There were 3,500 Internet subscriptions in 1998.

4 GMPCS with the telecommunications services basket

GMPCS services are two-way voice and data telecommunications services accessed through a mobile or fixed-mobile terminal, with the final link to the user provided via satellite. GMPCS offers voice, low-rate data, fax and messaging services to mobile or fixed handsets anywhere on the earth. ICO, Iridium and Globalstar, the primary GMPCS service providers are all expected to be offering services in 2000.

GMPCS systems can be distinguished from broadband satellite services (BSS) which offer telephony as well as high-speed data services and Internet access. These systems require fixed antennae terminals. Consortia currently preparing to enter the market include Teledesic, Skybridge and SPACEWAY. These systems will not be operational before 2001.

GMPCS and BSS systems represent a massive and innovative step forward in telecommunications. Whilst these systems are likely to perform a significant role in the future telecommunications environment, their business model had yet to be proven, as no successful GMPCS operations have yet established themselves. Iridium, the first GMPCS system to go operational, filed for protection from creditors under Chapter 11 of the U.S. Bankruptcy Code in August 1999, following slower than expected subscriber uptake. As in many other sectors of the technology industry, it appears that first-to-market advantage was not in fact realized.

Competing GPMCS service providers such as ICO and Globalstar may benefit from understanding the mistakes made by Iridium.

Overall, once the initial teething problems are sorted out, GMPCS is expected to occupy a niche role in the global telecommunications industry, but it will be an important one.

The markets targeted for GMPCS services are:

- Callers who roam outside of cellular coverage. GMPCS services overcome the problems caused by the lack of a global cellular telecommunications standard, which prevent roaming beyond the range of compatible base stations.
- Extension of cellular coverage. GMPCS services provide service for residents of areas not served by traditional cellular networks.
- Semi-fixed access. GMPCS services provide service via payphones in areas where it is uneconomical to provide PSTN access.

5 Mozambique telecommunications market development needs

Mozambique's telecommunications development needs are much the same as the rest of Africa, only more so. The country needs to provide affordable universal service or universal access to its citizens and also needs to provide businesses and business people with cost-effective advanced telecommunications services. The effects of this will be to facilitate the rebuilding of the economy, and make Mozambique more competitive in international markets.

In general, the African countries suffer the burden of high prices for telecommunications services in conjunction with relatively low incomes.

This is clearly evidenced in terms of connection charges for PSTN services. The connection charge in Mozambique is 56% of GNP per capita.

This, in the context of 20% for Africa overall, and 5% average globally, indicates that telecommunications services are simply out of reach of the average Mozambican resident.

In terms of providing universal access, the crux of the issue is one of low income per capita versus expensive telecommunications services based on technologies using expensive imported infrastructure. When also considering the low population density in rural areas as well as geographic isolation, it begins to look increasingly likely that universal access, and not universal service, should be the goal in the medium term.

The way to achieve this is through shared public communications facilities or telecentres.

The building of telecentres is preferable because of the higher revenues per line generated and the relatively lower costs. The roles the government can play in this scenario include focusing on universal access as opposed to universal service and licensing of operators utilizing suitable telecommunications services that will facilitate the building of telecentres.

6 The potential for GMPCS within Mozambique

Within Africa, GMPCS service providers are targeting two primary market segments:

- Premium services to wealthy individuals and industries that seek worldwide connectivity for voice and data services.
- Basic services for rural telephony connectivity, where the service would be used to connect isolated geographical regions.

The business market and the business traveler are currently under-serviced in terms of available telecommunications infrastructure. Mozambique has significant natural resources, which could see the development of industry sectors of fishing and agriculture, mining and tourism. Agriculture accounts for 30% of Gross Domestic Product. All of these industries typically occur outside of the scope of urban areas and are thus not covered by fixed line or cellular networks. The development of these sectors will be enhanced significantly by the provision of adequate voice and data telecommunications facilities.

The rural connectivity market, as mentioned above, will be well serviced by the development of telecentres.

The question becomes one of whether GMPCS services are the appropriate technology to cater for the above-mentioned needs, in the light of other available technologies. These technologies and their suitability to meet the required connectivity are discussed below:

- Copper landline solutions, are unlikely to be suitable outside of urban areas, due to their expense.
- Point-to-point radio links may prove to be useful solutions in terms of linking certain remote areas.
- Cellular services are available within urban areas, but are an unlikely solution in rural areas due to the high costs involved.
- WLL solutions such as DECT and CDMA may well prove to be useful technologies in peri-urban areas.
- VSAT-VSAT has been used significantly within Mozambique, as in many countries in Africa. VSAT is likely to continue to play a strong role within the country for the purposes of linking remote fixed sites.

Outside of urban areas, it is clear that GMPCS has a role to play in fulfilling these needs. The touted advantages of GMPCS include cost-effectiveness in terms of infrastructure rollout in comparison with fixed line, cellular and point-to-point radio links, as well as speedy rollout, flexibility, and relatively low maintenance.

In terms of the markets generally targeted by GMPCS service providers the market for cellular extensions and international travelers is likely to be the most important target market initially.

7 The economic benefits of GMPCS

The uptake of new technologies such as GMPCS has the potential to allow under-developed countries such as Mozambique to leapfrog telecommunications networks in other countries, which have massive legacy telecommunications, systems. This is already demonstrated in Mozambique, to some extent, by the digitization of 95% of the switching of the network, ahead of a number of Western economies. These new networks, if properly exploited, can enable these economies to grow at a rapid rate.

Growth in Mozambique's telecommunications industry will boost the economy in the following ways:

- Creating jobs in the telecoms sector and supporting industries.
- Reducing the costs of doing business in the country by making other industries more competitive in world terms.
- Access to and usage of information globally will increasingly drive economic development in all countries.
- Access to the Internet as well as other data services will rapidly become very important, for all sectors, including education.

The addition of GMPCS to the collection of telecommunications services offered in Mozambique can only increase competition in the provision of telecommunications services in the country. This will have the effect of driving down costs and making telecommunications services affordable for a larger portion of the population. It is this type of drop in prices, which can result in the significant increases in teledensity, which will be required to support sustained economic growth.

8 Conclusion

The development of telecommunications infrastructure is but one of the factors speeding up development of the Mozambique economy. Other factors such as economic reforms have had a very significant effect, so it is difficult to view the effect of telecommunications in isolation.

Telecommunications today can be viewed as the equivalent of building roads in previous decades. Without them, economic development, at the rates required by Mozambique, is impossible. GMPCS has an important niche role to play within the telecommunications infrastructure of Mozambique, and as prices decrease, the potential for this new technology will increase dramatically.

Biography

Mr. Khaya Dlukulu is a South African national and brings together extensive experience from the IT market in Africa, where he has worked over the past 19 years in various commercial roles for companies like IBM South Africa, HP and Arthur Andersen. Khaya joined ICO from Infiniti Technologies where he was Group Executive, Marketing and Business Development.

PALEXPO # DEV.4

Wednesday, 13 October 1999	09:00 - 12:30

Dev.4	Internet in Developing Countries

Chairperson	**Mr. Bruno LANVIN,** *Head,* Electronic Commerce (UNCTAD)
Moderator	**Dr. Tim KELLY,** *Head, Operations Analysis,* Strategic Planning Unit (SPU/ITU)
Keynote Speaker	**H.E. Dr. Mai Liem TRUC,** *Secretary General,* Department of Posts and Telecommunications (Viet Nam (Socialist Rep. of)
Panelists	**Mr. Charles ZHANG,** *CEO,* Internet Technologies China (ITC) (China)
	Mr. Shashank KANSAL, *Sr. Vice President,* WorldLink Communications Pvt. Ltd. (Nepal)
	Mr. Ayisi MAKATIANI, *Chief Executive Officer,* Africa Online Holdings Ltd, (Kenya)
	Mr. Daniel SALCEDO, *Executive Director,* PEOPLink Inc. (U.S.A.)
	Mr. Jose SORIANO, *Chief Executive Officer,* Red Cientifica Peruana (Peru)

Roundtable and Discussion

Commentators	**Dr. Hans D'ORVILLE,** *Director IT for Development* (UNDP)
	Mr. Danilo PIAGESSI, *Chief,* Information for Technology Development Unit, Inter-American Development Bank (USA)
Rapporteur/Right of Response	**Mr. William KEEFE,** *Vice President,* International Prodigy Communications (U.S.A.)

PALEXPO

DEV.4

Wednesday, 13 October 1999	09:00 - 12:30

Dev.4	Internet in Developing Countries

The advent of the Internet has been variously described as being as important for society as the development of the personal computer, the telephone or even the printing press. In theory, the Internet can widen and enhance access in developing nations because it offers a relatively cheap, versatile and technically efficient service that complements standard telephony. In fact, Internet access is viewed by many as a component of a re-defined “universal service”. Furthermore, the Internet can allow businesses from developing nations to “leapfrog” into the development mainstream because Internet commerce will allow them to sell their wares and their services directly to customers. The advent of the Internet has challenged many well-established economic and business models in telecommunications, broadcasting and many other service activities. It also offers considerable promise in facilitating the delivery of basic services, such as health and education, which are unevenly distributed at present.

How is such an array of phenomena likely to affect developing countries and their integration into the emerging “global information economy”. This session explores the current and likely impact of Internet development in a number of areas of social and economic concern to developing countries, ranging from some unique infrastructure challenges to pricing issues as well as services to be delivered over the Internet.

Mr. Bruno LANVIN
Head, Electronic Commerce
UNCTAD (United Nations Conference on Trade and Development) (Switzerland)

DEV.4

Internet in Developing Countries

The Internet is reaching a critical stage of its history. After spending its infancy in the laboratories of the military in the 1970s and its childhood on university campuses in the 1980s, it entered adolescence with the birth of the world wide web in the mid-1990s. This was the time when the Internet world was guided by a creative and unprecedented kind of cooperation between engineers, academics and entrepreneurs.

One could then reasonably foresee that the Internet phenomenon would soon become a global source of knowledge and wealth creation through the internationalisation of the original kind of self-governance and cooperation which had characterized its birth and expansion in the United States and, later, in other industrialized countries. For developing countries, the main obstacles to becoming part of the Internet revolution were then related to the existence of proper telecommunications infrastructures.

With the latter part of the 1990s, however, a new phenomenon has started to change radically the very nature of the Internet revolution, and hence the ability of developing countries to participate in it. This phenomenon can be called for short the 'shift in economic models' implied and personified by the Internet. Three examples of this shift can be quoted, which lead to rather far reaching questions about Internet and development:

1) *Which global information infrastructure?*

One way of looking at the issue of who should finance the information infrastructure in developing countries is to consider the evolution of the relationship between telephony and the Internet: when packets started to be exchanged over telephone lines, many worried about the valid 'accounting model' which should be used by telcos to 'digest' the Internet phenomenon; however, when IP telephony started to approach the quality of regular telco services, the underlying economic model used by most major telcos needed to be revisited; should the concept of 'universal service' be redefined along those lines? If so, what should be the consequences on international settlement agreements and accounting rates? How would this need to be reflected in international trade negotiations, i.e. in the WTO context?

2) *E-commerce and development:*

Electronic commerce is turning into the driving force of the information revolution; however, e-commerce is not developing along the lines that initially seemed to be the road to success: business-to-consumer transactions will soon be dwarfed by business-to-business transactions, and an increasing array of products will be distributed for free over the Internet, as a larger share of e-commerce revenues become indirect (e.g. from advertizing). What could this mean for developing countries and their enterprises (especially small and medium-sized enterprises) in the years to come? How should this be reflected in international discussions about the fiscal treatment of Internet-based commercial transactions?

3) *Content and value:*

All projections seem to conclude that, in the next few years, the bulk of Internet use and Internet content production should come from non-english speaking countries, in particular in developing countries. This, to some extent, is a reassuring perspective. However, what needs to be done to ensure that the well known phenomenon of 'impoverishing growth' is not replicated in the Internet era; in other words, how can developing countries ensure that the Internet revolution not only reduces the North-South gap, but also pervades their own economies and societies in ways that contribute to reduce local income disparities, strengthen democracy and stimulate innovation, entrepreneurship and competitiveness at all levels?

As we embark on a new millenium, our societies could very well find in the emergence of a global information society new reasons and fresh possibilities to work in better harmony and to identify new positive-sum games. The Internet has the potential to be instrumental in the pursuance of this ambitious goal, but it is in developing countries that we shall first be able to see whether or not the dream is becoming reality.

Biography

A United Nations specialist in electronic commerce, international trade and telecommunications issues, Dr Lanvin has been responsible for research, analyses and negotiations related to information, telecommunications, technology and trade. He has focused in particular on the relationship between information technologies, telecommunications, and international trade in services. His current main area of specialization is electronic commerce. He focuses on advising the governments of UNCTAD's member countries in the area of regulation, trade policy and national strategies to stimulate the participation of local enterprises (in particular SMEs) in global e-commerce. As head of UNCTAD/FALPRO's Strategic Planning Unit, he has had the responsibility to formulate and implement the strategic plans for trade facilitation and information-related trade projects in the United Nations Conference on Trade and Development. His various responsibilities (especially as Deputy Executive Secretary of UNISTE and General Manager of GET UP) have lead him to deal directly with the CEOs and highest decision makers of large private enterprises involved in telecommunications, information technologies and electronic commerce. As World Coordinator of the Trade Point Programme, he has overseen the development of the world's largest Internet site for pre-transactional trade information (GTPNet). Under his chairmanship (1995-1997), the membership of ISOC's Geneva Chapter grew from 50 to 490.

A doctor in Economics (Troisième Cycle, La Sorbonne, Paris – France) and master in business administration (HEC, Paris – France), Bruno Lanvin has been in charge of managing the events and exhibition of the first meeting of 'Partners for Development' devoted to electronic commerce (Global Electronic Trade UN Partnership, Lyon, November 1998), for which he has been working particularly closely with private enterprises involved in telecommunications, the Internet and electronic commerce.

His mother tongue is French. He is fluent in Spanish and English, and has a basic working knowledge of Russian. He is married to Anne Miroux and has four children.

Carreer record

After working as an economist for the Services of the French Prime Minister (1978-79), Mr Lanvin was recruited by the United Nations where he was successively the Special Assistant to the Director General in New-York (1981-1983), and to the Deputy Secretary-General of UNCTAD in Geneva (1984-1990). Since 1983, he was one of the UNCTAD economists in charge of studies on the Services sector, and specialized on information-intensive services, including telecommunications (see bibliography below). In 1990, he was appointed by the OECD as rapporteur of the concluding meeting of the 'Technology and the Economy' Programme. In 1991, he became responsible for the strategic planning activities of the newly created Special Programme for Trade Efficiency. Following the decision of the General Assembly of the United Nations to convene the International Symposium on Trade Efficiency (UNISTE), he was appointed Deputy Executive-Secretary of UNISTE (1993), a position which he still holds.

From 1994 to 1998, he has been the World Coordinator of the Trade Point Programme, through which the United Nations has established the Global Trade Point Network (GTPNet), which includes over 100 'telecenters' in all regions of the world. A core purpose of GTPNet is to allow traders and investors worldwide to benefit from recent advances in the area of information technologies and telecommunications. In that context, one of Dr Lanvin's responsibilities has been to stay abreast of the latest developments in the fields of the telecommunications industry, with special focus on Internet and electronic commerce. In 1998 he was appointed General Manager of GET UP (Global Electronic Trade UN Partnerships), covering all activities related to electronic commerce within the Lyon Summit (9-12 November 1998). A few months later, he became the Head of the n Electronic Commerce Section which had just been created in UNCTAD.

In early 1999, he received responsibility for carrying out UNCTAD's activities under the 'Development Account' funds granted by the United Nation's General Assembly for activities in the area of e-commerce. In that context, he created and promoted the concept of 'e-velopment', which served as a basis for a series of inter-regional, regional and national workshops on 'e-commerce and development', including in Geneva, Caracas, Lima, Nairobi and Colombo.

Other relevant recent activities

In 1995, Dr Lanvin was invited by the Secretary-General of the ITU to serve as a member of the advisory committee of the Strategies Forum of Telecom'95. In that capacity, he chaired the Forum's Session devoted to 'Social issues'. Also at Telecom'95, he chaired the final session of the 'Internet@Telecom' Forum. In late 1995, he was invited by the Secretary-General of the ITU to serve as a member of the Advisory Committee of Telecom Americas, held in Rio de Janeiro from 11 to 15 June 1996.

In August 1995, Dr Lanvin became the president of the Geneva Chapter of the Internet Society. He was re-elected in January 1996. Dr Lanvin has been a member of the INET'96 and INET'97 Committees, co-chairing the 'expansion' and 'regional development' tracks, respectively.

In early 1996, he became the UNCTAD staff member responsible for the substantive and logistical preparations of the First National Event on Trade Efficiency organized in South Africa in parallel with UNCTAD IX (27 April-11 May 1996), and the resource person for UNCTAD's participation in the ISAD (Information Society and Development) Conference held in South Africa under the auspices of the G7 (13-15 May 1996).

In late 1996, he was designated by the Secretary-General of the ITU as Chairman of the Forum for Telecom Interactive (to be held in Geneva 8-14 September 1997), and a member of the Telecom Asia Preparatory Committee (Singapore, June 1997). In December 1996, he served as a member of ITU's Regulatory Colloquium. In April 1997, he chaired the gTLD-MOU meeting hosted by the ITU, which officially launched a new worldwide effort for 'voluntary multilateralism' in the area of Internet domain names.

In 1998, he participated in ITU's 8th Regulatory Colloquium, devoted to electronic commerce. and in 1999, he represented UNCTAD in a number of international conferences, including the G-15 Summit (Montego Bay, Jamaica).

Academic qualifications, publications

Bruno Lanvin holds a PhD (Doctorat de Troisième Cycle) in Economics from the University of Paris I, Panthéon-La Sorbonne (1980), an MBA from the Ecole des Hautes Etudes Commerciales (HEC, Paris, Promotion 1977), and a BA (MP1) in Mathematics and Physics (University of Valenciennes, 1972). He has taught international economics and information technology management in several American and European universities (Long Island University in New-York, Webster University MBA Programme in Geneva, i.a.). He has been a regular lecturer on telecommunication issues at the Institut National des Télécommunications (INT) as well as at the CERAM (Mastère Réseaux), in France, and Michigan State University (Telecom European Programme). A frequent invited speaker in international meetings he has addressed telecom issues in a wide number of fora such as IDATE (Institut Européen pour l'Audiovisuel et les Télécommunications, Montpellier, France) since 1987, Networked Economy Meetings since 1993, or the Strategy Forums of the ITU Telecom events, since 1994.

Dr Lanvin is the author of numerous publications on information technology and international trade (see below), including 'Global Trade' (IDATE, Paris, 1989), and 'Trading in a New World Order' (Westview, Boulder, 1993). He contributed to 'Trading Telecommunications – A Contribution to a European Doctrine' (IDATE, 1992), and, most recently, to 'The New Information Infrastructure' (W. Drake ed., Twentieth Century Fund, New-York, June 1995). He has been a member of the scientific committee of 'Communications & Strategies' since its creation in 1990.

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Plus numerous interviews for newspapers, journals, radio and TV stations, and appearances in over 200 international conferences.

Teaching experience

Dr Lanvin has taught international economics, management information systems, business management, communications skills and advanced mathematics in several European and American universities. He is a regular lecturer at major universities on issues related to international business, telecommunications and electronic commerce.

Other information

Holder of several records in track and field (100 m, 200 m and 4 x100 m, 1970-72), and former coach and captain of the 'Europe' soccer team of the UN league in New-York (1981-83), Dr Lanvin was born in 1954.

Dr Tim Kelly
Head of Operations Analysis/Strategic Planning Unit
International Telecommunication Union (ITU)

DEV.4

Direction of traffic, 1999: Trading telecom minutes

Summary of a new report published by ITU and TeleGeography Inc., October 1999[1]

1. Traffic Trends

This report looks at the wholesale market for minutes of telecommunications traffic: "Trading telecom minutes". Specifically, it is concerned with the transition from the traditional revenue-sharing mechanisms of the accounting rate system to newer, cost-oriented mechanisms, principally via domestic interconnect regimes or via the Internet.

In 1998, the volume of international telephone traffic minutes was just over 90 billion minutes worldwide. On the basis of current trends, and taking into account the accelerated growth in the number of main lines and the continuing rapid expansion of the mobile network, one can reasonably expect that the number of minutes of international traffic will surpass 100 billion during 1999 and will reach 143 billion minutes by 2001.

At present, almost three-quarters of international outgoing traffic is generated in just 23 developed countries. The rest of the world accounted for the remaining one quarter of traffic. For incoming traffic, however, the story is somewhat different. The same developed countries account for only 57 per cent of international incoming traffic. It is this gap between the distribution of outgoing and incoming traffic which explains the requirement for an international settlements system and which is the main theme underlying this report.

In 1998, the concept of international telecommunications as a competitively traded service finally became a reality:

- Around three-quarters of the world's international telecommunications traffic is now provided under competitive conditions, compared with just 35 per cent of traffic in 1990 (Figure 1).
- The World Trade Organisation's agreement on basic telecommunications, concluded in 1997 and implemented on 5th February 1998, has ushered in a multilateral trading regime for international telecommunications traffic.
- A growing share of international traffic, perhaps as high as 30 per cent, now passes outside the traditional accounting rate system, with domestic interconnection now becoming the dominant mode of operation, at least in Europe. Indeed, there is a thriving market for trading in options to carry traffic on liberalised routes.

In the emerging telecommunications environment, international telephone calls are increasingly treated like domestic ones. This reflects new trade principles and network economics. The economic and technological forces underlying the changing status of international calls are best demonstrated by the Internet. The price paid for an Internet session is the same whether information traverses

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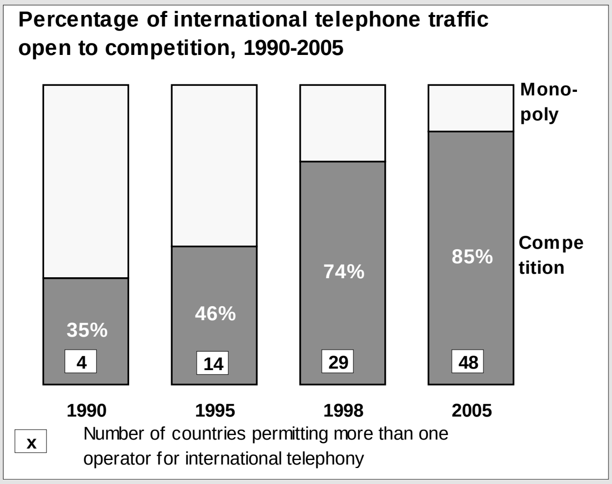
[1] This document provides a summary of the report. The full report, which has 340 pages of analysis, charts and statistics, is available from ITU and from TeleGeography Inc. For more information, see http://www.itu.int/ti.

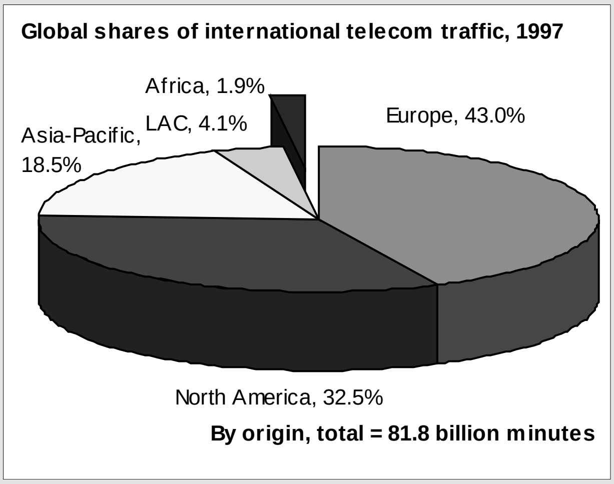
international borders *en route* or not. The longer international telephone calls continue to deviate in price from domestic telephone calls, the more international voice and fax traffic will shift to the Internet. As a result, prices for local calls are likely to become the base price for more and more international communications.

In economies such as Hongkong SAR and Germany, these trends are already in evidence (Figure 2). In the former, the monthly volume of dial-up Internet use is now three times higher than the total for international traffic (outgoing and incoming combined). In the latter, Deutsche Telekom's calls to its Internet service almost doubled in 1998 whereas its international traffic volume fell.

Figure 1: The route to competition

Percentage of the international telecommunications market open to competition, 1990-2005, and regional shares of international traffic market, 1997



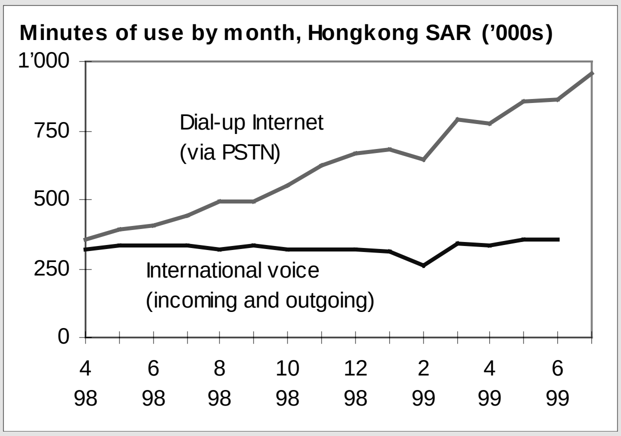


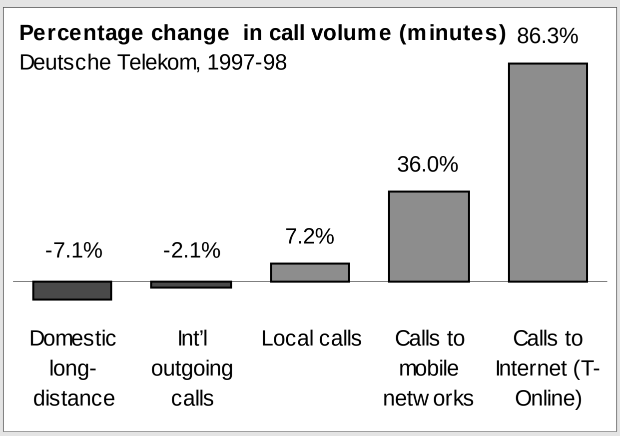
Note: In the left chart, the figures relate only to the commitments made by WTO Member Countries. This is almost certainly an underestimate of the true level of global competition. In the right chart, LAC = Latin America and the Caribbean.

Source: ITU "Telecommunication Regulatory Database", ITU/TeleGeography Inc. "Direction of Traffic" Database and WTO.

Figure 2: Internet traffic outgrowing other traffic types

Examples from Hongkong SAR, April 1998-July 1999, and Germany, Deutsche Telekom, 1997-98





Note: For left chart, the minutes of Internet use cover only dial-up access via the Public Switched Telephone Network (PSTN), which is primarily residential use, and exclude access via leased lines, which is primarily business use. For the right chart, the statistics relate only to Deutsche Telekom's network and exclude calls made on other networks in Germany, including those from mobilephones.

Source: Left chart: OFTA, statistics available at http://www.ofta.gov.hk. Right chart: Deutsche Telekom, SEC Form 20-F, April 15, 1999.

2. The International Telecommunications Environment in Transition

The international telecommunications environment has historically been based on a framework of bilateral relations: between countries and latterly between operators. This regime is enshrined in the International Telecommunication Regulations, an international treaty which dates back to the early days of telegraph communications between sovereign states. What is now emerging is a multilateral regime, based on trade principles and captured in the WTO trade-in-services regime. As a result of this paradigm shift, traditional arrangements for carrying international calls and settling accounts are coming under increasing pressure.

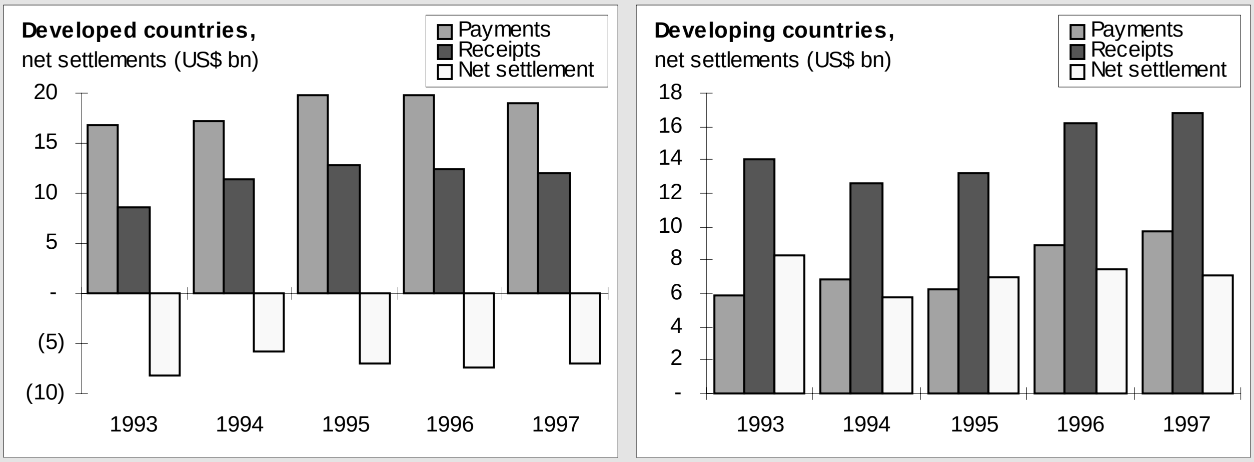
On certain routes, particularly between developed and developing countries, imbalances between incoming and outgoing traffic have been accelerating since the early 1990s. This is partly due to the uneven pace of market reform, but it also represents the increasing ease with which the direction of a particular call can be reversed to arbitrage price differences, a service known as call-back. The United States is the home of most call-back services and US citizens are the most avid users of calling card and home country direct services. Virtually every single country of the world receives more traffic from the United States than it sends. In 1997, the United States sent out some 13.4 billion more minutes of traffic than it received and its trade deficit on international telecommunication services reached some US$ 5.7 billion.

But the United States is not alone in making net settlement payments to other countries. In total, some 38 countries, as diverse as the Switzerland and Swaziland, are obliged to make net compensation payments to their traffic partners. Added together, they have a net deficit of around US$ 12 billion in 1997 of which the United States makes up just under half. By contrast, the top ten net settlement surplus countries are all developing economies, headed by China and India, the world's most populous countries.

Between 1993 and 1998, a minimum of US$ 40 billion has been directed towards developing countries via the mechanism of the accounting rate system (Figure 3). If this money had been used in its entirety to fund network development at best practice procurement rates (admittedly, a politically idealistic assumption), then it would have been sufficient to fund around 45 million new main lines which would be equivalent to a rise of one extra telephone main line per 100 inhabitants among developing countries. No other net flow of telecommunications assistance towards developing countries, apart from perhaps privatisation receipts which have generally not been used for telecommunication purposes, comes even near to matching this level of funding.

Figure 3: Net financial transfers between developed and developing countries

Total payments, receipts and net settlements made under the international accounting rates and settlements system, between developed and developing countries, 1993-97



Notes: For the purpose of the analysis here, the developed countries are broadly defined as the 15 EU Member States plus Iceland, Norway, Switzerland, Canada, United States, Australia, Japan and New Zealand.

Source: ITU estimates.

3. Transitional arrangements towards cost-orientation

It has long been accepted that the logic of the competitive marketplace will dictate a shift from the traditional regime of revenue-sharing for the settlement for international services to one based on cost-orientation. Accounting rates have been declining worldwide, especially since ITU-T Recommendation D.140 was approved in 1992 (Figure 4). But it is widely felt that, until recently, these reductions have not been moving fast enough to catch up with declining cost trends. Consequently, most rates remain significantly above costs. Recent events, especially the WTO Agreement on Basic Telecommunications and the FCC Benchmark Order, have brought the issue to a head.

The reform of the accounting rate regime constitutes one the main challenges that the membership of ITU is facing today, especially for developing countries. In March 1998, ITU held a World Telecommunication Policy Forum on the topic of trade in services. As a result of this meeting, a Focus Group was created with a mandate to develop proposals for "transitional arrangements towards cost orientation beyond 1998, including ranges of indicative target rates". The Focus Group completed its work in November 1998 and its proposals were accepted, with minor modifications, by ITU-T Study Group 3 at its June 1999 meeting. They should be formally adopted as part of ITU-T Recommendations D.140 before the end of 1999.

The "indicative target rates" proposed by the Focus Group are different from the Benchmarks put forward by the FCC (see Table 1).

- For the majority of traffic, generated by developed countries, the target rates proposed by the Focus Group are *lower* than the FCC Benchmarks: for countries with a teledensity above 50, a target rate of 6 US cents per minute is proposed compared with the 15 US cents per minute benchmark for high-income economies proposed by the FCC.
- For the majority of countries, especially in the developing world, the target rates proposed by the Focus Group are *higher* than the FCC Benchmarks: for countries with a teledensity of below 1, a target rate of 44 US cents per minute is proposed compared with the 23 US cents per minute benchmark proposed by the FCC.

The Recommendations of the Focus Group also differ from the approach taken by the FCC in terms of the proposed transition period (to year-end 2001) and in the upper limits proposed for carriage of transit traffic (6.7 US cents per minute). When approved, the Focus Group's recommendations will mark the first multilateral accord on the transition to cost orientation and will provide a counter-balance to the unilateral approach adopted in the FCC's benchmarks.

Table 1: ITU Focus Group Indicative Target Rates and FCC Benchmarks compared

	FCC Benchmarks	*ITU Focus Group*
Coverage of analysis	72 countries	224 countries/territories
Data timeliness	1994 for income data; 1995/6 for cost/price data.	1 Jan. 1998 for teledensity; 28 Sept. 1998 for settlement rate data. Teledensity data to be updated annually. Net settlement data on three-year moving average.
Range of rates (direct relations)	0.11-0.16 SDR per minute (15-23 US cents)	0.043-0.327 SDR per minute (6-44 US cents)
Transit shares	Not covered	0.05 SDR per minute (6.7 US cents)
Country groupings	4 by income + 1 by teledensity	7 by teledensity + 2 others for small island states and LDCs
Target years	Multi-year: 1998 (high income), 99 (upper middle), 2000 (lower middle), 2001 (low income), 2002 (low income, teledensity <1)	Year-end 2001 (2001-2004 for LDCs)
Dependency on settlements	Not covered	Extended transition period for LDCs.

Source: ITU.

4. Cost and price trends

If the cost of making an international telephone call was directly related to the costs of international infrastructure, then it would be declining by some 40 per cent per year. Thanks to technological change, the infrastructure costs of providing international telephony are tending towards zero. But of course there are many other components involved in the cost of a call. In particular, the national extension part of an international telephone call has not experienced the same dramatic price reductions. Furthermore, as the physical costs of conveying the call have become less significant, the costs associated with marketing, billing and maintenance have become relatively more significant. The result is that there has been a divergence between the cost trends underlying wholesale and retail prices. Overall, the rate of reduction for wholesale costs has been accelerating (see Figure 4).

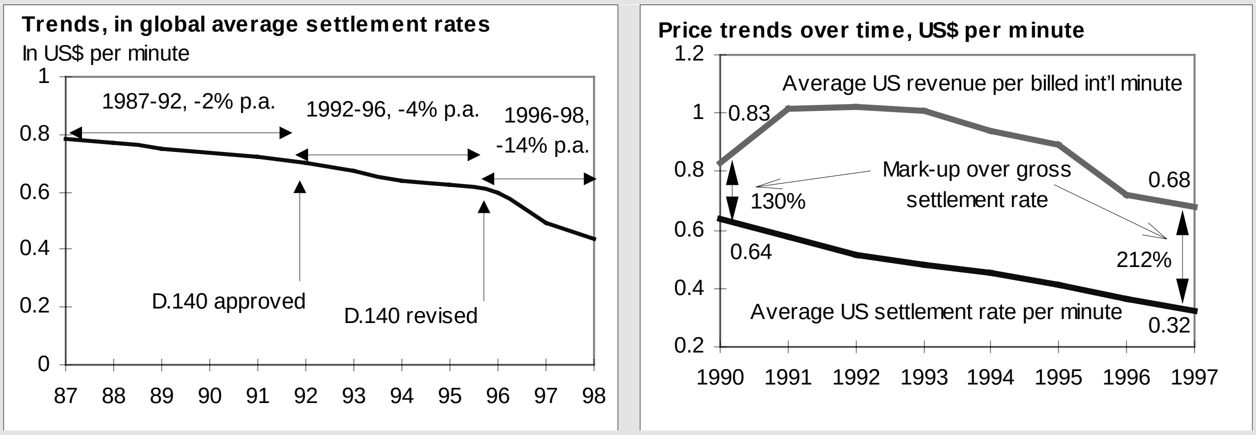
At the heart of the debate between developed and developing countries over settlement rates is the issue of whether the cost of terminating a telephone call varies according to the level of development of a country, and if so, by how much? The approach taken by the FCC, in its Benchmark Order, is that the range of variation in costs is likely to be small. After all, it is argued, the basic elements necessary to construct a network (switches, cables, transmission devices, etc.) can be bought on the global market at competitive prices. Consequently, the FCC proposes a relatively narrow range of costs, between 15 and 23 US cents per minute, or a ratio of 1 to 1.5. By contrast, the approach taken by the ITU Focus Group was based on a "best practice" approach using actual market prices for settlement rates in all the countries and territories of the world, not just the ones with large traffic streams to the United States. The resulting analysis gives a range of costs between 6 and 44 US cents per minute, or a ratio of 1 to 6. The rationale here is that the volume of traffic generated by a country is a critical factor in determining its unit cost.

The real cost difference between developed and developing countries probably lies somewhere between that suggested by the FCC and the Focus Group. Furthermore, the cost distribution, if it could be plotted, would probably be a highly skewed one with the highest costs occurring in the Least Developed Countries (LDCs) and in other small states, especially remote islands. Cost differences are unlikely to be so high between, say, a large developing economy with a high volume of traffic and a small developed country with limited traffic.

But ultimately the real costs of providing international telecommunication services will probably never be known. And even if they were known, the cost structure would probably have changed by the time the study had been completed. For consumers, it is the price not the cost which is the issue. For regulators, it is the negotiated interconnect price rather than the true underlying cost which is significant. For PTO managers and shareholders, it is the overall package of costs, rather than their allocation to individual services, which needs to be managed. Ultimately, models for allocating cost are mainly of academic interest.

Figure 4: Sliding downwards

Price trends for global average settlement rates, 1987-98, and for US retail rates and settlement rates, 1990-1997, in US$ per minute



Note: In the left chart, the "global average settlement rate" is based on responses to an annual questionnaire carried out by the ITU. In the right chart, the retail price is calculated by dividing the revenue per minute billed by US carriers by the total number of outgoing international traffic minutes. The "settlement rate" is an average US settlement rate for all routes weighted by traffic.

Source: ITU, FCC.

5. Developing Country Concerns

Debate about the reform of the international accounting rates system has stirred immense concern among developing countries. While developing countries have been part of the gathering momentum towards the implementation of cost-oriented accounting rates, and many have made commitments to market opening under the WTO basic telecommunications agreement, they continue to be concerned about the impact these changes will have on their telecommunication economies.

Most nations of the developing world are net receivers of international telephone traffic and hence recipients of settlement payments. Any change to the status quo could involve a reduction in these payments (Table 2). In order to investigate the likely impact that changes in the international telecommunications environment could have on developing countries, a series of country case studies were commissioned by ITU, the Commonwealth Telecommunication Organisation, the World Bank's *info*Dev Programme and the European Union. The case studies looked at the impact of five main scenarios for accounting rate reform:

1. Implementation of the FCC benchmarks;
2. Staged reductions of 6 or 10 per cent per year;
3. Asymmetric settlement, for instance using a termination charge or a 60/40 split of the accounting rate;
4. Very-low settlements rates or sender-keeps-all;
5. Implementation of the Focus Group's indicative target rates.

For the majority of countries, the worst scenario is the collapse of the accounting rate system (4), or implementation of FCC Benchmarks (1). Staged reductions (2) and the Focus Group's recommendations (5) are relatively neutral in their revenue impact, presuming that traffic continues to grow at current levels. Asymmetric settlement (3) would bring positive benefits to some countries, though not to all. Figure 5 summarises the impact of the FCC Benchmark and Focus Group scenarios relative to a hypothetical "Baseline" scenario in which accounting rates remain unchanged at 1997 levels.

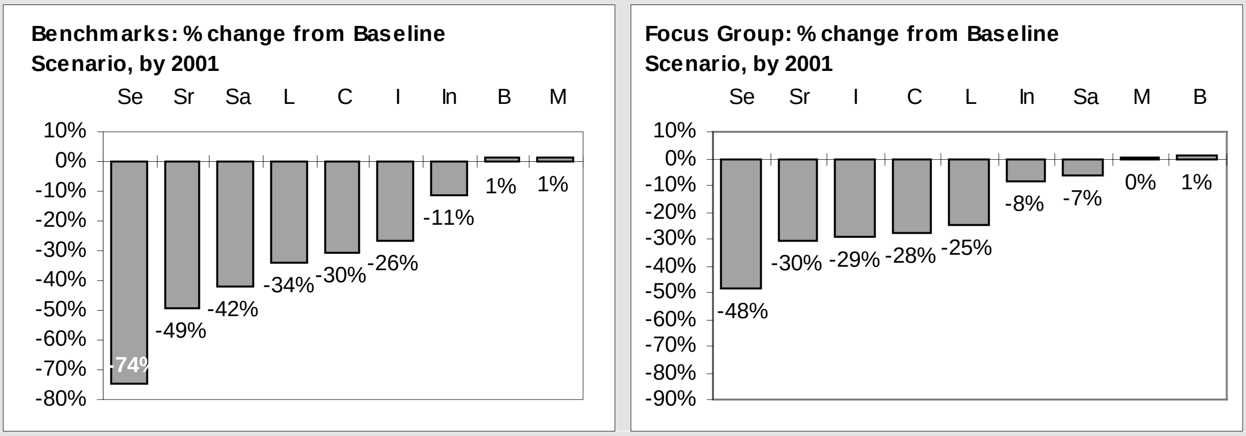
Table 2: Top 10 net settlement surplus countries, 1997
As measured by estimated net settlements from the rest of the world, in US$ million, 1997

Countries	*Outgoing traffic, 1997 (million minutes)*	*Incoming traffic, 1997 (million minutes)*	*Imbalance (outgoing minus incoming)*	*Imbalance % of total traffic*	*US settlement rate, 1997 (US cents per minute)*	*Estimated net settlement, 1997 (US$m)*
China	1'631.8	2'400.0	-768.2	-19.1%	84.5	*650*
India	420.5	1'256.0	-835.5	-49.8%	71.0	*600*
Mexico	1'213.6	2'819.3	-1'605.7	-39.8%	35.0	*600*
Pakistan	76.9	565.3	-488.4	-76.1%	100.0	*500*
Viet Nam	55.8	310.0	-254.2	-69.5%	100.0	*260*
Philippines	249.5	709.0	-459.5	-47.9%	50.0	*230*
Lebanon	60.0	240.0	-180.0	-60.0%	87.5	*160*
Colombia	158.2	439.0	-280.8	-47.0%	50.0	*140*
Jamaica	51.6	269.3	-217.7	-67.8%	62.5	*140*
Brazil	476.9	776.7	-299.8	-23.9%	42.5	*130*
Top 10, total/average	**4'394.7**	**9'784.6**	**-5'389.9**	**-38.0%**	**62.0**	***3'410***
All net surplus countries, Total/average	**32'234.4**	**44'248.9**	**-12'014.5**	**-15.7%**	**36.2**	***6'200***

Notes: Figures shown in italics are estimates. All other figures are as reported by the countries concerned. For Jamaica, which does not report bilateral traffic flows, derived statistics for incoming and outgoing traffic for the United States and the United Kingdom, its two major traffic routes, are used.
Source: ITU/TeleGeography Inc. "Direction of Traffic Database", FCC.

Figure 5: Impact of reform on the international revenues of carriers in nine case study countries

Percentage deviation in international revenues by 2001 from baseline scenario of implementation of FCC Benchmarks or Focus Group Indicative Target Rates



Key: B = Bahamas; C = Colombia; I = India; In = Indonesia; L = Lebanon; M = Mauritania, Sa = Samoa, Se = Senegal; Sr = Sri Lanka.

Note: Zero percentage change represents no change in international revenues from the baseline scenario in 2001 under which settlement rates remain the same as 1997 levels.

Source: ITU calculations, based on ITU/CTO/EU country case studies.

6. Transit Charges

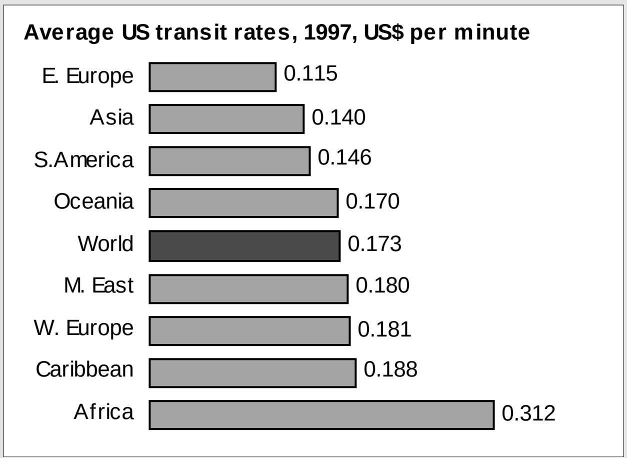
The service of "transit" involves the delivery of telecommunications traffic from one country to another via a third country. Transit may be unavoidable for some developing countries because of their geographical situation. However, increasingly, operators are offering transit as a competitive service, a practice often called "hubbing". Some operators also offer to terminate and reoriginate a particular call—a service known as refile—in order to exploit arbitrage opportunities in the price of two indirect calls compared with one direct one.

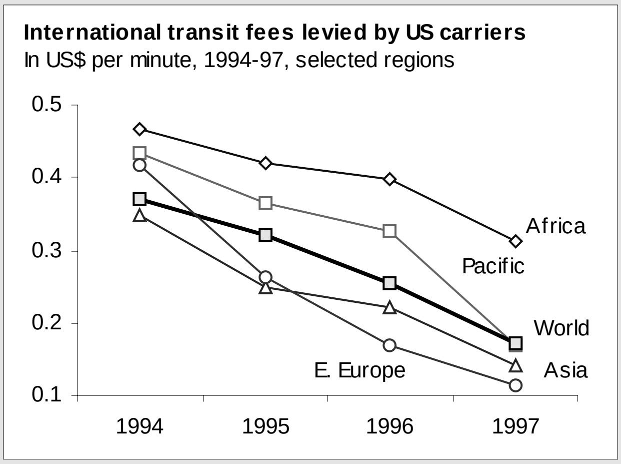
For many countries, transit traffic represents a major portion of their total traffic. For instance, Lesotho's transit payments are so high that the country maintains a settlement payment deficit with the rest of the world. No carrier voluntarily publishes transit charges and only one regulator, OFTEL in the United Kingdom, requires publication, and even this obligation is restricted to a few markets where one or more companies hold a dominant position. A transit carrier will typically agree one rate for a traffic stream with both origin and destination countries (the published rate) but actually charge a different, lower rate (the confidential rate) to the origin country. The lack of transparency means that competition is frequently not effective in reducing prices. Using data on transit revenues raised by US companies, it is possible to estimate that the average price for transit was some 17 US cents per minute in 1997 and above 30 US cents in Africa. These rates are actually *higher* than the FCC's Benchmarks for settlement rates in many parts of the world.

In discussions over transit, the positions adopted by operators of the developed North and the developing South are often the reverse of the positions adopted over settlement rates. For instance, countries of the North which are net exporters of telephone traffic have adopted a position of wanting to see settlement rates reduced towards costs, in a transparent, non-discriminatory and cost-oriented environment. In the case of transit relations, it is the countries of the South which are pushing for lower rates, and the operators of the North which are resisting the call.

The Focus Group has proposed an upper limit on transit charges of 6.7 US cents per minute to be achieved by year end 2000 in relations where the operator lacks a choice of transit service provider. If implemented, this would bring substantial benefits to small and land-locked economies. The FCC's Benchmark Order is curiously silent on the topic of transit, perhaps reflecting the fact that US carriers are among the major providers of the service.

Figure 6: Transit charge costs per minute, for US carriers, by region 1997, and trends 1994-97
Figures are shown in US cents per minute. Conversion rate is 1 SDR = US$1.336





Note: Unit costs per minute are calculated by dividing the revenue paid by foreign carriers, minus the revenue paid out to foreign carriers, by the minutes of traffic originating from each region.
Source: Adapted from FCC "Statistics of Common Carriers Yearbook", various years.

7. Profits and Losses

When the first *Direction of Traffic* report was published, five years ago, international telecommunications was a high margin, high growth business. But the business of carrying international telephone traffic is no longer such a profitable one to be in. New market entry and price competition are turning the provision of minutes of international traffic into a cut-throat commodity business. The Internet threatens to undermine the entire business model on which the international traffic industry is founded. As Table 3 shows, while the top 20 public telecommunication operators (ranked in terms of international revenue) saw their traffic streams grow by 7 per cent during 1998, the revenue they derived from the service actually fell by some 9 per cent. This reflects the impact of tariff cuts which many operators made before and during 1998 in order to combat the threat of competition. Falling revenues also reflect the fact that traffic growth slowed during 1998, partly as a result of the Asian financial crisis but also because international traffic is increasingly being routed outside the accounting rate system in ways which are not as easy to measure, for instance, via the Internet. The prospects of slower growth have encouraged the major carriers to seek alliances to achieve economies of scale and further scope for cost-cutting, notably the AT&T/BT alliance and the MCI/WorldCom merger.

Whichever scenario comes to pass for the evolution of the international trading system for minutes of international telecommunications traffic, it is likely that the current volume of cross-border financial transactions, particularly from developed to developing countries, will diminish in size and significance. In the days of relative plenty, it was possible for carriers to overlook the inequities and inefficiencies of the accounting rate system. Now that profit margins are being squeezed, above-cost accounting rates seem an obvious target for cost-cutting. The main losers from settlement payment reductions are likely to be operators in developing countries. They face a dilemma. If they cut settlement rates too quickly, they may lose vital revenue. On the other hand, if they cut settlement rates too slowly, they risk seeing the whole accounting rate system collapse with voice traffic shifting to the Internet. The majority of developing countries are now negotiating lower settlement rates, but they argue that more time is needed before they can reach cost-oriented levels. The critical word is "transition".

The bottom line is that change is inevitable but, for developing country carriers, that change should be approached positively. There are risks on both sides, but the status quo is not an option. With the recommendations of the ITU Focus Group, a consensus transition path has now been mapped out. But will it be followed?

Table 3: Top 20 Public Telecommunication Operators
Ranked by bothway international traffic (incoming plus outgoing), 1998

	Int'l telephone traffic (bothway)		*International telephone revenue*		
	Minutes, m	*CAGR*	*US$ m*		*CAGR*
Operator (Country)	*1998*	*(97-98)*	*1998*		*(97-98)*
AT&T (USA)	*14’529*	*7.1%*	4’729	N	-16.0%
Deutsche Telekom (Germ.)	10’058	3.0%	3’357	G	-16.4%
MCI WorldCom (USA) [b]	*7’189*	*16.5%*	2’734	N	0.0%
France Télécom	7'300	9.0%	1'859	G	-17.3%
BT (UK) [a]	6'350	10.2%	924	G	-14.2%
Telecom Italia	5'289	9.5%	1'438	N	0.6%
Sprint (USA)	*4’470*	*10.1%*	714	N	-11.3%
China Telecom (China)	4'212	4.9%	2'200	G	3.0%
Hongkong Telecom [a]	3'818	3.8%	1'995	G	-17.7%
Telefónica (Spain)	3'704	16.1%	813	N	-3.9%
Swisscom (Switz.)	3'680	-2.9%	1'379	G	2.2%
Telmex (Mexico)	3'286	-12.8%	879	N	-24.3%
KPN (Netherlands)	3'443	6.0%	847	G	-23.6%
C&W Comm. (UK) [a]	2'670	36.2%	477	G	36.0%
Belgacom (Belgium)	*2’622*	*10.0%*	*548*	N	*-6.5%*
Singapore Telecom [a]	2'251	25.6%	1'267	G	7.3%
KDD (Japan) [a]	2'200	3.3%	1'903	G	-5.0%
PTA (Austria)	*1’954*	*4.9%*	*492*	R	*-9.3%*
Teleglobe (Canada)	1'905	3.1%	631	G	-18.3%
VSNL (India) [a]	1'679	21.2%	1'600	G	11.8%
TOP 20	**92’609**	**7.0%**	**30’785**		**-9.0%**

Note: United States dollar values are obtained by using operator-supplied exchange rates or ending period exchange rate. International revenue is shown as reported by the operator: G = Gross (including settlement receipts or payments); R = Retail (not including settlement receipts of payments); N = Net (after adjusting for settlement transactions). Figures in italics are estimates or refer to years other than those specified (e.g., 1997 and 1996-97 CAGR). CAGR = Compound Annual Growth Rate.
[a] Year beginning 1 April. [b] MCI and WorldCom merged in 1998.
Source: ITU

Dr. Mai Liem TRUC
General Secretary
Dept. General of Posts and Telecommunications (DGPT)
(VIETNAM)

DEV.4

Internet – Challenges and opportunities for developing countries

Abstract

After describing radical transformation into the information society initially caused by the Internet and the effect of Internet in developing countries, the author mentioned the problems that governments and ISPs in developing countries have to solve in order to promote the development of Internet usage in the developing world. The problems include an insufficient access system for basic telecommunication services, the lack of an effective legal system and regulation body promoting the competition environment and attracting foreign investment the regulation of content over the Internet. The author also mentioned opportunities that Internet and Electronic Commerce could bring to the developing world. He indicated measures required to be carried out by developing countries to create an effective environment for development of an access system for basic telecom services, the role of the government to promote Internet and electronic commerce applications in developing countries.

The Author confirmed the need for support from international organizations and developed countries to fairly manage the Internet resources such as Domain Names and IP address in respecting sovereignty of nations and resolving dispute with trademarks and requested more active participation of developing countries in the open international discussions related to the development of Internet.

The Author called for support from ITU, other international organizations and developed countries to help developing countries participate in the development of Internet, based on equality and mutual benefit cooperation between ISPs and countries in order to provide a world-wide equal access to the Internet and its services.

Biography

Dr. Mai Liem Truc received his Doctorate of Philosophy in Telecommunications in Germany and has more than 30 years experience working the Telecom sector. He headed several divisions and operation departments in the telecom sector in Vietnam. From 1997, Dr. Truc is Secretary General of the Department General of Posts and Telecommunications (DGPT) in Vietnam – the government administration which has responsibility of policy making and regulatory body of Vietnam in the field of Posts and Telecommunications.

Before 1997, Dr. Truc was Director General and CEO of Vietnam Posts and Telecommunications Corporation (VNPT) – the incumbent carrier of Vietnam. He is now the Deputy Chief of National Coordination Committee of Internet in Vietnam, member of National Steering Committee of Information Technology, President of national Frequency Management Committee, President of Radio Electronic Association of Vietnam. He is also a member of several important national associations and committees related to the post and telecom field in Vietnam. Dr. Truc headed Vietnamese delegations in some ITU Plenipotentiary Conferences.

PALEXPO **DEV.5**

Wednesday, 13 October 1999	14:00 - 17:30

Dev.5	Development Models

Chairperson:	**Dr. Marko JAGODIC,** *Adviser to the Director General,* Iskratel (Slovenia)
Keynote Speakers	**H.E. Dr. Ivy MATSCOPE-CASABURRI,** *Minister for Communications,* Ministry of Communications (South Africa)
	Mr. Daniel S. GOLDBERG, *General Counsel and Member of the Board* New Skies Satellites (Netherlands)
Presentations	
Information Technologies for Development	**Mr. Jean-Guy CARRIER,** *Manager, International Management Research Development (IMRD)* World Trade Organization (WTO)
Acceso Universal, Nuevos Servicios y Competencia en la nueva era de las telecomunicaciones	**Mr. Alejandro HERRERA,** *Specialist in Competitive Analysis of telecommunication products and services,* AH-Studies of Telecommunications (Argentina)
MRAs Speed Introduction of technology	**Mr. Eric NELSON,** *Vice President,* Telecommunications Industry Association (TIA) (USA)
Innovative approach to ICT and development	**Mr. Mart van DE GUCHTE,** *Managing Director,* International Institute for Communication and Development (Netherlands)
Turnkey solutions for the developing countries - from Concept to Profit	**Mr. Christian MOREL,** *Vice-President,* Switching Systems Division, Alcatel (Belgium)

Fostering Economic Development through Privatization: The case of Telecommunications Industry in Thailand	**Ms. Ratirat PAIRAT,** *Marketing Manager*, Nippon Telegraph and Telephone Corporation (NTT) (Thailand) Co-author: **Dr. Boonmark SIRINAOVAKUL,** *Senior Dean,* Graduate School of CEM, Assumption University of Thailand (Thailand)

Published

Effective Transfer of Technology for Industrialization of a Nation	**Mr. Kailash N. GUPTA,** *Executive Director,* Center for Development of Telematics (India)
Market Development Strategies for low income markets	**Mr. Simon ALBURY,** *Senior Consultant,* Analysis Ltd. (United Kingdom)

Wednesday, 13 October 1999	**14:00 - 17:30**

Dev.5	**Development Models**

De-monopolization, privatization and competition are creating a completely different environment for development of telecommunications in every country. To adjust to this rapidly changing environment is very demanding task and even more so for the developing countries. The importance to be able to use to the greatest possible extent the available information technologies for the benefit of their emerging economies poses before them a genuine problem to select the most appropriate development model to establish on time the necessary information and telecommunication infrastructure.

The session will address the issue of appropriate models to stimulate the sustainable development based on the widespread introduction of information and telecommunication technologies and also present results of case studies in several developing countries.

Dr. Marko JAGODIC
Adviser to the Director General
Iskratel
(Slovenia)

DEV.5

Development models

Advanced telecommunication and information infrastructure is generally recognized as the most important prerequisite to instigate faster and better overall development of emerging economies. The spectrum of available technologies and solutions to build this kind of infrastructure is today greater than has been ever before. In addition, the ongoing process of de-monopolization and privatization of telecommunications has acquired global proportions and must be taken into consideration as well. In such a dynamic environment, the task of selecting the right combination of technologies and matching them with a suitable development model demands an in-depth knowledge of available technologies on one side and detailed understanding of the real requirements, characteristic for individual countries, on the other side.

Also in developed countries, there are areas requiring a similar approach to the installation of an advanced telecommunication and information infrastructure, in order to secure sustainable development of such regions. Although financing such projects in developed countries should not create serious problems, the experience gained is very valuable also for less developed ones.

The aim of the Session is not to provide a complete coverage of all the problems emerging economies might encounter in their effort to build an appropriate telecommunication and information successful solutions in rather different environments together, with the experience they gained so far. The experience is perhaps the most sought for information by everyone dealing with these kind of problems. It should be noted though that there is no universal approach valid everywhere and that the optimization of applied development models requires serious consideration of regional information and expertise.

Biography

Dr. Marko Jagodic, a specialist in digital networking, received his doctoral degree from the University of Ljubljana, Slovenia, in 1976. He held several topmost R&D positions in the telecommunications industry in Slovenia.

Currently he serves as R&D Adviser to the Director General of Iskratel. He is also Associate Professor at the Universities of Ljubljana and Maribor, Member of the Engineering Academy of Slovenia, President of the Electrotechnical Society of Slovenia, and national co-ordinator for R&D in telecommunications for the Ministry of Science and Technology of Slovenia.

He has been actively involved in preparation of many ITU TELECOM Forum events as well as of several other top international and national telecommunications conferences.

Mr. Daniel S. GOLDBERG
General Counsel and Member of
the Board of New Skies Satellites
(Netherlands)

DEV.5

Biography

Mr. Goldberg is General Counsel of New Skies Satellites N.V. and, in this position, serves on the New Skies Management Board. Prior to joining New Skies, Mr. Goldberg was Vice-President of Government & Regulatory Affairs and Associate General Counsel of PanAmSat Corporation.

Before joining PanAmSat, Mr. Goldberg was an associate at the Washington, D.C.-based law firms of Goldberg, Godles, Wiener & Wright and Covington & Burling, where he practiced telecommunications and general corporate law. Mr. Goldberg also served as a Deputy Prosecuting Attorney in Boise, Idaho.

In 1987, Mr. Goldberg obtained a Bachelor of Arts degree from the University of Virginia, where he graduated with highest academic honors. In 1991, Mr. Goldberg graduated *cum laude* from the Harvard Law School.

Mr. Jean-Guy CARRIER
Manager,
Information, Technologies for Development Project
World Trade Organisation (Switzerland)

DEV.5

The WTO: using IT to inform and train trade officials in developing countries

Introduction

A majority of WTO Members, signatories of the Uruguay Round Treaties, are least-developed or developing countries. Many have no representatives in Geneva and experience difficulty obtaining WTO information and documents. The WTO is using Information Technologies, including Internet access, to close the information gap for the trade officials of these countries. The main components of the WTO program are:

a) provision of computer equipment, internet connection and training to enable decision makers to access WTO information on-line and on CD-ROM from their own WTO Reference Center;

b) development of information and training resources, accessible on-line and on CD-ROM, which assist decision makers in Developing countries make more effective use of the multilateral trading system.

This WTO initiative began in October 1997 with a pilot project to install Reference Centres in 7 African countries. The enthusiastic response by WTO members to this pilot effort led to its extension to all Least Developed Countries (WTO members and non-members) as well as all Developed countries in need of such support.

The network of WTO Reference Centres now extends to 65 countries in Africa, Asia, the Caribbean and the South Pacific.

Biography

Manager, Information Technologies for Development Project, World Trade Organization.

Canadian citizen.

Mr. Carrier is a communications specialist with over 20 years of experience working with national and international organizations in both the private and public sectors.

He is a graduate of the University of Ottawa, Canada.

Mr. Eric NELSON
Vice President, International Affairs
Telecommunications Industry Association (TIA)
(United States of America)

DEV.5

Mutual recognition agreements speed the introduction of technology

I would like to thank Mr. Utsumi and Mr. Bare for the invitation to speak to you today. TIA is very pleased to contribute to this very important symposium on telecommunications development.

For those of you unfamiliar with my organization, TIA is a nationwide trade association in the United States that represents approximately 1000 telecommunications equipment providers. While our members include all of the global equipment suppliers that you are probably familiar, such as Lucent, Motorola, Nortel Networks, Alcatel, most of our members – almost 90 percent – are small and medium size companies making exciting new technologies for niche markets. TIA's members make all of the products used in a modern network, including satellite, switching, fiber optics, data communications, wireless, and so forth. TIA represents its members in many different ways trying to enhance and grow the global telecommunications market.

TIA is quite interested in the area of telecommunications developments. We participate quite actively in much of the work of ITU D and have also been active in the development symposia at the regional TELECOMs and World TELECOMs for many years. TIA believes quite strongly that there are many untapped business opportunities for our members in developing countries that can contribute substantially to the build out of advanced information infrastructures everyone now recognizes as critical to sustainable economic development.

The subject I would like to speak to you about today is the issue of regulations that deal with telecommunications equipment.

One of the most difficult barriers facing the development of a truly global marketplace is the difficulty companies encounter in getting products approved or certified for use in various countries. These restrictions – which are often duplicative and, in many cases, unnecessary – increase the cost to users and delay the availability of products in a large number of markets. This problem is frequently accentuated in developing countries that have an urgent need for emerging technology and yet may not have the processes established to facilitate timely equipment certification. The development of mutual recognition agreements (MRAs) for conformity assessment, whose purpose is to decrease costs and time delays while ensuring safety and reliability to consumers, is valuable to developed and developing nations alike.

The MRA, is a relatively recent tool of the international trade process. Nevertheless, recently concluded MRAs with virtually every major trading partner of the United States, including Canada, Mexico, Japan, China, and the European Union, will ease the flow of billions of dollars of international trade in telecommunications equipment beginning in the year 2000. These MRAs will reduce the time it takes for products to be tested, will ensure that products are as safe as possible, and will speed the introduction of the highest quality equipment to the largest number of consumers worldwide.

The need for MRAs in the telecommunications equipment field arose from the myriad and un-harmonized technical requirements which national regulators have put in place over the past 50 years. For the most part, the purpose of the regulations has been to protect the physical safety of people coming in contact with telecommunications equipment, to ensure the continued proper functioning of the network, and to protect other products and services from interference. These three areas are often broadly referred to as electrical safety, terminal attachment, and electromagnetic compatibility (or EMC).

While most countries have based their telecommunications equipment on standards developed through the ITU and the International Standards Organization (ISO), it has nevertheless been common for each country to implement the requirements in slightly different, but significant ways. In addition, many countries have required that product testing be done in-country and in some cases, countries have designated particular testing bodies as the only organizations allowed to approve products.

As products proliferated through the development of increasingly advanced technology, national regulators around the globe have responded by introducing ever more comprehensive and complex regulations. Even in countries with similar business and socio-political systems such as the United States and Canada have developed rules and regulations with slightly different variations that have required separate testing and approval.

As a result, today's telecommunications equipment suppliers face a patchwork of regulations in each marketplace which often reach into hundreds of pages of complex legal language. In fact, the European Union recently estimated that the combined regulations of its fifteen member states related solely to the certification of wireless telecommunications products, if placed together in paper format, would create a stack nearly two meters high.

In addition, the number of approval marks or certifications which must be placed on the surface of some communications equipment is so high that manufacturers are running out of physical space on which to place them. These include such requirements as Europe's CE mark, Canada's Industry Canada mark, and other national approval stamps.

Because the telecommunications equipment industry supplies a global network and because they already work together to promote interoperability and safety standards through organizations such as my own, the Telecommunications Industry Association, there is a tremendous need to rationalize the regulatory process which products face before they are permitted to enter into the marketplace. Additionally, the competitive nature of telecommunications – particularly at the retail level with such items as telephones, wireless equipment, and modems – means that the effective life cycles of products are growing shorter.

In practical terms, the heavy burden of regulation slows the introduction of products into new markets, increases the costs to consumers, and requires manufacturers to undertake duplicative and costly testing and resetting of their equipment. For example, a simple product like a modem may have a total shelf life of 12 months in the competitive marketplace. If a manufacturer of that product wishes to maximize his profits and minimize his costs, he will only attempt to test , certify and sell that product in the largest markets and in markets where requirements are the least burdensome. For every month of delay that goes by in getting the product approved, that manufacturer loses fully one-twelfth of the overall expected revenues of the product. This proves a tremendous disadvantage not only to producers, but to consumers and service providers in regions where it does not make economic sense to go through the certification process, or where the time it takes to complete the process limits the time the product will be available for sale.

The natural answer to this problem is for national regulators to agree upon a single set of global standards, allow for a single set of tests to be done, and allow manufacturers to self-declare their conformity with those requirements. Unfortunately, such a process of global harmonization will take decades at best, and may never completely function. For example, the level of harmonization in telecom regulations expected between Canada, the United States, and Mexico under the North American Free Trade Arrangement has not come to fruition fully six years after the pact was signed. And while the European Union is in the process of deploying a new directive to allow for self-declaration of conformity in the year 2000, there are still discrepancies in standards and requirements for some products.

This has led the U.S. telecommunications industry to embrace the mutual recognition agreement (MRA). At its most basic level, an MRA acts as a confidence builder between two trading partners. It neither requires harmonization, nor regulatory reform. Instead, it allows manufacturers to choose where to test products and what laboratories to use, even though those companies will continue to be required to comply with the laws of the country where the product is ultimately sold. Under an MRA, national regulators maintain their rules, but allow others to apply them.

The expectation is also that regulators who work together on implementation of international agreements will come to understand and embrace the need for long term reform. Since the purpose of the MRA is to build confidence, regulators have spent an increasing degree of energy and time explaining their own processes and learning the processes of other nations. Because they all have similar conceptual goals (that is, electrical safety, terminal attachment, and electromagnetic compatibility), there is a readily identifiable basis for moving forward on developing common procedures.

In practice, this means that a single testing body can be used to produce test results required by multiple trading partners. This reduces duplicative testing, allows for greater economies of scale, and increases the pace at which products can be certified. Since an MRA requires each signatory country to make all its requirements publicly available, it also provides manufacturers and test houses with a greater ability to understand the overall regulatory demands of the global marketplace.

When manufacturers can build, test, and ship their products to supply the global telecommunications infrastructure on a more rational, competitive basis, everyone wins. Regulators can be assured that users and networks will not be harmed, producers can more easily manage the approvals process, and consumers worldwide will have access to the same level of technology at the same time and under the similar market conditions.

The MRA initialed in June of 1997 between the United States and the European Union (EU) required that considerable time and energy be spent by both the Telecommunications Industry Association and the U.S. government to ensure that its provisions were carried out. TIA provided extensive comments on the Federal Communications Commission's Notice of Public Rulemaking (NPRM) regarding the U.S.-EU agreement, and has developed a closer working relationship with the Occupational Safety and Health Administration to address questions related to electrical safety.

Within the Asia Pacific Economic Cooperation (APEC), a landmark agreement was reached between the eighteen member economies on a Mutual Recognition Arrangement (MRA) in June 1998. Sixteen APEC economies have already indicated their willingness to enter into the agreement's first phase (exchange of test reports) and full implementation is expected to take place over the next few years.

The development of an MRA with Latin American nations has also moved significantly forward. In April 1998, the democratically-elected leaders of the Americas region met in Santiago, Chile for a Summit of the Americas and set forth a plan of action which included the "negotiation and implantation" of a telecom MRA. With this in mind, we have begun work within the Organization of American States' Interamerican Telecommunications Commission (CITEL) to get an MRA text developed by the end of 1999.

MRAs have shown that once they are introduced to the realities of the global marketplace, regulators are ready and willing to move forward with international agreements, and that confidence building is a viable method of encouraging reform. As I mentioned earlier, the European Union has already moved towards a self-declaration process in order to reduce the regulatory burden. In addition, the Federal Communications Commission in the United States is moving forward with plans first to privatize the certification process, and ultimately to allow for self-declaration. Similar movements are taking place in Canada and in Asia. We believe that the Americas Telecom MRA will have a similar impact in South America.

Despite successes to date in developing MRAs, there are some areas where it is unclear whether broad regional agreements can be easily reached, particularly in Africa and the former Soviet Union. The diversity of certification regimes (including the outright absence of clear legislation in some countries) make it challenging for negotiators to promote viable regulator-to-regulator agreements. For that reason, we believe that one possibility for a longer-term solution may be to work through the World Trade Organization. A WTO-wide agreement to promote the free flow of trade in telecommunications equipment would be consistent with the organization's previous telecom agreements on liberalization in services and elimination of import duties.

The will to take up the challenge of establishing a global agreement on equipment certification has been demonstrated by the tremendous level of cooperation and goodwill that was established during the ITU-sponsored discussion related to the GMPCS (global mobile personal communications by satellite) Memorandum of Understanding. The intent of that effort was to establish a global consensus that would allow for the free circulation of GMPCS terminal equipment. Among the strongest proponents of that MOU were developing countries interested in creating the opportunity to bring enhanced services into their region.

MRAs affect billions of dollars in trade annually in telecommunications equipment, and reduce the delay in getting products to the market as quickly as possible. They allow the marketplace to function more smoothly, and provide economic incentive for producers to deploy their equipment to the largest number of consumers and operators. Such agreements also require trading partners to make known all of their regulatory procedures, which creates a freer and fairer playing field for suppliers and testing bodies.

The U.S. telecommunications industry is convinced that MRAs are leading the way to greater global access to new technology and greater global access to new technology and lowering the cost of products. We believe that the years we have invested in developing MRAs are beginning to bear fruit in regulatory reform, and are relieving developing nations from the burden of having to develop their own unique set of requirements and rules. It is our hope that the effort to create agreements on telecommunications equipment type approval, yielding benefits for consumers on a worldwide basis and greatly aiding in the deployment of the global information infrastructure in the 21st Century.

In closing I would like to thank you for your attention and to make a request. As regional and global efforts are undertaken to try to streamline telecommunications equipment regulation, I would like to ask for your support. TIA firmly believes that these efforts will bear fruit not only for equipment suppliers, but perhaps most importantly, will contribute to the goal of providing universal and expeditious access to an advanced telecommunications infrastructure for all telecommunications consumers around the world.

Biography

Eric Nelson is the Vice President of International Affairs for the Telecommunications Industry Association (TIA), the principal U.S trade association representing American telecommunications equipment manufacturers. At TIA, Nelson is responsible for directing the association’s activities in international trade policy and trade promotion.

Nelson joined TIA in May 1991 from the North American Telecommunications Association (NATA) where he directed the association’s government relations and market research efforts. At NATA, Nelson published numerous studies and reports relating to international markets and international trade policy.

Prior to NATA, Nelson was a Senior International Trade Analyst with the U.S. International Trade Commission (ITC) during 1981-1988. For the ITC, he evaluated the impact of international trade on the communications industry and made recommendations to Congress and the U.S. Trade Representative. Before that, Nelson was an industry analyst with the U.S. Department of Commerce where he prepared reports relating to the competitiveness of the communications industry.

A long-time resident of the Washington, D.C. area, Nelson is 41 years old. He graduated with Honors from George Mason University with a B.A. in Economics. He also holds a M.A. in Economics from Virginia Polytechnical Institute and State University. For his master’s thesis, Nelson constructed an econometric model of the telecommunications industry and quantitatively determined the effects of increased competition on the industry.

Mr. Mart W. van de GUCHTE
Managing Director
International Institute for Communication and Development (IICD) (The Netherlands)

DEV.5

Development models
Innovate approach to ICT and development

1 Introduction

In this session we are addressing appropriate models to stimulate sustainable development, based on the widespread introduction of Information and Communication Technologies (ICTs). I will therefore focus on an innovative approach to ICT and Development, that is based on a twofold strategy: facilitating National ICT Roundtables to articulate demand for ICT applications in developing countries and disseminating best practices and lessons learned through web-based ICT Information Services.

The International Institute for Communication and Development (IICD) assists developing countries to utilise the opportunities offered by ICTs to realise sustainable development. It uses a practically oriented approach in which local entrepreneurs (‘agents of change’) *themselves* come up with proposals for ICT applications. IICD acts as catalyst in this. Using this demand driven approach, we strive for an as realistic as possible applicability of ICTs, which can count on broad consensus. In our view, local ownership and broad social support form an essential basis for sustainable economic development.

Governments are not the only driving force behind the embedding of ICTs in developing countries. Private enterprise, local institutes, centres of expertise, NGOs and financial institutes also form essential drivers in the process. IICD defines its role as an independent advisor and broker between these driving forces in the global ICT market and those with promising initiatives in the South.

2 National ICT Roundtables

In order to assist developing countries in articulating their demand for ICT applications, National ICT Roundtables are facilitated. These Roundtables focus on the identification, development and implementation of an ICT policy and of projects. Up till now, IICD facilitated ICT Roundtables in five countries: Burkina Faso, Ghana, Jamaica, Tanzania and Zambia. Moreover, an ICT school project involving local ownership and capacity building is also implemented in South Africa.

In each of the ICT Roundtables 20 to 30 national stakeholders participated. These stakeholders included representatives of national governments, ICT companies, media, financial institutions, non-governmental organisations (NGOs), chambers of commerce, national telecom operators and centres of expertise, such as universities.

In terms of outcome, the Roundtable process has two primary objectives:

– the formulation of policy recommen-dations on the role of ICT in development;

– the development of ICT project ideas.

The National ICT Roundtables start with a workshop in which national stakeholders explore the most desirable socio-economic development path for the country in question. A ‘reference report’, written by a local consultant, provides the stakeholders with an overview of national ICT policy and the actual status of ICT in the country concerned. During the workshop, the participants identify and validate scenarios for the future, which result in the formulation of national ICT policy recommendations.

Next to the formulation of policy recommendations, the Roundtable participants identify ICT priority areas. For instance, in most Roundtable processes the sector education, in which the use of ICT can be instrumental, is considered to play a pivotal role in achieving national development. These leverage areas are considered to contribute greatly to national socio-economic development and therefore function as the starting point for the development of project ideas.

Subsequently, so-called ‘agents of change’ are identified. These are key persons for the implementation of ICT demonstration and action-research projects to spearhead the desired developments and to raise national awareness.

The formulation of feasible projects is the next step in the process. So far, 25 out of the initial 32 projects ideas have been formulated and presented in a work plan. For example in Burkina Faso and Ghana, an agricultural information centre will provide up-to-date market, price and crop information to local farmers and will promote the products involved via its website.

In Burkina Faso, ICT has been introduced in Information Boutiques to create an easy accessible ICT facility where information can both be collected and published in order to promote citizens’ participation in decision making processes. Information Boutiques, a sort of information and telecentres, reflect the paradigm shift for developing countries, away from individual connectivity to community connectivity.

In Ghana an environmental project has been set up to enable effective resource management by making relevant information accessible to key organisations, such as forestry conservation institutes, via an on-line database, CD-rom’s and diskettes as well as via hard copy.

In order to contribute to bridging the gap between training and employment in the ICT industry of the West African sub-region an ICT Training Centre has been set up in Ghana. This Centre for ICT will focus on training professionals to plan, build, operate and maintain networks and applications. Since learning, a two-way knowledge transfer, is considered to be strategic, training courses for local users are always embedded in each project. The ICT Training Centre will allow for attaining synergies in such training courses.

Another project example is a Tourist Attraction Information system in Jamaica that will provide virtual tours of national attractions, where reservations can be made by using email and where the amount of tourists, coming to the region, can be monitored.

After the project formulation phase, assistance is provided in partnering, fundraising, capacity building and in the dissemination of actions and lessons learned.

Last year, IICD conducted a thorough evaluation of the results of the National ICT Roundtable process. Although the general approach was considered to be successful, there appeared to be a need for an even stronger and more pragmatic focus. For maximum results in terms of learning and multiplier effects, synergy and overall efficiency, IICD decided to concentrate on additional activities in the five existing Roundtable countries, such as conducting sector-specific Roundtables. For example, in June and July this year such a sector-specific Roundtable was held in Tanzania on the use of ICT for socio-economic opportunities.

3 ICT Information Services

The collection and dissemination of best practices and lessons learned is an important tool in IICD’s role as a knowledge broker. The experience and expertise that are acquired within the Roundtable process and through other activities are disseminated to a broad public via ICT Information Services. The ICT website (http://www.iicd.org/) and the Intranet are important means to that end.

The Service Desk is a human point of contact, where people and organisations can ask questions on ICT and Development. Answers to these questions vary from relatively straightforward information to tailor-made advice and project assistance. Advice is rendered with the assistance of a network of experts. The Service Desk therefore combines global ICT expertise with knowledge of the local situation in developing countries. Knowledge that is acquired via the Service Desk is documented through the Intranet and made available to a broader public via the ICT website, for example by means of Frequently Asked questions (FAQs).

The ICT Stories Project, a joint-activity of IICD and *info*Dev of the World Bank, is another important tool to disseminate best practices and lessons learned. Input is generated from people that gained ‘hands-on’ experience in development projects with an ICT component.

4 Project examples

Burkina Faso and Ghana – Agro Business Information Centres

In Burkina Faso, an agricultural information centre will provide up-to-date market, price and crop information to local farmers. Through the use of ICT, information will be gathered by and disseminated from the information centre in Ouagadougou to four regional centres in a fast and cost-effective manner. In so doing, a large number of farmers will possess information they can adequately use while negotiating with intermediaries on prices for their crops. Moreover, they can exchange information on crop diseases, based on their own and other people's experiences.

The information centre will also promote the products of the producers involved via its website and will provide training in marketing as well as in the use of ICT.

In Ghana, a similar project is set up to connect local farmers and small and medium-sized exporters to national and global markets. Eventually, a fast and secure online ordering and payment system is meant to be one the services of this e-commerce project.

Burkina Faso – Introducing ICT in Information Boutiques

The Information Boutiques aim to enlarge the range of choices for the population to actively participate in the development of democracy and sustainable human development.

In order to serve this goal, the Information Boutiques collect and distribute information, provide training and act as an intermediary between local citizens and the government.

IICD has offered to assist in the introduction of ICT in four boutiques. The objective of the project is to create an easily accessible ICT facility where information can both be published and collected in order to promote the participation of citizens in decision making processes. To serve this objective the Boutiques are assisted with the development of their own website. Moreover, a multi-media presentation programme, in the local languages, will be worked out. In order to ensure local capacity building, IICD developed ICT training for staff and users of the Boutiques.

Ghana – Environmental Information Network

Natural resources are the fundamental means from which the Ghanaian population derives its livelihood. Such heavy use of natural assets calls for tight resource management, in which information about the state of the environment is crucial.

The goal of the Environmental Information Network project is to improve such resource management by collecting and processing environmental information into a web-based information system. This database entails information on forestry, on the protection of animals and plants and on other environmentally relevant issues. Crucial Ghanaian players in environmental research and management are involved in the information collection, which will ensure an overall picture of the state of the environment in Ghana. By means of a website the broader public will have access to such information.

Ghana – ICT Training Centre

Companies and organisations in Ghana increasingly realise the potential of ICT to improve the effectiveness and efficiency of their businesses. In this respect, there is a growing need for professionals to plan, build, operate and maintain networks and services.

A survey, carried out last year, on the use of telematics in Ghana, revealed that most ICT facilities are developed, installed and maintained by foreign companies as local organisations do not have sufficient in-house staff. The development of local expertise is therefore crucial for limiting dependency on foreign experts to support ICT applications.

The Centre for ICT will initially focus on training ICT specialists in networking and applications. In this way, the centre will contribute to bridging the gap between training and employment in the ICT industry of Ghana and the West African subregion.

The set up of an ICT Training Centre will contribute to sustainable economic and social development by building local capacity required to disseminate and support ICT in Ghana.

Jamaica – Tourist Attraction Information System

In Jamaica many tourist attractions focus on natural splendour or cultural heritage. The Tourism Information System will provide virtual tours of Jamaican attractions and will allow potential clients to make reservations for tours to these attractions using email. In this way, the environmental management of these attractions will be facilitated. For instance, should the maximum amount of visitors an attraction can sustain be exceeded, appropriate measures can be taken.

Global Teenager project

While testing the videoconference, pupils from a farm school in Grahamstown sang a song to students in the Netherlands.

The Global Teenager project is committed to stimulating the use of ICTs for the creation of cross-cultural understanding. More specifically, the Global Teenager project focuses on two-way communication between students in different countries, who thereby learn from and about one another’s lifestyles. By using email as a low-key technological solution rather than requiring full Internet access, the Global Teenager project focuses on the basics of learning: sending and receiving information, the basic ingredient of knowledge.

The Global Teenager project fulfils a need schools around the world have for creating an international learning environment and, at the same time, integrating ICT into their curricula.

Initially, only students in South Africa and The Netherlands participated in the project, but since there was much enthusiasm for interacting with a broader range of countries, an Adopt-a-School plan was set up. The plan, which already received great financial support from various private enterprises, enables the provision of adequate equipment, training and content to schools in developing countries. In this way, these schools are able to participate in the Global Teenager project and increase and sustain their ICT awareness and computer literacy.

Students in South Africa and the Netherlands asked each other questions via the computer.

5 Partnering

One of the major issues in tackling the emerging knowledge gap is partnering, co-operation through functional relationships. While striving for knowledge to become accessible to everybody, *smart partnerships* between on the one hand public and private institutions and on the other hand local and international organisations are critical. No actor alone has the combination of vision, power and resources needed to guide the revolution in such a way that it advances the general good and let's not forget that PEOPLE make it work.

Stimulation of private sector involvement will contribute to development in a sustainable manner. The private sector is able to provide resources and expertise in the areas of technology, financing, capacity building and infrastructure. New strategies are needed to take advantage of current and future developments in ICT. Therefore, a cross-sectoral approach to development, in which private sector plays a significant role, has to be pursued and win-win-win situations should be sought after. For example, there is a need for strategic partnerships between employers, educators and governments to explore creative solutions to the urgent world-wide need for trained employees in the field of ICT. Ways have to be sought for keeping staff developers up-to-date and to expand their knowledge and skills in a rapidly changing environment. Employers, academics, trainers and professionals from content and equipment industries play an important role in the dialogue, while preparing new 'business' models.

Information used to be considered as gold. These days, however, through the use of new technologies, information is more like milk: it has to be used while it is fresh. Staff developers and students therefore need to know how to locate and access relevant information, whether it is via databases or making use of innovative networks or via other people working in similar jobs or sectors. Access to such sources and interactive learning are important to gain new perspectives and to support self-development of trainers.

A concrete example, in which such creative alliances are sought after is the earlier mentioned ICT Training Centre project in Ghana. Multinational corporations co-operate with local companies and centres of expertise, such as universities, to offer intensive ICT training. In this way, ICT specialists will be equipped with the requisite state-of-the-art skills to design, build, operate and support local ICT application initiatives.

Such smart partnerships are in conformity with a more general goal to co-operate with private sector on a long-term basis, in which companies are invited to offer human resources, expertise, training and other contributions as a partner.

While talking about partnering, the notion of 'leapfrogging' is often brought up, offering several advantages and opportunities. As a result of dialogue between 'innovators and applicators', the South can take advantage of the errors made in the North in order to grow faster. But what to do if there are no legs for leapfrogging?

We'll have to think out of the box, while recognising that many applications are not immediately appreciated and recognised, and: I hope that we do not underestimate the tacit, indigenous knowledge available at both ends.

6 Conclusion

What I talked about here today is only one approach, a potential model, to stimulate sustainable development through ICTs. It is hoped that participants of this summit and other conferences will explore these lessons learned as well as other case studies, research and best practices. Projects can also serve to gain insight into the positive role of knowledge and new information technologies in the development process, as well as in the obstacles that need to be overcome.

In my view, focal points in this global learning process should be local ownership, capacity building and smart partnerships. In such a way, countries in the South will develop the institutional capacity to use information and communication technologies, on their own terms, as tools for sustainable development and empowerment of the poor.

Biography

Managing Director, International Institute for Communication and Development (IICD), The Hague, The Netherlands.

IICD envisages a world in which developing countries will have unrestricted access to information and communication, a world in which all members of society can use Information and Communication Technologies (ICTs) to gather information, acquire knowledge and participate in decision making progresses. IICD acts as an independent broker between countries in development and the stakeholders that drive the international market of ICTs.

Mart W. Van de Guchte, 53, was born in Eindhoven, The Netherlands, earning his Bachelor's degree in Civil Engineering in 1969 and graduating from various marketing, sales and senior management courses in succeeding years.

Mr. Van de Guchte started his career with Philips in the 70's with the NV Philips Gloeilampen Fabrieken – The Netherlands as a design/construction engineer. He first lived in Saudi Arabia in 1975 as the company's project manager primarily responsible for the implementation of civil, mechanical and electrical work projects and involved in the preparation of bids for the Kingdom's First Telephone Expansion Project (TEP).

In 1978, he moved to Philips Export BV – The Netherlands to become commercial project manager and subsequently contract/area manager for the Middle East, though with his base in the Netherlands.

In 1986, Mr. Van de Guchte joined the Philips Development Corporation – Jakarta, Indonesia, as manager of the professional services and project division. His responsibilities included i.a. installations of public telephony equipment for the AT&T and Philips Telecom joint venture, as well as the execution of development aid financed hospital projects.

In 1989, he was appointed marketing director for the Far East of AT&T Network Systems International in The Netherlands. In this position, he supported the AT&T organizations in Indonesia, China, India, Peru, Aruba, France and Saudi Arabia.

A year later, in 1990, Mr. Van de Guchte expanded his area of responsibility to organisations in the USA and the Netherlands within the same AT&T business units, when he became marketing and sales director for the Middle East and Africa.

When the Saudi Arabia Government awarded the sixth Telephone Expansion Program (TEP6), Mr. Van de Guchte, who was AT&T's proposal director for this program, was appointed Vice President of the TEP6/GSM program management team, with end-to-end responsibility for the successful implementation.

His last function, before joining IICD in August 1997, was that of International Wireless Services Vice President within Lucent Technologies (USA).

Mr. C. MOREL
Vice President
Alcatel
Switching and Routing Division (Belgium)

DEV.5

Turnkey solutions from concept to profit

Solutions that enhance the revenue generating potential of telecom in developing countries

1 Introduction

"The environment of the telecommunication sector is undergoing significant changes. The combined forces of "demand pull" and "supply push" have made telecommunications one of the leading growth sectors in the world economy. The telecommunication sector has a high profit potential in every country of the world. However, experience suggests that in developing countries retained earnings in the sector are not sufficient to finance all new projects because networks are underdeveloped and do not generate enough cash flow."

(Paragraph-e- of the "Valletta Declaration")

Access to telecommunication services is increasingly considered as a basic human right and offering these services to everyone, regardless if they live in a big city or a small village, is seen as a prime condition for economic and social development. However, telecom operators in developing countries are struggling to meet their commercial and economic commitments.

Telecommunication needs in developed and developing countries, being initially quite distinct, have traditionally been treated separately. In developing countries, a low start-up cost, given the low initial penetration and/or the low population density, is an essential requirement. Additional costs are incurred because the equipment must withstand more severe installation and operating conditions (climatic, powering, maintenance) than is generally the case in developed countries.

These constraints have resulted in a multitude of ad hoc solutions (often locally developed and sometimes at a high cost), produced in small quantities with limited features. Furthermore, the average conditions of transport and power utilities in developing countries make the rollout of telecommunication projects more complex and difficult.

These barriers to development are now being lowered thanks to recent events in developed countries that are bringing about new technologies and solutions that will dramatically affect the prospects of developing countries.

The main event has been the liberalisation of the provision of telecommunication services whose objective was to spur the development of telecommunications in the most industrialised countries through competition.

To make this competition effective, it was necessary to level the playing field by defining new – open – standards under the leadership of ITU. The objective was to create a new – global – market whose volumes could justify the considerable research and development effort required.

One of the consequences of the global character of these new standards has been a rapid decrease in the prices of infrastructure and terminal equipment that are reaching today a level affordable in the entire world.

2 Challenges

Operators all over the world are facing the problem that they have to live up to both their commercial and social commitments. Operators have to be profitable (commercial commitment) and provide telecom services to everyone (social commitment), but if we look to the distribution of the cash flow over the different subscriber segments we see that these commitments are not easy to merge.

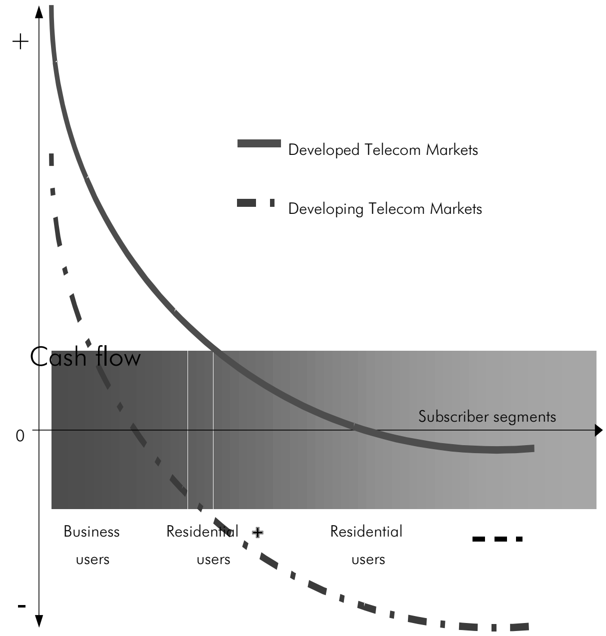


Figure 1 – Cash flow versus Subscriber segment

For operators in developed telecom markets, business[1] and residential+[2] users are the cash cows and the low-end residential[3] users are generating a slight negative cash flow. For operators in developing markets, the picture is different.

- Due to the absence of added value services and an up-to-date infrastructure, business users are not generating high profits.
- Potential residential+ users are not provided with the appropriate telecom services to enhance the telecom usage in this potentially profitable segment.
- A large part of the residential users in many cases living in rural areas is not reached with the existing network in a cost-effective way.
- The low-income group is often causing billing problems.

Operators in the developing countries are now facing the challenge to create a profitable network without giving up on their social commitments, in other words, pulling up the line shown in Figure 1.

The following chapter is describing some economically viable solutions that help operators facing the above challenges

3 Solutions for developing countries

Solutions for developing countries should focus at cost-effective ways of providing telecommunication services in areas with low population density, triggering economic development. Furthermore, it is essential to provide added value services to business users and residential+ users to enhance the overall profitability of a telecom operator providing a reasonable return on investment.

The proposed concepts are characterised by an inherent flexibility, enabling common platforms to support applications that serve both commercial and social objectives.

Therefore, these concepts should:

- **Increase the revenue** potential of the network (Intelligent networks);
- **Enhance the quality** of the network (Telecom management networks, Infrastructure);
- Reduce the commercial risks (Intelligent networks);
- **Reduce the cost of ownership** (Telecom management networks, Infrastructure, Network Operator Support services);
- **Reduce the capital investment** (alternative pricing schemes);
- **Support the operator** in all phases of the network (Network Operator Services);

and meet stringent specifications and requirements so that they can:

- **Operate under extreme conditions** where there is a minimal or no basic infrastructure;
- **Operate without local supervision** in places not readily accessible by highly skilled personnel;
- **Support business and residential+ users as well as residential users.**

3.1 Accessing a World of Services

Cost-effective access is a key element in developing telecom services in low-density areas. In view of the distribution mix of customers, there is

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[1] Business users: including corporate and small-and-medium businesses.

[2] Residential+ users are subscribers that have a high potential usage of telecom services, including internet and added value services.

[3] Residential users are the subscribers with a low telecom usage often in low-income groups and located in remote areas.

no such thing as "one solution for all". Instead a mix of access technologies will be used to connect all subscribers as cost-effectively as possible to the nearest switch.

Direct access over open wire will be used to connect individual subscribers to the network, while other access technologies will be used for clusters of subscribers.

Remote switch concentrators or small switches will be used in low-density areas where there are medium size population centres. Alcatel's range of switches includes a number of cost-effective, low capacity remote units.

3.1.1 *Wireless Access*

Traditionally known as the most cost-effective rural telecommunications access technology, wireless access or radio access is being introduced increasingly in urban and suburban areas. Due to its deployment speed and flexibility wireless Access allows operators to extend their network to reach the high end of the subscriber spectrum with higher quality connections. Again, technology is evolving to support an ever-wider service mix – including multimedia on-line services – with this technology.

3.1.2 *Satellite Access*

Satellite access provides new solutions to the problems faced in urban, regional and rural areas. It is especially useful for connecting very remote pockets of subscribers or for serving temporary installations since it does not require the installation of a terrestrial transmission infrastructure.

Each access system has its own advantages. Various parameters have to be considered when choosing the most appropriate solution, including:

- population density;
- subscriber clustering;
- traffic requirements;
- estimated growth;
- services to be provided;
- temporary or permanent installation.

Figure 2 illustrates the possible impact of two of these parameters; population density and subscriber clustering.

3.1.3 *Multiplexers and digital cross-connects*

Add/Drop multiplexers and cross-connects support the broadband communications services requested by the subscribers at the high end of the spectrum. Advanced capabilities groom traffic for optimum network fill and provide the necessary connectivity between the individual wavelength network layers. They also provide protection and rapid restoration in case of faults. High capacity and service redundancy allow for continued growth and easy reconfiguration of today's and tomorrow's evolving multi-service networks.

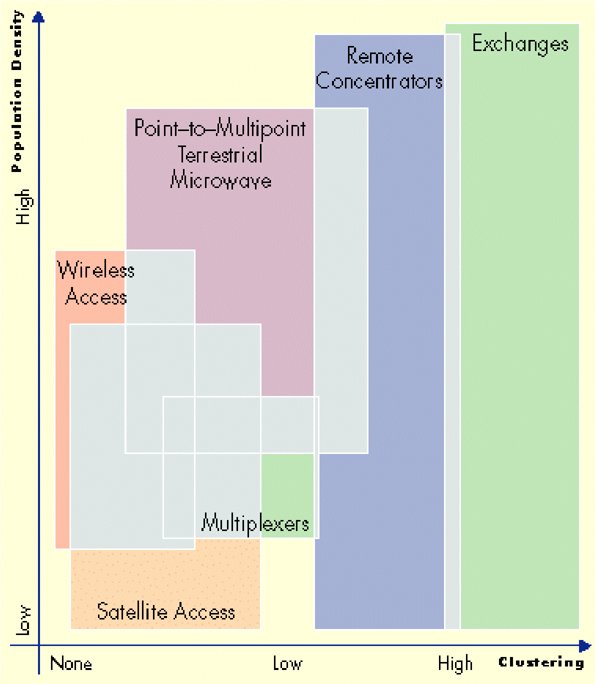

Figure 2 – Population density versus clustering

3.1.4 *Point-to-Multi-point terrestrial Microwave*

The Point-to-Multi-point microwave concentrators can cover an area of up to several hundred km in diameter. Subscriber clusters within the area access the concentrator via a local terminal radio station. The final drop to the subscribers can use either copper pair cable or a wireless tail, providing full wireless access to the subscriber's premises. This solution is particularly suitable for collecting traffic from small subscriber clusters spread over a large area.

3.1.5 *Remote concentrators*

Traditional narrowband access networks are based on twisted copper pair lines, from one to a few tens of kilometres in length, which feed directly into telephone exchanges. Many operators all over the world are currently rationalising their access networks by concentrating call services in larger nodes.

Concentrators are installed to handle the increased loop length. This allows the existing copper loop to be reused while access nodes are connected to the now more distant exchanges using high performance fibre optic transmission techniques.

3.1.6 Exchanges

Every communication network is built around a basic switching infrastructure that might consist of a single switch or of a multi-level network. Quite often a low-density area will surround one or more large cities. In this case, the low-density network will be built up around the switching systems installed in these cities extended with remote concentrators and other access devices.

In the absence of large centres of population, the network can be based on an autonomous, small switch that is cost-effective at very low capacities. Collection points can be based on either a small capacity or a remote unit using any of the access devices already described.

3.1.7 Phoneshops

Providing “access” to telecom services goes further than providing the necessary technological solutions or network components and therefore in many developing countries, network operators are looking for ways to open up the telephone service to the general public. Providers offer a range of coinboxes and cardphones. However, these proven devices are sometimes not suited to local needs, coinboxes are unsupervised and therefore prone to vandalism and the general population in a number of countries does not accept Cardphones.

To overcome these problems, some providers are offering a new solution, the phoneshop.

The phoneshop is a communication and information centre that offers a personalised and managed telecommunication service to the local community. Local entrepreneurs for whom they offer a real business opportunity run Phoneshops; these operators then receive part of the call revenues.

A typical phoneshop houses up to ten telephones, each with an individual taxation unit, housed in their own booths. The phoneshop operator centrally manages the phones. It can be connected to the network using a variety of access technologies.

Phoneshops are providing an easy and cost effective telecom solution for small business by providing shared access to fax, and e-mail facilities. Furthermore, Phoneshops can evolve to “internet-café”-like services providing families and youngsters access to the information available on the world-wide web.

Figure 3 – Alcatel 9910 phoneshop

3.2 Intelligent networks

Under the pressure of commercial goals, operators in developing telecom markets are being forced to innovate in order to develop new markets or simply to enhance the profitability of existing markets.

State of the art IN architectures, are fully scaleable starting from a single service node (IP/SN) to a “full IN” system (Figure 4), so there is no lost investment in hardware, software and O&M i as the operators business develops. When the architecture grows, each component can be reused giving an extremely smooth capital investment profile against traffic and service revenue growth.

The power of an Intelligent Network concept is to a large extent determined by the end-user services and applications. A broad library of IN services is available and typically grouped in the following families

- Alternate Billing Services.
- Calling Card Services.
- Enterprise Network Services.
- Fixed/Mobile Convergence.
- Internet Services.
- Lifestyle Services.
- Mass Calling Services.
- Number Translation and routing.
- Operator-Oriented Services.

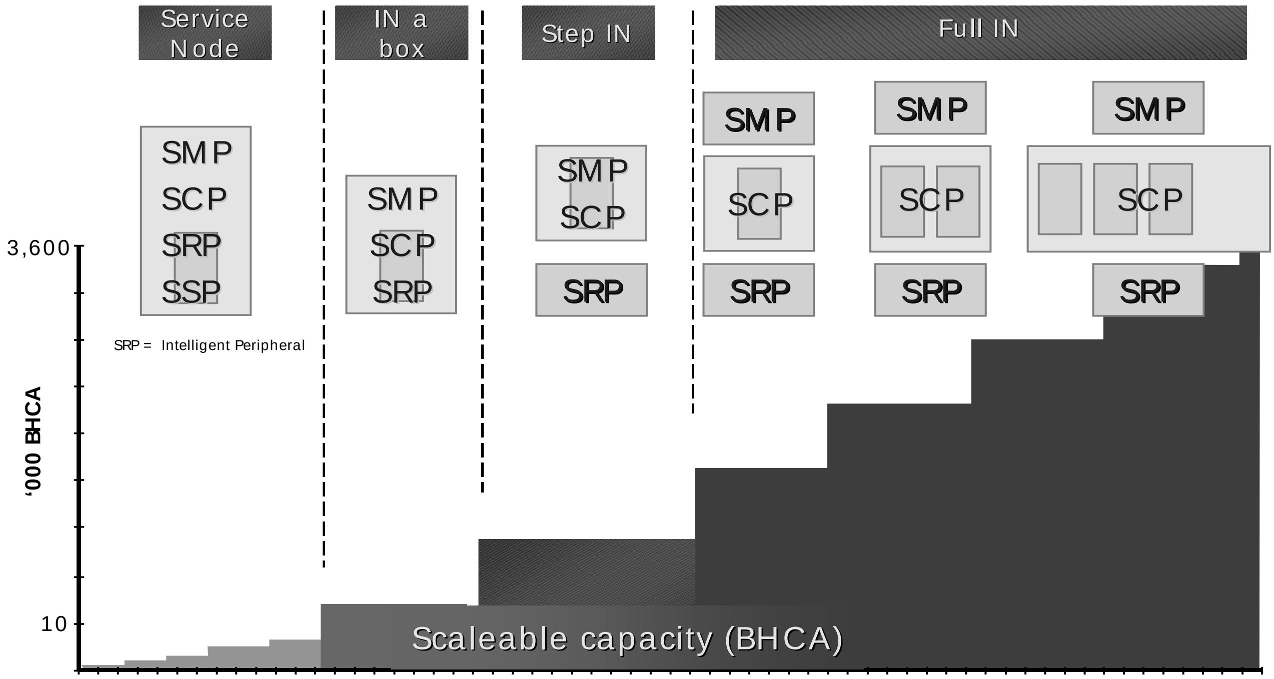

Figure 4 – Scalability of IN architectures[4]

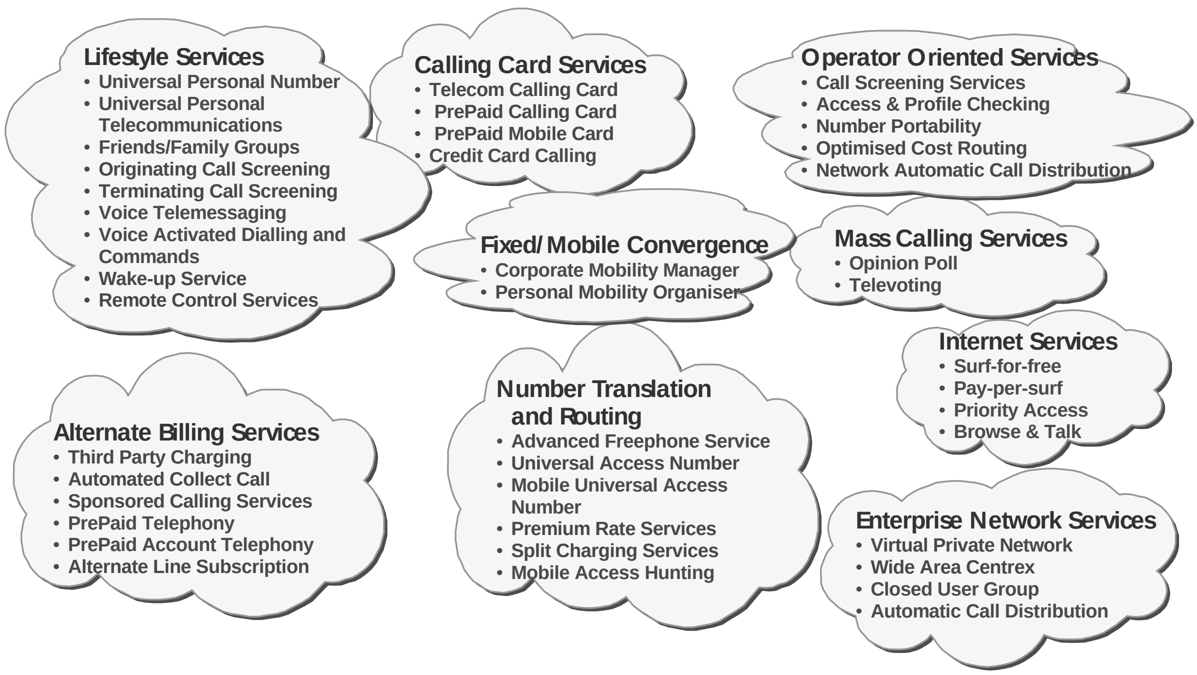

Figure 5 – IN Services available on the Fixed and Mobile Networks

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[4] SMP: Service Management Point
SCP: Service Control Point
SRP: Service Resource Point
BHCA: Busy Hour Call Attempts

Operators in developing countries can select the most appropriate ones out of these families, allowing them to enhance the service they offer to their most demanding customers; the business – and the residential+- user. And furthermore, they can limit the billing risk associated with offering telecom services to low income and defaulting subscriber-groups.

Using for instance prepayment means that problems associated with defaulting customers are eliminated once and for all. It is a fact that the major amount of the potential residential user market has no bank account, ruling out the possibility of a conventional telephone rental agreement. Nevertheless, these people represent a significant potential income for an operator capable of providing customised services.

In return, the operator benefits from advance payment and is able to reinvest the income without first having had to provide a connection or if the credit is not fully utilised, without having to provide a connection at all.

In contrast to prepaid systems involving a rental agreement, prepaid card systems relieve the operator of customer administration and management (billing, debt recovery, customer records, billing complaints), which reduces the administration cost per user.

A further advantage lies in the elimination of formalities when the service is initially provided, which means that prepaid cards can be used much more widely than conventional agreements. There are no delays. Cards can be distributed through existing outlets such as shops and post offices, or even through automatic systems. Furthermore, the systems installed to handle pre-payment can easily be used for other deployment of other revenue generating services from the service families mentioned above.

3.3 Telecom management networks

Business users and residential+ users demand excellent quality of service. Therefore also telecom operators in developing countries should be extremely concerned about the reliability of their networks. A major element of network quality is subscriber line quality. A low quality or poorly supervised subscriber line network directly compromises your profitability by:

– Reducing your revenue generation capability as faulty lines essentially mean lost calls.

– Increasing the cost of operating the subscriber lines, as multiple resources are required to handle complaints and localise faults.

In order to avoid loss of revenue and reduce the costs associated with operating the subscriber line network, Operators should deploy centralised high-performance line test and administration systems.

Using these systems, operator will have:

Direct revenue increase

Due to the higher subscriber line availability, the operational revenues will show a direct increase. This comes from the combined effect of better and more efficient utilization of manpower, shorter line repair times and higher availability of subscriber lines.

High quality subscriber lines

Nightly *automatic* routine line tests allow the operator to be *proactive* on subscriber line maintenance. In other words: potential problems will be fixed even before the customer will be aware of them.

Effective resource allocation and optimized equipment utilization

By its centralized nature, line test systems optimize on equipment utilization. Both centralization and proactive problem solving lead to a very effective management of all resources.

High customer satisfaction

Optimization of operational procedures and high quality subscriber line network give rise to high customer satisfaction and consequently increase the usage.

3.4 Network Operator Support Services

Simplified we can state that every project undergoes 3 major phase (Figure 6):

– A conceptual phase, wherein the idea is born and planned towards a solution

– A deployment phase, i.e. the solution roll-out

– An operational phase, Keeping the solution up and running.

Figure 6 – Telecom project lifecycle

Each of these phases is characterised by specific problems and challenges.

Problems related to lack of knowledge, available resources or equipment can be solved with the assistance of Operator service providers.

A lot of the equipment vendors see the need to provide more than equipment only, more and more they enlarge their support service portfolios to assist their customers in a partnership-like way.

Operators in developing countries can benefit from these offering to:

– Satisfy their subscribers

  Satisfied subscribers mean steadier revenues. What they want most is a smooth-running network and excellent services all the time. Operator support services can help operators in developing countries to enhance the quality of service they deliver and consequently to enhance the profit made with the business and residential+ users.

– Optimise their investment

  As we indicated already, profit is scarce in telecom operations in the developing countries and the subscribers at the high end of the spectrum want tailor-made services delivered without delay. Therefore, operators can benefit from support services offered to help them to invest the right amount at the right time for the best possible return on investment.

– Trim operating and maintenance costs

  To achieve a reasonable level of profit, operators all over the world have to cut expenses. With support from service providers, they can get help to reduce costs at the source and right from the start through enhanced quality operation, design and efficiency.

A typical Network Operator Services offering contains the following domains all in one portfolio;

- **Management & business consulting**; assisting operator in finding answers to technical and commercial questions.
- **Network & service design**; Assisting the operator in the planning and assessment of the network and the definition and specification of new services.
- **Network & service integration**; Helping the operator with the evaluation and testing of multi-vendor network elements, focusing on issues such as Conformity, interworking and interoperability.
- **Network implementation**; offering operators turnkey approaches including site management, customer application engineering, logistic management and actual deployment.
- **Customer administration**; helping the operator to cope with frequently changing pricing policies, introduction of new services and billing aspects.
- **Network & service enhancement**; assisting the operator with the day to day operations of the network allowing the operator to concentrate on other key activities and get more out of existing networks.
- **Skills & resource development**; training the operators work-force and bringing the right information at the right place at the right time.
- **Network Operation & maintenance**; helping the operator to get the maximum out of the network, via assessments, network optimisation, service optimisation and network capacity enhancement.

4 Alternative pricing schemes

Reducing the capital investment will help the operators in the developing countries to enhance their profitability and consequently focus more on their social commitments.

Here, alternative pricing schemes between operator and provider proof their value. Pricing schemes that are not based upon a lump-sum only but schemes that help you master the delicate balance between operational expenditure and capital expenditure. Pricing schemes that are based upon concepts that use different schemes at once; lump sum pricing, variable recurrent pricing and fixed recurrent pricing.

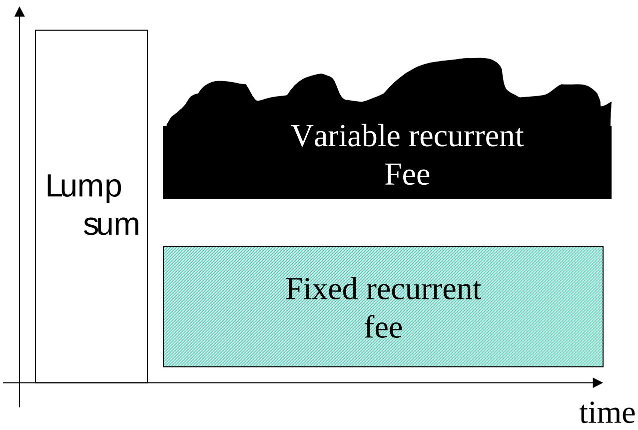

Figure 7 – Pricing elements

The lump sum stands for the investment an operator makes; his capital expenditure.

The fixed recurrent sum is the operational expenditure, based on the business plan made during the "design" phase. The Variable recurrent fee, is a way of sharing risks between the provider and the operator usually based on the actual the usage of a network.

Typically, the lump sum covers the installed equipment, the fixed recurrent fee the supporting services and the variable recurrent fee the software right to use.

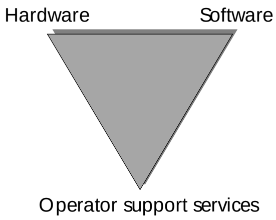

Figure 8 – Infrastructure & service solution

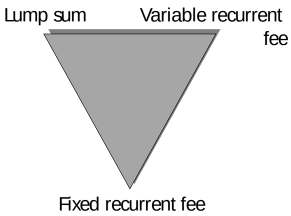

Figure 9 – Financing solution

5 Network evolutions

5.1 Fixed-Mobile Convergence

In several developed telecom countries mobile penetration rates in excess of 40% are foreseen in the coming years. Subscribers to both mobile and fixed services are beginning to wonder if their two subscriptions, their two telephones, their two voice mail services etc. will not become rather redundant in the long run, not to mention over-complicated. In developing telecom countries the demands of business and residential✚ users are certainly similar and also here, convergence of the fixed and mobile services is required.

Fixed-Mobile convergence services will simplify the life of the subscribers and make them more reachable, providing the demanded "anytime, anyplace, anywhere" connectivity. Services such as one number improve the reachability of subscribers wherever they are at home or on the move. In rural areas, the future 450 MHz net-works will enable the cost effective provision of mobile telephony due to the use of bigger cells and thus fewer antennas.

The fixed-mobile-convergence end-user services also described as "Two Phones – One Service", is mainly based on Intelligent networks and encom-passes combined and complementary use of fixed and mobile terminals, with a set of core services common to both.

5.2 Voice-data convergence

Access to the Internet and other data networks via POTS (data over voice) and ISDN lines and via air interfaces as well as the delivery of voice services over data networks (voice over data) are becoming standard services. Voice-data conver-gence is a way to optimise investments in both the data and the voice segment. Using the same network for both these segments is for developing telecom nations a sure way of catching up.

A typical voice (and FAX) over data (VoData) scenario is in Figure 10. The subscriber receives a service comparable to the service of end-to-end conventional time division multiplexing (TDM) voice networks. At some point in the network, a VoData gateway converts between the TDM voice signal and packets or cells. Examples of VoData gateways are Voice over ATM gateways and Voice over IP gateways. The same scenario applies to FAX over data.

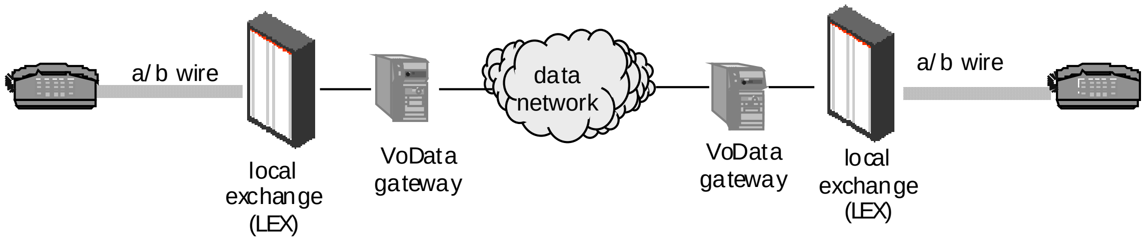

Figure 10 – Voice over Data

Gateways may be located in a public voice network, a private voice network, or even inside a special telephone set.

By using these mechanisms operators all over the world can concentrate on building-up a reliable data network that can also be used to transport voice traffic.

6 Conclusions

The state of the telecommunication infrastructure and the services provided on it are playing an important role in the development of a country. Technology is moving fast and decisions should not be taken lightly.

An evolution path has to be incorporated in the network as early as possible and operators have to be able to offer a wide range of services to the whole population whilst limiting their risks. Choosing the right solutions to stand up to their challenges, operators in developing countries face a dilemma; running a sound commercial enterprise and offering services to the most remote areas. However, a multitude of solutions exists that help them to cope with their specific problems.

ITU is playing a key role in the development of telecommunication networks. On the other hand, telecommunication solution providers are offering their services to their customers; helping them to plan the evolution of networks from the conceptual phase up to the actual operation of the network.

Although the operators and the private sector have different drivers, they have a common goal.

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Telecom services within everybody's reach

Biography

Mr. Chris Morel was born November 2, 1945 in Poperinge Belgium. He is married, has 3 children. And holds a university degree in Economical and consular Sciences of the University of Antwerp, Belgium. Chris Morel was employed in the newspaper-, banking- and medical- sector before he joined Alcatel (Bell Telephone at that time) in 1972. At this moment, he holds the following functions.

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- Chairman North east Asia telecom, Shenyang, China
- Chairman Shanghai B.A. Mobile Com, Shanghai, China
- Vice-Chairman Beijing Bell, Beijing, China
- Board member of Shanghai Network Support Systems Cy, Shanghai, China
- Managing director Shanghai Bell Belgium, Antwerp, Belgium
- Vice-Chairman Teletas, Istanbul, Turkey
- Vice-Chairman Alcatel ZAO, Moscow, Russia
- Member board of partners World Trade telecom, Moscow, Russia
- Chairman of the board of partners Mosbell, Moscow, Russia
- Boardmember Bell Kenya, Nairobi, Kenya
- President Bell Congo, Kinshasa, Congo
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DEV.5

Fostering economic development through privatization: a case of telecommunications industry in Thailand

Thailand has to hasten the privatization of state enterprises; due largely to the heavier debt burdens after the baht float in1997. 1999 will deregulate highlights of privatization program to date in telecommunication sector. The primary objective of the study is to analyze the impact of privatization through economics development, telecommunication development and any industries in Thailand. The framework provides the indicators to access the impact and is applied through the identification of financial, organizational, performance and market composition of Thai Telecoms SEs, and analysis characteristics of Thai and overseas carriers. The economic development theory is applied by the best fit of neoclassical analysis. The study concludes how privatization of Thai telecommunications will lay firm foundation for progressive change in order to bring benefits to Thai economy, society, enterprises and consumers.

1 Introduction

The telecommunication business plays a role most essential to economic and social development, and will become more important in the future. Owing to the rapid and continuous changes of telecommunication technology, the applications of IT and computer technology working on telecommunications system, and including the trend of world free trade in globalization, it is imperative to Thailand to improve telecommunications and allied businesses to cope with possible changes. The telecommunication business in Thailand is monopolized by the State and State Enterprises (SEs), which still lack flexibility in their administration. There is no agency to directly serves as the National Independent Regulator at present. Such lack is an obstacle to competition with other private sectors both on regional and world levels. It is, therefore, most necessary to develop Thai telecommunication SEs to be prepared to operate modern telecommunication services adequately to meet people’s demand in the country and to be in a position to compete with other operators in neighboring countries in the region and the world in the future.

2 Current roles of the States, State Enterprise Agencies and the Private Sectors

In Thailand, government owns all radio and television broadcasting stations. The Public Relations Department is responsible for enforcing the Radio Broadcast and Television Broadcast Act of 1955. The telecommunication services are monopolized and provided by the government through state enterprises.

2.1 State Agencies

The Ministry of Transport and Communications (MOTC) holds the telecoms regulation power and authorizes the Post and Telegraph Department (PTD), the Telephone Organization of Thailand (TOT) and the Communications Authority of Thailand (CAT), to do on behalf of the Ministry, under the principal Acts of each organization, i.e. the Telegraph and Telephone Act 1934, the Telephone Organization of Thailand Act 1954, and the Communications Authority of Thailand

Act 1976 respectively. The MOTC and the National Economic and Social Development Board (NESDB) have primary responsibility for drafting the country's policies and development plans for the telecommunication industry. The Ministry of Finance (MOF) is responsible for financial matters and policies for the Government including telecommunication sectors.

The PTD currently controls and manages radio frequencies, regulates and coordinates domestic communication via satellite through integrated ground stations. PTD is mainly responsible for the international and regional cooperation and coordination in the field of postal and telecommunication activities on behalf of the Royal Government of Thailand.

2.2 State Enterprise Agencies

The TOT mainly operates and oversees all domestic telecom services. Its services include PSTN, data communication, cellular telephone, paging, telepoint, trunk mobile radio, ISDN, leased circuits and value added services. In all of these categories, there is at least one private concessionaire involved in providing the service. At the end of 1998, the TOT had 2,559,172 subscriber lines and 26,017 staff, i.e. 98 lines per staff member.

The CAT is responsible primarily for providing and regulating the international telecommunications and postal services. Most of the CAT revenue comes from telecommunications, but the work force is primarily engaged in postal services. Almost two-thirds of the CAT staff work in Postal Bureaus. The telecommunications services include the international telephone, data communication, cellular phone, paging, trunk mobile radio, leased circuits, Internet and etc. The concession and joint venture are involved in providing the services.

2.3 Private Sector

Thailand was the first Asean country to open its telecommunications sector to private sector participation. However, according to the policy, the private sectors have been allowed to operate the services by joining the government since the end of decade of 1987 to 1997 to date. Even so, the monopoly under current laws still allows the private sector to operate with a joint operation contract in the Build-Transfer-Operate Concept (BTO) by sharing the revenue with the State and SEs agencies, and also sell stock to the public at very early stages of commercial operation. The concessions are involved many services such as fixed telephones, mobile telephones and other services, i.e. satellite, paging, public cardphone, voice phone, value added services, and etc.

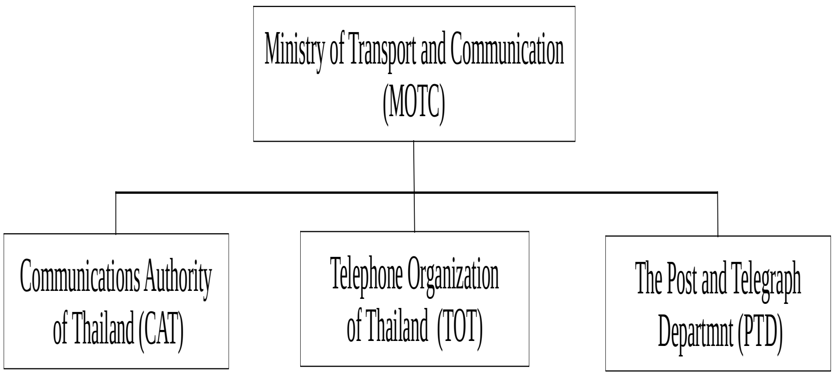


Figure 1 – The structure of telecommunication service industry in Thailand

Table 1 – Concession of telecommunication services in Thailand

Service	Concessionaire	Concession granted by	Term (year)	Contract Singing	Operated year
PSTN 2 M. lines 1 M. lines	TA TT&T	TOT TOT	25 25	1991 1992	1992 1994
Public Card Phone	AIS (Advanced Information System) Lenso Phone Card	TOT CAT	10 15	1990 N.A.	1991 N.A.
Cellular Telephone NMT900, GSM900 AMPS 800B,PCN 1800 PCN 1800 PCN 1800	AIS (Advanced Information Service) TAC WCS Digital Phone	TOT CAT CAT CAT	20 22 22 22	1990 1990\ N.A. N.A.	1990,1994 1991,1994 N.A. N.A.
Paging Packlik Phonelink Page Phone Easy Call World Page Post Tel	Pacific Telesis/Percom Service Shinawatra Paging Hutchison Telecommunications Matrix(Thailand)/ Lenso Paging World Paging Samart Paging	CAT TOT TOT CAT TOT PTD	10/15 15 15 15 15 20	1986/1990 1989 1990 1990 1993 N.A.	1987/1991 1990 1991 1992 1993 1995
VSAT VSAT ISBN TDMA	Samart Telecoms CompuNet Acumen Siam Sat Network World Sat Corp. Acumen Acumen	PTD PTD TOT CAT CAT TOT TOT	15 15 15 15/22 22 15 15	1988 1988 1991 1992 N.A. 1991 1990	1989 1989 1991 1992 N.A. 1991 1991
Trunk Mobile Radio Phone World Radio	Radio Phone TAC	TOT CAT	15 15	1992 1992	1993 1993
Data Communication DataNet	Shinawatra Datacom UCOM (Mobile Data)	TOT CAT	10 20	1989 N.A.	1990 N.A.
Satellite Thai-com	Shinawatra Satellite	MOTC	30	1991	1993
Others Videotex Telepoint(CT2) Directories	Line Technology (Thailand) Fonepoint (Thailand) Shinawatra Directories	TOT TOT TOT	15 10 5	1992 1990 1989	1994 1991 1989
Optical Fiber Network	Comlink (Thailand) Jasmine Submarine Telecommunications	TOT TOT	20 20	1990 1991	1992 1992

Source: TDRI report in August 1997.

Table 2 – Some service of joint-investment project with private sector

Project / Services	Project Proposition	Organization & Joining Proportion
Iridium	Thai Satellite Communication S.E. Asia Iridium	TOT 13%, CAT 10% TOT 10%, CAT 25%
Radio Telephone	Sahaviriya & TA	CAT 33%
Internet	NECTEC KSC Advanced Research Wattachak Loxley Information M-Group Samart Telecom TA UCOM	CAT & TOT CAT CAT (not less than 35%) CAT (not less than 35%) CAT (not less than 35%) CAT (not less than 35%) CAT (not less than 35%) CAT (not less than 35%) CAT (not less than 35%)
EDI	Trade Siam (NECTEC)	Gov. 49%, P.V. 51% with total share of SEs under MOTC 16%
Submarine Optical Fiber Network	Jasmine Submarine Telecommunications	TOT 10%
Satellite Uplink-Downlink	C.S. Communications Loxsat MCOT	CAT 49% CAT 49% under proceeding

Source: TDRI report in August 1997.

3 The present principle laws of telecommunications

The existing principal laws related to the telecommunication services are as follows:

- *The Telegraph and Telephone Act 1934*: It empowers the state, through PTD, to monopolize the provision of all Telegraph and Telephone Services.
- *Telephone Organization of Thailand Act 1954*: TOT was established to replace the PTD in supervising and providing domestic telecommunications services to the public.
- *The Communication Authority of Thailand Act 1976*: CAT was established for supervising and providing international telecommunications and postal services, which were originally under the PTD.
- *Radio-communication Act 1955*: It gives the PTD responsibility in the management and allocation of radio frequencies.
- *The Postal Act 1934*: Postal Services Management.
- *Radio Broadcast and Television Broadcast Act 1955, amended in 1959, 1979 and 1987:* Radio & Television Management.

4 Telecommunication development and economic development

Various studies [1], [2], [3], and [4] have investigated the relationships between telecommunication and economic development. The most important conclusion from the statistical analysis established the strongly positive relationship between investment telecommunications and economic development. Before the economic crisis started in 1997, Thailand had the estimated 7.9 telephone lines in service per 100 population at the end of 1997. However, Bangkok, Thailand's capital, had a fairly high 34.36 lines in service per 100 population.

Table 3 – Thailand telephone network and economic growth

	1990	1991	1992	1993	1994	1995	1996	1997	1998
Fixed lined installed									
(1,000)	1,126	1,204	1,360	1,891	2,579	2,948	4,166	4.201	4,340
Bangkok	1,126	1,204	1,354	1,589	1,600	1,598	1,598	1,601	1,740
TOT			6	302	979	1,350	2,568	2,600	2,600
TelecomAsia	559	665	812	1,024	1,584	1,946	2,467	2,707	3,088
Rural areas	559	665	812	957	984	996	1,012	1,207	1,588
TOT				67	600	950	1,455	1,500	1,500
TT&T									
Total	1,685	1,869	2,172	2,915	4,163	4,894	6,633	6,908	7,428
Lines in service (1,000)									
Bangkok	901	1,044	1,159	1,464	1,841	2,214	2,561	2,748	2,769
TOT	901	1,044	1,159	1,383	1,511	1,531	1,528	1,502	1,459
TelecomAsia				81	330	683	933	1,246	1,310
Rural areas	424	509	631	807	1,110	1,382	1,737	2078	2,266
TOT	424	509	631	802	930	949	959	997	1,099
TT&T				5	180	433	778	1,081	1,167
Total	1,325	1,553	1,790	2,271	2,951	3,596	4,200	4,826	5,035
Lines in service									
per 100 population									
Bangkok	12.1	13.7	15.2	18.8	19.8	23.7	26.63	34.36	34.57
Rural areas	0.9	1.0	1.3	1.6	2.0	2.6	3.42	3.95	4.25
Total	2.5	2.7	3.1	3.9	4.6	5.9	7.0	7.9	8.2
Economic Growth	11.2%	8.5%	8.1%	8.3%	8.7%	8.6%	5.5%	– 0.4%	–7.8%

Source: Nomura Research Institute, from annual reports, NESDB.

Economic Development is a process whereby an economy's real national income increases over a long period of time. And, if the rate of development is greater than the rate of population growth, then per capita real income will be increase. [5] As the Thailand Country Report presented clearly that the significant structural change in Thai economy has taken place through out the past decade. In 1988, the economy accelerated into the highest GDP increasing by 13.3% in East Asia and during the first 5 years of the 90's (1991-1995) the growth rate of GDP was also considerably high in and average of 8.4 per cent. During the 5th and 6th National Economic and Social Development Plan (1982-1991) the government used a development policy designed to utilize the potential of each region to open up new economic areas in the country. This created revenue for the country and expanded development. Infrastructure development during this time changed somewhat, as the private sector became more involved in the development process. Consequently, more private involvement was sought to alleviate the states' investment burden and increase not only service quantity, but also quality.

Thailand's economic situation during the 7th National Economic and Social Development Plan (1992-1996) was very satisfactory, with a steady high growth rate. But existing basic infrastructures e.g. telephone system, still could not satisfy demand generated by the economic growth. As the need for infrastructure development investment grew, the practice whereby project funding was acquired through loans became a huge burden for the state; the private sector played an increasingly important role, as it was able to finance project better than the state. The Plan called for speeding up the implementation of telecommunication projects and reduction of monopoly power of public agencies and the encouragement of the private sector involvement in the industry. Presently, the private sector is involved in many telecommunications projects as the state slowly deconcentrates its monopoly in telecommunication business. The telecommunications systems have been privatized e.g. basic telephone project (3 million numbers and additional 1.1 million numbers) in the form of BTO (Build Transfer Operate), mobile telephone project, and other value added service projects. The Plan encourages private sectors involvement in the telecommunication industry through one or combinations of these mechanisms: private sector operation of services, joint ventures between the state enterprises and private companies, subcontracting, and selling some or all of the government's shares in the SEs.

The 8th plan (1997-2001) was established with the aim for making Thailand a regional hub for telecommunications by developing telecommunications and information technology systems. The Plan calls for the Mega projects of infrastructure and to speed up many telecommunication projects. The Plan encourages the use of the liberalization policy in development process of telecommunications and information technology system, setting up an independent national mechanism, which is able to regulate the operation of telecommunication businesses, and improving the quality and increasing investment of the postal service. Moreover, the telephone lines growth forecast from the year 1997 to 2020 points out that there is a good opportunity for new operators.

5 Privatization in Thailand

5.1 Rationale for Privatization

There are basically three reasons why the Thai Government decided to privatize the TOT and CAT. The first and main reason is certainly to eliminate the telecommunications monopoly and to prepare the telecommunications industry for liberalization. Secondly, the privatization of the organizations will enable them to conduct their own businesses more efficiently. As a result, the TOT and CAT will be in a strong position to compete with other private operators, both within the country and the region. Moreover, the efficiency of the organizations will lead to better services for their customers. The third reason is that the Thai Government is now faced with fiscal constraints and is trying to liquidate some of its assets. Selling part of the TOT and CAT to potential investors is expected to draw a significant amount of money to the Government. Thailand realizes that the demand for telecommunication services is increasing rapidly, and also the rapid change in technology. There are various forms of privatization [6] gradating of different techniques for private sector participation, ranging from subcontracting, all the way to divestiture and Thai government had started the privatization by BTO technique in telecom sector since early 1990s. The present laws relating to telecommunications need to be revised. The amendment of the laws is under way in order to cope with national policy and the future growth of telecommunications. Needless to say, it is an urgent issue revising the law concern to make ways for the privatization and liberalization.

In order to ensure that a liberal market in the telecommunication business takes place in Thailand as prescribed in the 7th National Economic and Social Development Plan, was said that monopolization must, therefore, develop into a liberalization of world telecommunication services emanating from the GATTS agreement with WTO. Lately, due to the economic crisis in Asia, Thailand has many creditors including IMF. The government has carried high NPLs and other burdens, and realized that the participation of private sector has given a lot of benefits to the people such as TA and TT&T has helped TOT to serve the demand of fixed telephone subscription quickly. Thai State Enterprises in telecommunications sector will certainly privatize in principle based on the implementation of the National Telecommunication Development Master Plan approved by the Cabinet on November 4, 1997.

5.2 The Master Plans

The N ational Telecommunication Development Master Plan

Thailand has drafted three master plans for telecommunication development since 1995. The Cabinet approved the latest Master Plan on November 4, 1997, opened for Internal Competition in October 1999 and for Full Competition in 2006 as committed to WTO.

The Ministry of Transportation and Communications has drawn up the Telecommunication Development Master Plan with the purposes to set out guidelines for the privatization of the TOT and CAT, to establish a regulatory body, to liberalize the telecommunications industry, and to identify various major components of telecommunication development. The plan also provides specific dates for the implementation of these activities. The main policies of telecommunication development are adopted as follows:

- Policy on the liberalization by canceling the monopoly.
- Policy on the increasing private participation.
- Policy on the roles separation of independent regulator and service providers.
- Policy on the privatization of TOT and CAT.

Table 4 – Prospective growth of Thai telecommunications (in local telephone line)

Year (AD)	Approx. Populations (Millions)	Approximate Line Capacity (Millions)		
1997	60.0	6.7		
1998	60.6	7.5		
2001	62.4	8.93 (6% an.);	9.19 (7% an.);	10.2 (8% an.);
2006	65.6	11.95 (6% an.);	12.89 (7% an.);	14.99 (8% an.);
2011	68.9	16.00 (6% an.);	18.08 (7% an.);	22.03 (8% an.);
2016	72.5	21.41 (6% an.);	24.42 (7% an.);	32.34 (8% an.);
2020	75.4	27.03 (6% an.);	32.00 (7% an.);	44.00 (8% an.);
Note – Population Growth at about 1% annually.		Note – Annual growth at 6, 7, 8% is assumed. – Line capacity shown at about 5 year periods.		

Source: Min. of transport and communications, Thailand: March 20th, 1997.

- Policy to separate postal services from telecommunication services.
- Policy on consumer protection.
- Policy on research and development and industrial development.
- Policy on personal development.
- Policy on supporting information technology, computer technology, and multimedia.
- Policy on law revision.
- Policy on pricing structure.
- Policy on regional center.

The Master Plan for State Enterprise Sector Reform

Unfortunately, the schedule has been delayed since the government dedicated most of its effort to solve the country’s financial problems. However, on 1 September 1998 the government, providing a new time frame for all activities needed for the privatization of the two enterprises and the liberalization of the telecommunications sector issued another plan. This new plan, known as the Master Plan for State Enterprise Sector Reform, specifies not only the framework and guidelines for the reform of the TOT and CAT, but also for the reform of other state-owned enterprises in various sectors.

5.3 Process

The key issues set forth in the National Telecommunications Development Master Plan and the Master Plan for State Enterprise Sector Reform can be summarized as follows:

Liberalization

Liberalization of the industry is expected to be implemented concurrently with the privatization of the TOT and CAT. While full privatization is expected by the end of 2001, full liberalization of the market is not expected until 2006, in line with Thailand's recent commitment to the World Trade Organization. The policies on liberalization, separation roles of regulator and operators, and the privatization of TOT and CAT would be the prior components in importance to the functional. According to the Master Plan for Telecommunication Development, its significant principle is to liberalize telecommunications industry. The guidelines and measures therein are as follows:

1) Step by step liberalization approach.

2) Liberalization of domestic telecommunications at first.

3) Liberalization of telecommunications according to WTO commitments in the year 2006.

Shifting from a monopoly to free competition and to liberalization involves several processes and tasks, particularly the amending of relevant laws, which will take time. In the period before the laws are practically amended, it is necessary to prepare approaches, which may need to be carried out to prevent the shortage of telecommunication service. The necessary measures for the pre-liberalization period are the expansion of basic telephones and rural public telephones, the improvement of competition in the mobile telephone service, the increasing competition in other telecommunication services, and the conversion of concession contracts between MOTC, PTD, TOT, CAT and private firms.

Conversion of BTO Concessions into BOO Licenses

The Existing BTO (Build-Transfer-Operate) contracts that TOT and CAT have made with the private sector under revenue sharing scheme for 15 to 30 year concession, might be converted into BOO (Build-Own-Operate) licenses as follows:

1) Evaluate the expected revenue from the revenue-sharing scheme and convert it into NPV (Net Present Value).
2) The NPV will be used for:
    a) Reduction of tariffs.
    b) Set up a fund for telecoms human resources development.
    c) Set up a fund for research and development and for promotion of the telecoms manufacturing industry.
    d) Convert into shares of the Government.

To this end the MOTC had commissioned a consultant to advise on how best to go about the concession conversion to ensure fairness to all parties concerned and its report had been already submitted to the cabinet. In order to find the best solution that will be fitted with the Master Plan for State Enterprise Sector Reform, the MOF has been taking the responsibility in concluding the appropriated conversion method with a hired consultant, TDRI. The study report of TDRI is expected before the end of August 1999.

Laws

Consequently, it is necessary to prepare measures for the liberalization and privatization effectively. The most important of measures of liberalization is to amend the related laws by elaborating some draft amendments and draft Acts which are:

- Draft Act to repeal Telegraph and Telephone Act 1934: to abolish monopoly right.
- Draft Act to repeal Telephone Organization of Thailand Act 1954
- Draft Act to repeal the Communications Authority of Thailand Act 1976
- Draft Amendment to Postal Services Act.1934: to establish a new state enterprise to operate postal services.
- Drat Amendment the Radiocommunication 1955: to transfer the authority exercised by the Director General of PTD to the new Independent Regulatory and its secretariat office respectively.
- Drafting the Act to establish the new Independent Regulatory Body (ies): to assign radio frequencies and to supervise and regulate radio and television broadcasting and telecommunications activities for the benefit of the public.
- The Corporatization Act: The MOF has drafted an Act to be the guideline for privatization of every state enterprise. The Parliament has recently passed the Corporatization Act and now it enters into force. Currently, the Act is under review by the Constitutional Court to determine whether it conflicts with the National Constitution.
- Drafting New Public Telecommunications Act
- Drafting and revision of related laws e.g. Criminal Code Laws, and Civil and Commercial Code Laws.

Categories of Telecommunications Carriers

The liberalization of telecommunication in Thailand will provide opportunities to local and foreign private sector to apply for licenses to operate telecommunication services as the joint venture with the local Thai companies. The foreign companies may enter into the telecommunications business in Thailand after the year 2006 without joint venture with the local firms. There are three types of providers categorized and qualified for liberalization as follows:

Type 1 Service providers are those who lease communication lines or circuits from Type II Network providers and resell them to customers in the form of retail sale.

Type 2 Network providers provide telecommunication services through own telecommunications circuits and facilities on a wholesale basis.

Type 3 Service and network providers are large-scale including both wholesale and retail sales.

Categories of Telecommunications Services

In the approved Telecommunication Master Plan, telecommunication services are classified into four categories. They are:

1) Basic service.
2) Value-added services.
3) Information technology.
4) Multimedia.

5.4 Independent Regulator

Establishment of the Independent Regulator will ensure that the promotion of competition in telecommunication business will be on the free and fair basis. According to the Cabinet decision on June 23, 1998, two independent regulatory bodies will be established i.e. the National Broadcasting Commission (NBC) and the National Communication Commission (NCC). Pursuant to the provisions in Section 40 of the current Constitution stipulating that the independent regulatory body is to assign frequencies for the benefit of the public and to supervise and regulate radio and television broadcasting and telecommunication activities.

There are various groups that have analyzed the directives regarding the establishment of Independent Regulator along with the provisions in Section 40 of Constitution. Lately, on April 7, 1999 the House Representative unanimously approved a Draft Act to establish a new Independent Regulatory Body that is independent and consistent with Section 40 of Constitution that shall be a single organization covering different operations conforming. The Independent Regulator is called the National Communications Resources Management Commission (NCRMC).

Authorities

The National Communications Resources Management Commission (NCRMC) is an independent organization of the government to allocate frequencies and supervise broadcasting radio, television and telecommunications in national communication for public interest and the implementation that is to the maximum benefit to people. The Commissions two main responsibilities are as follows:

1) Allocation of all frequencies throughout the country.
2) Regulation of the broadcast radio, television and telecommunications operations ased on any types of frequency and technology.

The mechanism in utilizing the regulating authority is broken into two levels. The NCRMC and on two specialist sub-commissions: ac hoc committee on telecommunications and ac hoc committee on broadcast radio and television appointed by NCRMC.

Structure and qualifications

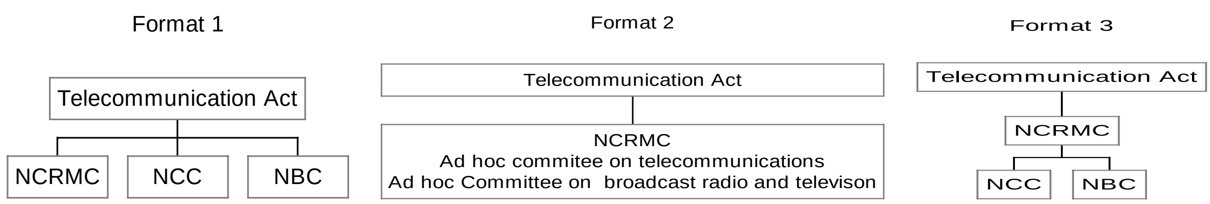
The National Communications Resources Management Commission (NCRMC) will have a seven-year term and consist of 15 members, one President and 14 members to be appointed by the King on the recommendation of the senate and recruiting committee.

Ad hoc committee on telecommunications will consist of five members: one chairman and four committee members who are the specialists in telecommunications.

Ad hoc committee on broadcast radio and television will consist of five members, one chairman and four committee members who are specialists in broadcast radio and television.

For specific qualifications and prohibited characters other than general features which will make the operation independent without being dominated politically and commercially, which is compatible with independent organizations envisaged by the constitution. Other qualifications included are that individuals are to be knowledgeable in frequency operations and broadcast radio, television and telecommunication. Appropriate individuals are described as follows:

1) Academics on mass communications or telecommunications
2) Experienced persons involved in broadcast radio, television and telecommunication operations.
3) Knowledgeable or specialized persons in general fields that are useful in overseeing public benefits and protection thereof.
4) Persons with specific knowledge of regulations regarding the supervision of broadcast radio, television or telecommunications.



Source: Tharnsettakit newspaper on May 14-16, 1999.

Figure 2 – Structure of independent regulatory agency

Duties

In regulating the broadcasting of radio, television and telecommunications operations, the commission is empowered to specify criteria and procedures in the licensing, terms of operation, standardization, interconnection, protection and responsibilities of officers, consumer protection, operation protection and rights, tariff, and other concerning matters.

5.5 Privatization of TOT and CAT

TOT and CAT have started privatization program and advising of future direction since 1992 and 1993 respectively by hiring the consulting groups to make the feasibility studies of their privatization, and the cabinet approved both TOT and CAT privatization program and the Telecommunication Development Master Plan on November 4, 1997. There are two possible ways to privatize the telecommunication state enterprises in Thailand. The first way carrying over the National Telecommunication Development Master Plan will be done by the Public Telecommunication Act that has not yet passed the approval. The second way under the Master Plan for State Enterprise Sector Reform will be proceeded by the Corporatization Act 1999. Recently, TOT and CAT have proposed their Privatization Plan that was approved by the cabinet to MOTC in order to proceeding the Corporatization Act 1999.

The Master Plan for State Enterprise Sector Reform states that the privatization of the new TOT Company and CAT Company will commence in the third quarter of 1999 and will be completed within the year 2000. According to the Telecommunication Development Master Plan, after the amendment, abrogation and enactment of involved laws: the Telegraph and Telephone Act 1934, the Telephone Organization of Thailand Act 1954, the Communications Authority of Thailand Act 1976, the Post Act 1934 and the Act to establishment of Independent Regulatory body are placed, the transformation of TOT and CAT will be carried out in phases as follows.

Phase 1 – Transition from State-owned Enterprise to Corporatization

Establishing the Holding Company wholly shared by MOF to own the TOT and CAT who will then be corporatized into three limited companies: TOT Co., Ltd., CAT Telecoms Co., Ltd., and CAT Postal Co., Ltd. These limited companies will be 100% owned by the Holding Company as show in Figure 3.

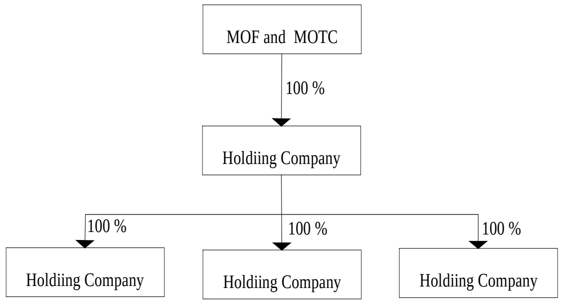


Figure 3 – Phase 1 of transformation of TOT and CAT

Phase 2 – Transition from corporatization to Company Limited

As soon as the Independent Regulator is established and the new *Telecommunication Act* is promulgated, TOT Co., Ltd. and CAT Telecom. Co., Ltd. shall seek their strategic partners by invitation of interested parties to apply under the TOR for international bidding with transparent covenants and fairness. The specifications of the required strategic partners are expertise, technologies and proceeds that could lead the privatized companies into the global market competition successfully. The private placement is planned to start within six to twelve months after the strategic partner has been selected. The shares of these two limited companies will be distributed as follows:

1) Holding Company shared by MOF < 50%.
2) Strategic partner < 25%.
3) Private placement < 22%.
4) (Not more than 5% each).
5) Existing staff > 3%.

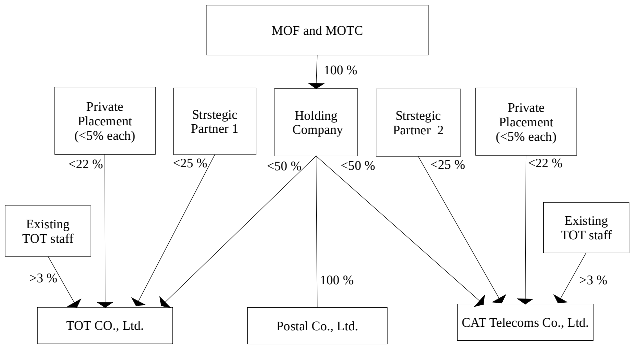


Figure 4 – Phase 2 of transformation of TOT and CAT

Phase 3 – Transition from Company Limited to Public Company Limited

TOT Co., Ltd. and CAT Telecoms Co., Ltd. will be transformed into public companies. The shares are to be offered to the public through the stock exchange, this will not amount to less than one third of the total number of shares in each company. Subsidiary companies can then be established for appropriate lines of activities as shown in figure c. The shares will be distributed as follows:

1) Holding Company shared by MOF > 30%.
2) Employee > 4%.
3) Strategic partner < 25%.
4) Public and Private placement Remaining.

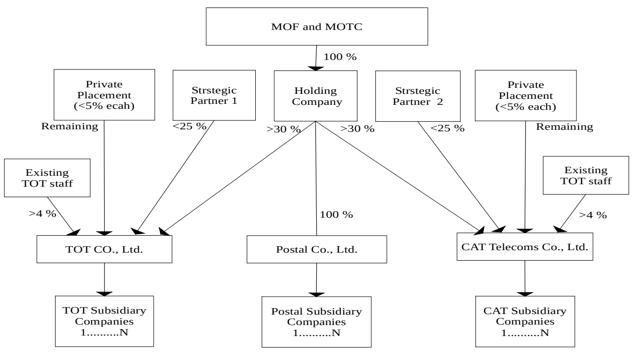


Figure 5 – Phase 3 of transformation of TOT and CAT

CAT Postal Co., Ltd. will operate such postal business as CAT is currently operating and be regulated by PTD. The amendment of the Post Act 1934 will be done appropriately. The government will wholly own the CAT Postal Co., Ltd. until it will be transformed into a private limited company in due course.

As part of the privatization process, it is necessary to evaluate the telecommunication facilities value/ assets of TOT and CAT. These asset evaluations have been carried out by both state enterprises, with the assistance of some outside consultants.

6 Expectation of changes

A Financial change

TOT and CAT's revenue has traditionally come from telephone services: local, long distance and international services. Until recently, their revenues have come from its telephone services and BTO contracts. Under state enterprise status, they have generated high annual income from the government and have been exempted from various taxes such as income, local, enterprise and fixed asset taxes and the government and treasury has held the guarantee, loan and investment. Both TOT and CAT have made very high payments to the treasury annually. After privatization debt will be the syndicated loan and supplier credit and the equities will come from the government fund, management buyout, strategic partners, private placement, employee stock ownership plan, and initial public offering (IPO).

TOT has prepared the strong financial performance change project in the short, medium, and long term. Its scope of work is to improve financial management and planning processes to be world class, to improve accounting processes particularly cost accounting processes to be world class, and deploying new IT tools to enhance performance of the finance function. After privatization, the TOT and CAT private firms, as joint-stock companies can carry out daily business activities independently and will be granted increased independence in raising and managing investment funds. Funds from foreign direct investment by strategic partners, sharing of private placement investors and shareholding by both private Thais and foreigners will take place shares in the Stock Exchange of Thailand will be utilized for telecommunication investment competitively. We expect that the privatization methodology that the government is taking will meet capital investment requirements and can decrease the government's financial burden, allow private sector's involvement and enjoy more innovative sources of financing. The operation income in the future will be challenged to target in the liberalized market.

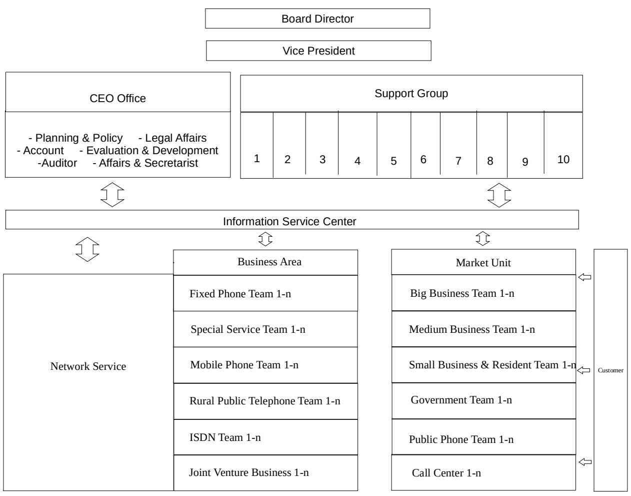
B Organizational Change

According to the Telecommunication Master Plan, the new telecom market may be split into network and service providers. Transition from a state owned enterprise to corporatization and privatization requires change in many aspects. TOT and CAT organizational changes are not directly related to the telecommunication reform laws. The studies of TOT and CAT reorganization have been made at their headquarters and their reorganization plans will soon be announced. TOT

6.1 Schedule for Liberalization and Privatization

Liberalization	Abolish Monopoly (Amendment Laws Concerned)	October 1999
	Establishment of Independent Regulator (NCC)	October 1999
	Rules & Regulations for Competition Preparation	October 1999
	Rules & Regulations for Competition Announcement	March 2000
	Open for Competition	March 2000
	Open for Full Competition	January 2006
Privatization	Amendment of TOT and CAT Acts	October 1999
	Registration for Holding Company	October 1999
	Registration for TOT Company CAT Company Postal Company	October 1999 October 1999 October 1999
	Strategic Partner Seeking	Jun. 1999-March 2000
	Private Placement	March 2000
	Employee Stocks Distribution	March 2000
	Public Placement	After April 2000
	Registration for TOT Public Company CAT Public Company	After April 2000 After April 2000

has adopted a functional structure, with the recent change in its structure occurring in 1996 dividing its functions into: staff, core and support functions (total 39 departments). After the privatization, TOT Co., Ltd. will have many changes in its new organization structure (see figure) as proposed by its consultant firm.



Source: TOT, transformation section, July 1998

Figure 6 – New organization structure of TOT Co., Ltd.

C Market Structure Change

In the past, all telecommunication services were offered directly by State Enterprises. The role of the private sector was limited to supplying equipment and services to these SEs. Since 1986, the TOT and CAT have been offering concessions to the private sector to operate telecommunications services. Today, the Telecommunication Master Plan has specified the roles of the players at the different levels of telecommunication activities. In order to enhance telephone penetration, promote new investments, reduce prices, and improve services, the government must change the structure of the telecommunications industry and its regulatory body. After the privatization of TOT and CAT, the independent regulator must specify clearly how many operators there will be for fixed line services, cellular, international phone services, etc. that would be appropriate for the competition in Thailand. The market structure of the telecommunications business after privatization will change as shown in Table 5.

D Performance Change

The service scope of the State and SEs will change surely after the privatization. PTD will be transformed to be the Secretariat Office of NCC, the independent regulatory body, according to the cabinet's resolution on November 4, 1997. Their performances will be change based on the privatization program and their service scopes shown in Table 6.

Table 5 – Market structure of telecommunication businesses

	Pre-Privatization		**Post-Privatization**	
Policy Maker	MOTC NFMB NESDB MOF	– Transport, Telecommunications, Postal Policy – Radio Spectrum Management Policy – National Economic & Social Development Policy – State Enterprises (including TOT and CAT) Policy	Parliament Cabinet MOTC MOF NESDB	– Enacting the laws – Issuing the policies
Regulator	PTD TOT CAT	– Radiocommunications and Spectrum Management – Regulating Fixed & Mobile Services Agreements – Regulating Fixed & Mobile Services Agreements	NCC PTD	– Issuing the rules to regulate the operator – Licensing – Consumer Protection * PTD: Regulating the Postal Business only
Operator	TOT CAT Private Companies & Concessionaires	– Domestic & Mobile Services – International & Mobile & Postal Services – Provide Fixed, Mobile Phones, Paging, VSAT, Internet, etc.	TOT Group companies CAT Group companies Private companies	Operating Services Operating Network Operating Services and Network Research and Development Industry Development Human Development
User	Consumer	People	Consumer	People, User Group (Club, Association, Foundation)

NESDB National Economic and Social Development Board.
NCC National Communication Commission.
Private Companies & Concessionaires: Shin, UCOM, Samart, TA, TT&T, etc.

Table 6 – Comparisons: Pre- and Post- telecommunication privatization

Items	**Pre-**	**Post-**
PERFORMANCE		
• Ownership and shares	– Fully owned by the government	– Fully owned by the government for the ti me being – Foreigner allowed to own TOT and CAT stock – The government will be obliged to own one-third or more of total TOT and CAT stocks issued
• Taxes	– Exempted from various taxes, including income, local, enterprise and fixed asset taxes – Special Payment to the National Treasury	– As a general rule, taxes are imposed as for other private companies including the payment for social insurance fee and usage charges
• Assets	– Government assets	– Inherited from the old TOT and CAT
• Capital	– Decided by the Cabinet	– Decided by Board and shareholders
• Budget and Financing	– Controlled by the Cabinet, Government guarantee, treasury loan and investment	– Controlled by Board, no government guarantee and no treasury loans or investment
• Appointment and dismissal	– Board of Director and President appointed by the Cabinet	– Executive Officers and Auditors require approval from Board

Table 6 – Comparisons: Pre- and Post- telecommunication privatization *(end)*

Items	Pre-	Post-
PERFORMANCE		
• Licensing	– MOTC, PTD, TOT, CAT can all grant concession – PTD allocates the frequencies used in wireless communications	– NCC can grant the licenses
• Rate Regulation	– Proposed by organizations, approved by the Cabinet	– Approved by Board Members
• Technical & Service Standard Enforcement	– Organizations regulate themselves and their concessionaires	– Enforce by Executives
• Pension	– Approved by Cabinet	– Decided by TOT Administration, approved by Board and partially Regulator
• Management Form	– State Enterprise	– Company Limited, Public Company Limited
• Major Laws Applicable	Telephone Organization of Thailand Act 1954 The Communications Authority of Thailand Act 1976	New Public Telecommunication Act
MARKET STRUCTURE		
• Business Scope	1) TOT – Domestic telecommunications services – Telecom-related business 2) CAT – International telecommunications services 3) Private Sector – Under concession with TOT and CAT	1) TOT Co. – Domestic telecommunications services 2) CAT Co. – International telecommunications Service 3) Private Sector
• Competition	– Monopoly by TOT and CAT in the field of public telecommunications	– Competition in every field of telecommunications
• Structure	1) Policy Maker: MOTC, NESDB 2) Regulator: MOTC, PTD, TOT, CAT (Non-independence) 3) Operator: TOT, CAT, Concessionaire 4) User	1) Policy Maker: MOTC 2) Regulator: NCC, PTD (Independence) 3) Operator: TOT Co., CAT Co., Private firms 4) User: people and user group i.e. User Club
• Operator types	– Various types without categories	– Three main categories: 1) Type I Service Provider 2) Type II Network Provider 3) Type III Service and Network Provider
• Services types	– Various types without categories	– Four main categories: 1) Basic Services 2) Value Added Service 3) Information Technology 4) Multimedia
• Organization	– Profit oriented organization – Functional structure	Customer oriented organization Facility based market structure

7 Privatization of overseas carriers

Nippon Telegraph and Telephone Corporation (NTT)

The first privatization of NTT Corporation, a Japanese Telecommunication firm was on April 1, 1985. Its capital amounts to $7,800M and their total assets are $111,100M. The number of employee is 185,500, group companies are 132, stocks are 15.9M and shareholders are 1.6M. Their operating revenues are $62,300M and net income is $3,300M as of March 31, 1996. The productivity of telephone services is 60.7M per 120M population. Characteristics of privatization in 1985 was the simultaneous introduction of privatization and competition, the introduction of telecommunications business law-regulatory framework of Japan's telecom industry, and the introduction of NTT Corporation Law-shifting to joint-stock company and regulation on management. In the regulation of ownership the government retains more than one-third of NTT shares; foreign ownership not allowed (revised in August '92). NTT is obligated to provide universal services and the government ministry works as regulator. The background of privatization is the accomplishment of two major goals that are the reduction of waiting time for telephone installation and the establishment of nationwide automatic direct dialing. The necessity to improve managerial efficiency caused by the problems of the public corporation system (desire of NTT for being free from government regulations), budget system approved by Diet, limitations on business areas and investment, restrictions on fund raising and management, and extraordinary national treasury payment. The government needed to reduce the government's financial deficits, to improve NTTPC's management efficiency. The objectives of privatization are:

1) moving towards administrative reforms within Japan,
2) to meet increasingly diversified user needs,
3) to streamline management,
4) technological innovations eliminate rationale for natural monopoly and,
5) break-up of AT&T in US, and introduction of competition and privatization in UK.

Background of introduction of competition:

- customer's expectation: reduction of long distance & international charges and selection among diversified telecommunication,
- desire of potential competitors: profitable prospects in telecommunication industry and development of telecommunication technologies, and
- worldwide trend: reorganization of AT&T (1983) and introduction of competition and privatization in UK (1984).

The effects of privatization on the government finances restructured are with the proceeds of share sales, substantial employment reductions without layoffs, increased productivity, non-operating income improved by diversifying fund raising and operations, business diversification promoted, service quality improved, and rates reduced mainly in long distance charges. The effects on customer are the reduction of telephone rates mainly in long-distance charges ('85 = Y400/3 min. => '93 = 180/3 min. => '98 Y90/3 min.), diversification on service menu i.e. toll free, volume discount, telephone vote, phone number indication etc., improvement of service quality, and telephone installation within tree days. The effect on government is raising funds through NTT's share placement: US$78.5bn., 34.49% of shares. The effects on the telecom industry are the increasing of telecom carriers, enlargement of employment in telecommunications industry, and competition introduced into the telecommunications market. Effects on NTT are:

1) increased productivity: number of subscribers per employee increased, sales per employee increased, and total capital/profit ratio increased,
2) expansion of business fields through establishment of affiliates: sales of group companies increased, and number of group companies and companies total increased,
3) reduction of employment without layoffs: during ten years after privatization, employment has been reduced by 115,000 persons, or 38%, and
4) discretionary salary scale [7], [8].

The second change of NTT reorganization was started on July 1, 1999. NTT's business activities are officially transferred to the following wholly owned companies: NTT East Corporation, NTT West Corporation and NTT Communications Corporation. We can call it is NTT's global business expansion toward its reorganization [9].

British Telecom (BT)

In telecommunications, the United Kingdom has been a pioneer effort to privatize a public authority. The privatization of British Telecom

(BT) in 1984 was a flagship project for the Thatcher government's program of free market economic reform. BT has a legal monopoly on telecommunication services until the British Telecommunication Act of 1981 established it as a corporation separate from the General Post Office. The significance was set in precedents for future U.K. infrastructure privatization, including use of public flotation, creation of a golden share, establishment of a regulatory framework, development of the price cap formula and etc. The competition was introduced by opening the markets for consumer equipment and cellular services to new provider in 1981. Also in 1984, the Office of Telecommunications (OFTEL) was created as an independent regulatory body and headed by a powerful director general for telecommunications with authority to enforce and amend rules, etc. In 1984, Telecom was privatized through the sale of 51% of shares in the domestic and foreign market. A duopoly was set up in basic fixed-link telecommunications area between Telecom and a new operator, Mercury Communications Ltd. By 1992, the British telecommunications market has been transformed into one of the most dynamic in the world. More than 2 million-telephone lines have been added and over 90% of households now have telephone services. About 150 telecommunications licenses have now been granted and BT faces competitors in all segments of the telecommunication market. The strategies of combination of increasing competition and the regulator, telecommunication prices have fallen by over 30% in the real terms, at the same time BT's revenues have increased by 10% per annum against an inflation rate since 1984 [10], [11], [12]

8 Concluding remarks

It is hoped that the privatization of telecommunications state enterprises in Thailand will be a successful transaction. The decision of privatization by bringing the expertise, technologies, and proceeds of foreign telecommunication carrier into the country as a strategic partner and establishing the Independent Regulator would be the best way of preparing newly privatized companies to become more efficient and strong enough to exist in the global competitive environment. As mentioned earlier, the parties concerned (i.e. MOTC, MOF, NESDB, etc.) have planned and implemented the liberalization and privatization program as defined in two master plans: the National Telecommunications Development Master Plan and the Master Plan for State Enterprise Sector Reform, actively and properly. Enhancing of the development of telecommunications and fostering the economic development of the country will contribute to the privatization. There are various scenarios through which privatization can create the government benefits, public interest and economic development.

Advantage to the government revenues

While the government finances under TOT and CAT have included revenues via treasury remittances, taxes, and public dues, these revenues will shift to sale proceeds, tax revenues and dividend payments after privatization. Proceeds from the sharing of foreign strategic partners and future stock placements are expected to be allocated to national bond redemption and/or incorporated into special industrial-investment accounts used for various investments and loans. Government expenditures can be curbed through saving the administration costs and the subsidies, if any, to the related state enterprises. The privatization of TOT and CAT will not only will limit government size, and subsequently, its expenditures, but also will have positive fiscal impact on the government budget through generated revenues or saved subsidies.

Advantage to public interest

Operators: Once the Thai telecommunications industry is opened up to competition by the abolishment of monopoly, establishment of the Independent Regulator and restructuring of the market, it will be quite natural for competitors to enter into the most profitable areas in the most efficient and effective ways. Therefore, the new TOT and CAT companies must compete with any other Type I, II, III telecommunications providers that enter. In order to cope with such a competitive environment, new TOT and CAT companies must make every effort to become more responsive to opportunity and customer needs. For example, it must modify its tariff structure, taking into account demand trends and its financial position.

Users: Competition is the most important mechanism for maximizing consumer benefits and for limiting the adverse effects of monopoly. With the introduction of competition in the telecommunications industry, people will be able to choose the telecommunications service that best meets their communications needs. Competition may also reduce telecommunications rates and charges, the user may consume telecommunications services with lower prices and higher quality. It is believed that the privatization of TOT and CAT, will make them more responsive to opportunities and customers needs

Investors: What do the investors want to hear from the country policies and government plan for liberalization and privatization of the telecommunication industry? If issues have been defined clearly, it will ensure the successful reception of investors. Those issues are the number of successor companies, their assets and liabilities, their intended scope of business, structure of industry in which they will operate, the future level of government shareholding, and its influence over the direction of the company have been defined. It is the interest to investors of privatized companies.

Advantage to the Economic Development

The restructuring of the telecommunication market to a competitive one is a necessity for the country and a principled policy of government to restructure to rely not only on the privatization but also on competition. The social benefit of competition is a result of the idea of economist Joseph Shumpeter, to keep firms innovative and responsive to consumer demands. In Shumpeter's words, what really counts is:

"the competition from the new commodity, the new technology, the new source of supply, the new type of organization… competition which commands a decisive cost or quality advantage and which strikes not at the margins of the profits and outputs of the existing firms but at their foundations and their very lives." [13]

Economic Development is a goal of virtually every government and national economy. To determine if economic development is taking place, measures that indicate progress are required. Widely used measures include economic growth, increases in GNP and/or per capita GNP, increases in national income, literacy rates and more. After privatization, fund raising from the sharing of strategic partners and stock placement will increase national income. The current account deficit is one of major economic problems in Thailand, the privatization of telecommunication sector is expected to contribute positively to this problem by improving economic productivity and enhancing the performance of the telecommunications industry. It will reduce the existing external debt in the short run, and eliminate or at least mitigate trade barriers and widen the degree of openness. All in all, the most important aspect of the privatization program in Thailand is to abolish the monopoly of SEs, to restructure the telecommunication industry by the supervision of the new National Independent Regulator which both aims to enhance competition by various operators and investors in Thailand.

Recommendations

The mission of privatization program will take its course, but there are several critical issues that need to be resolved in order to build up optimal conditions for the transaction. These issues are the independence of the regulatory board, concessions, post-privatization status, scope of services, liberalization of the telecommunications industry, governance and control issues, and interconnection charge and tariff structures. The independence of the regulator: must identify the measures to establish a true independent regulatory body without interference of politics and government. The concessions: methods and timing of concession conversion must be finalized prior to the privatization. The post-privatization status of TOT and CAT: must be identified in term of how long and at what level the monopoly status of TOT and CAT will be protected following the privatization. The scope of services: the value and future growth of TOT Co., Ltd. and CAT Telecom Co., Ltd. depends on the diversification of services in which it is allowed to operate. In the liberalization of the telecommunications industry, there is uncertainty regarding the regulations of the liberalization. Guidelines on type and number of competitors to be allowed to enter the market must be provided. Competitive safeguards to prevent large operators from dominating the market should be addressed. The governance and control issue should include veto power for the management and strategic partners, board, and management representation for the government and strategic partners, method of preventing deadlock, etc. The interconnection charge and tariff structures, the basic terms for revenue sharing among domestic operators, must be established. Unless these issues are clarified, there may be a limited number of potential investors that show the interest in the TOT Co., Ltd. and CAT Telecom Co., Ltd.

Telecommunications facilities are crucial for economic development. Among the various types of telecommunications services available, the basic telephone service is the most widely used tool in the era of the information society. Telecommunications has ever been growing rapidly in Thailand because impressive economic growth here has led to big investments recently in infrastructure development with telecommunications being a key area. With the prepared program of government for privatization, liberalization to cope with those telecom and economic developments will improve the telecommunication and economic growth respectively. As confirmed by Mr.Sethaporn Cusripituck, Director General of Post and Telegraph Department, who states that on the road to the privatization of TOT and CAT and liberalization in the telecommunications industry, bright and promising opportunities for new comers can be seen. Fair games will assure benefits to all: government, regulator, present operator, investor, new comers and users.

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Biography

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- Chairman, Sub-committee on Information Technology and Telecommunications The House Committee on Science and Technology, Parliament of Thailand.

PALEXPO **DEV.6**

Thursday, 14 October 1999	09:00 - 12:30

Dev.6	Internet Governance: Technical and Policy Perspective

Chairperson:	**Mrs. Laina Raveendran GREENE,** *Chief Executive Officer,* GetIT (Singapore)
Introductory Remarks	**Mr. Houlin ZHAO,** *Director,* Telecommunication Standardization Bureau, International Telecommunication Union (ITU/TSB)
Keynote Speaker	**H.E. Dr. Alejandro B. CIMA,** *Secretary of Communication* (Argentina)
Presentations	
What does IETF do? How can someone participate and influence the Internet Standard's process?	**Mr. Fred BAKER,** *Chairman,* Internet Engineering Task Force (IETF) and Internet Engineering Steering Group (USA)
How does an Internet Registry and Policy organization get started and break into the mainstream Internet?	**Dr. Nii QUAYNOR,** *Executive Chairman,* Network Computer Systems (Ghana)
What role does Internet Associations play in policy making in the Internet Community?	**Mr. Michael SCHNEIDER,** European Internet Service Provider Association (EuroISPA) (Denmark)
	Mr. Eugenio TRIANA, *Member of the Initial Board of ICANN* (Spain)
	Dr. Mahal MOHAN, *Director, IT (Internet) Architecture,* AT&T Laboratories (USA)

Thursday, 14 October 1999	09:00 - 12:30

Dev.6	Internet Governance: Technical and Policy Perspective

The common perception is that no one controls the Internet. Many believe the Internet is a phenomena governed by anarchy. The reality of Internet Governance differs from common perceptions. The Internet does have a “method behind its madness.” The Internet has many dynamic groups processes, and procedures moulding its governance. What are these groups, processes, procedures, and dynamism that mould the Internet? How can governments participate and influence Internet Policy? How are Internet standards developed? How does one participate? These are all questions pondered by many of the world’s telecommunications professions. As the invasive spread of the Internet continues, people will want to know who is controlling this pervasive phenomenon.

This session brings together representatives from many of the groups who are involved with the growth, shape, and policy development on the Internet. Each speaker will work to enlighten the attendees of what each of their groups do, the role they play in the Internet policy development, how does one participate, and dispel common misconceptions of Internet Governance. In essence, the presenters will teach the “secret handshakes” used by people to control and govern the Internet.

Mrs. Laina Raveendran GREENE
Chief Executive Officer
GetIT
(Singapore)

DEV.6

Internet governance: Technical and policy perspective

Today's session is about Internet Governance: technical and policy issues. I hope to have this session be both informative as well as help stress the importance for participation from everyone. This is especially so since the Internet community is in the process of fine-tuning procedures and mechanisms for decision making that impacts all Internet service provides and users.

Internet Governance (in terms of the administration of IP addresses, domain names, and standards) has become a highly controversial subject over recent years. It used to be quietly handled by volunteers on a regional and national basis, and internationally through an academic institution in the United States paid for by the United States government. Back then, no one really questioned this structure since it worked and there was not as much money at stake in administrating the Internet.

The exponential growth of the Internet experienced with the introduction of the World Wide Web, the globalization of the Internet, the increase commercial usage of the Internet and the commercialization of ownership of the Internet backbone, has made the whole issue of who controls the administration of domain names and IP addresses a controversial one. It has become about control over money collected for IP addresses and domain names, about power grabbing, about being able to implement new rights through contract over and above that given by international and national laws (e.g. the famous mark holder issues), etc.

Much of the controversy over the restructuring process has been made worse, by the apparent lack of clear procedures in place. The so-called Internet netiquette, Internet concensus, peer review process of the old Internet world may have worked for a smaller constituency base but now the Internet has grown to include so many new stakeholders, not to mention new players totally oblivious to these old rules of the game, that these methods are leading to seemingly unjust results. Those who are organized and master the "unwritten rules" end up being able to manipulate the process in the name of "Internet consensus". In her testimony before the House Commerce Committee, ICANN Chairwoman Esther Dyson said that ICANN is nothing more, and nothing less, than an institution embodying and reflecting the "consensus of the Internet community", but how this is determined is unclear, and even questionable when used even where strong and vehement objections are raised.

This session will therefore explore the differences of the differing operating procedures. That of the "old Internet world" as reflected by the IETF, that of the traditional telecommunications world as reflected by the ITU, and that of national administrative bodies such as domain names registration agencies. The session will also explore how the Internet has largely been a bottom up organization and its flexibility, lack of rules and procedures was its strength. Today, this lack of procedures may have become its weakness. Globalization, commercialization, etc demands some level of structure and clarity.

The session will then look at these procedures against that which is currently going on within the Internet Governance debate (ICANN) and see how this works or does not. Since many developing countries are late players to this Internet Governance game, it would be helpful for them to understand the process and see how and why they need to begin actively participating in the process. Many of the evolving procedures using the Internet e-mail lists and web sites, is naturally biased to those who come from cultures where e-mail and web sites have become a common means of participation. This itself is causing its own anomalies. We hope to discuss these issues especially from the perspective of developing countries, many of which are only coming onto the Internet and are loosing a voice.

Having laid out that the session is primarily focused on a look of procedures and its lack thereof, the session will also explore the technical issues behind the need for coordination of IP addresses and domain names. IP addresses and domain names have to be unique and so coordination is required. This also involves issues about control and management of the root server. While some claim there can only be one root for the Internet, some others claim there can be mutliple roots. What is the truth to this? Then there is the issue of whether Ipv6 solves the problem of scarcity in Ipv4, brought about by finite numbering and inefficient allocations in the past (Stanford University for instance has more IP addresses than the whole of China). Does Ipv6 solve any problems, and if it does, is there an immediate need to have this administration fall under ICANN, which is only just formulating itself? Will many of these Internet Governance issues be superceded by technology, e..g directory services, url free browsers, etc.? These and other issues that will also be covered in this session.

1 Quick overview of Internet Governance

Internet Governance is a term that is often used very loosely to describe the control of the Internet. Some often include under Governance, issues relating to control of content and the role of Governments in the new Information economy. I shall not be using that loose definition of Internet Governance.

Instead, I shall be using it in the way that it is used in the US Department of Commerce Electronic Commerce Framework paper, published in July, i.e. it relates to the administration of the Internet such as Internet Protocol (IP) addresses and Domain Names.

2 Restructuring process

The Internet grew out of the Department of Defense. As the Internet grew, they delegated the management of this network to the late Dr Jon Postel, who was a graduate student then. Even after the network was commercialized and globalised, Dr Postel continued to manage these resources, under contract from the US government. Dr Postel’s functions under the University of Southern California became known as the Internet Assigned Numbers Authority (IANA).

For IP addresses, IANA allocated IP numbers globally by handing them to regional IP registries, such as ARIN for Americas, RIPE Europe and ME & Africa and APNIC in Asia Pacific. All these registries in turn have members who are ISPs or confederations of ISPs, who are given smaller blocks. ISPs then redistribute to their customers. IANA therefore sits on top of the hierarchy.

For Domain Names, IANA merely added new names. The existing names are managed through a root server. The root server is the authoritative database, which is replicated around the world. It keeps the authenticity and uniqueness of domain names, thereby keeping the Internet running as a global network. Network Solutions Inc (NSI) manages this root server also under contract by the US government.

Names on this server or Top Level Domains (TLDs) are several types. The key one under discussion lies over. com.,.net,.org which are also managed by NSI.

In July 1997, the US government announced that these IP address and domain name management should be privatized. Interestingly before this announcement, there already were efforts by some sectors of industry to set up the International Ad Hoc Committee (IAHC). The IAHC tried to set up a separate system for 7 new TLDs, but this effort was controversial. US government now looked for industry views on reform.

In July 1997, Department of Commerce sent out a request for comments from the public and world on Internet Governance. They gathered the views received and put together a preliminary report called the Green Paper published in January 1998. They again asked for views by March 1998. Views were collected and the Green Paper was amended into a statement of policy called the White Paper published on 5th June 1998.

The White Paper made it clear that the functions should be handed to private sector and not to other governments or inter-governmental bodies. They asked for industry to set up a body by September 30th 1998.

Industry set up a series of regional meetings called the International Forum for the White paper. Some attendees made proposals, by NSI, and by IANA. by September 1998, 4 proposals were lodged with the Department of Commerce. Call for views on these proposals were sought by October 13th 1998. BY October 21st, the US government announced that the IANA proposal called ICANN was accepted, but they were asked to make amendment to their proposal based on comments received. Since then ICANN has just announced the Board. The process is ongoing with ICANN, which has its strong supporters and strong opponents. This is a simplified overview but some sources for information about Internet Governance can be found at:

www.icannwatch.org

www.apdip.net

Biography

Laina Raveendran Greene is founder and Managing Director of GetIT, an Internet/Telecom consultancy. GetIT's clientele have included Cisco Systems, Pacific Internet, Commercial Internet Exchange (CIX), Asia Pacific Network Information Center (APNIC), Asia Pacific Internet Association (APIA), International Telecommunications Union (ITU), Asia Pacific Development Information Program (APDIP) of UNDP/UNOPs, etc. As chair of Asia Pacific Policy and Legal Forum and later as Secretary General of APIA, she has also been involved in Internet Governance issues since 1996. Most recently she served on the Steering Committee of the International Forum on the White Paper and on the Panel of Experts of the World Intellectual Property Organization. Her involvement has been driven by her desire to ensure that key stakeholders especially developing countries, small and medium enterprises and individuals, have their voices heard and are kept well informed. In January 1999, under her leadership GetIT produced a CDROM The Internet For Policy Makers which was sponsored by Cisco Systems and supported by APDIP. The CDROM was an attempt to help disseminate information on key internet issues (see www.getit.org). She comes from a legal education in Singapore and a Masters of Law from Harvard University. She has amassed about 13 years of working experience in the telecom/internet industry having worked with organizations such as ITU, INTELSAT, Singapore Telecom, APIA, etc. She has travelled extensively and worked on projects in countries such as Mongolia, Laos, Morocco, Malaysia, Mexico., etc.

Mr. Houlin ZHAO
Director
Telecommunication Standardization Bureau (ITU-TSB)
(International Telecommunication Union)

DEV.6

Internet governance:
Technical and policy perspective

Biography

Born on 7 March 1950 in Jiangsu (China), Houlin Zhao graduated from Nanjing Institute of Posts and Telecommunications in 1975. Between 1979 and 1980, he studied as a visiting scholar in Switzerland. He joined the University of Essex (United Kingdom) in 1984, where he obtained a Master of Science degree in Telematics in 1985.

From 1975 to 1986, he worked as an engineer in the designing Institute of the Chinese Ministry of Posts and Telecommunications, responsible for projects in the areas of telex, data communication, non-voice transmission, telephone switching and mobile networks. He took an active part in his country's experts meetings on national telecommunication standards. He received a second prize in 1985 for his science and technology achievements in the Ministry of Posts and Telecommunications. In addition, his work in the Departments of Planning, Capital construction and Network maintenance in the Ministry earned him an engineering project prize for his outstanding performance and contributions in the planning, designing and construction of a number of major national network projects. Between 1982 and 1983, he participated in CCITT Study Group meetings and joined the CCITT Secretariat (now TSB) in 1986.

Since 1993, he has served as TSB Counsellor for ITU-T Study Group 7 (Data networks and open system communications) and Study Group 8 (Characteristics of telematic systems). He is ITU-T's coordinator with the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC) and their Joint Technical Committee 1 (JTC 1). His record of maintaining excellent collaboration with these bodies, where he has combined technical expertise, diplomacy, firmness and flexibility, has ensured that ITU-T's interests are safeguarded in the development of joint standards.

On the human resources front, Mr. Zhao has been TSB's official representative on the Appointments and Promotions Board for posts of grade G.1 to G.7 since 1994.

He served as Secretary to the IXth CCITT Plenary Assembly in Melbourne (Australia) in 1988 and to the first World Telecommunication Standardization Conference (WTSC) in Helsinki in 1993 and the second WTSC in Geneva in 1996.

His Excellency Dr. Alejandro B. CIMA
Secretary of Communication
Secretariat of Communications
(Argentina Republic)

DEV.6

Biography

Academic background

- Professor of Customary Law. School of Social Service, Universidad Nacional de Córdoba (National University of Córdoba) (1982-1986).
- Professor of Labor and Social Security Law. School of Law and Social Sciences. Universidad Nacional de Córdoba (National University of Córdoba) (1985-1997).
- Member of the Administrative Law Institute – School of Law and Social Sciences. Universidad Nacional de Córdoba (National University of Córdoba) (1980-1984).
- Assistant and speaker at several courses on Labor, Social Security and Administrative Law.

Professional activity in the private sector

- Since February 1982 up to his appointment in the public sector, he worked as a lawyer, specially dedicated to advising on Labor, Civil, Commercial and Administrative issues.

Professional activity in the public sector

- Secretary for Communications. Secretariat of Communications, The Presidency, Argentina (July, 1999 to date).
- President of Encotesa e.l. (Government Postal Service Agency) (1997 to date).
- Under-secretary for Communications. Secretariat of Communications, The Presidency, Argentina (1998-1999).
- Ad honorem adviser to the Honorable National Chamber of Representatives (1993-1995).
- Ad honorem adviser to the Honorable Chamber of Representatives, province of Cordoba (1987-1991).
- Ad honorem adviser to the Honorable Constitutional Convention of the province of Cordoba (1986-1987).
- Member of the Law Office of the Treasury of the province of Cordoba, defending the provincial state in law suits (1985-1990).
- Member of the Body of Lawyers of the State Prosecutor’s Office of the province of Cordoba (1982-1985).

Mr. Michael SCHNEIDER
President of the EuroISPA
EuroISPA
(Denmark)

DEV.6

What role do Internet associations play in policy making in the Internet community

Biography

Attorney at law Michael Schneider born in 1962 at Bergneustadt, he was one of the founders of Eunet Germany Gmbh (now UUNet Germany Gmbh) and General Manager of its majority shareholder at that point in time. As of 1991, he was appointed to the executive management of Eunet Germany Gmbh and became its interim Chairman in 1995. In 1994 he led negotiations which successively let to the sale of 60% of the equity in Eunet. In 1994 he became Vice-President of CNI Communications Network International Gmbh (now Mannesmnn ARCOR AG & Co.) responsible for Value Added Services. In 1996 he and colleagues founded the consultancy IntraNet Gmbh as well as a law office. Since April 1999 he is also CEO of AboveNet Germany Gmbh in Frankfurt/Main.

Further, Mr. Schneider is founder Board-Member and since 1997 Chair of the Internet business association eco-electronic commerce forum e.V. Additionally he was first elected Vice-President and then President of the European Internet Service Providers Association (EuroISPA) in 1999.

Finally he is Chair of the complaints department of the Association “Freiwillige Selbstkontrolle der Multimedia-Diensteanbieter” (FSM) (Voluntary self-control of multi-media service providers).

Mr. Mahal MOHAN
Director, IT (Internet) Architecture,
AT&T Laboratories
(USA)

DEV.6

Biography

Dr. Mahal Mohan is Director, Internet Architecture in AT&T Laboratories, Florham Park, New Jersey, USA. He currently leads a team responsible for developing the overall network, middleware and applications architecture for AT&T's Internet Protocol (IP)-based services.

Dr. Mohan received his Ph.D from the State University of New York at Stony Brook. At AT&T, he has held management positions in a variety of functions including data services planning, data services marketing and the development of AT&T's strategies and public policy positions on broadband and Internet services.

PALEXPO

DEV.7

Thursday, 14 October 1999	14:00 - 17:30

DEV.7	The future for Private Companies in the telecommunication markets of Developing Countries

Chairperson:	**Mr. Hamadoun TOURÉ,** *Director,* Telecommunication Development Bureau (ITU/BDT)
Moderator	**Mr. Ronald DAVIDSON,** *Director,* International, Final Analysis (U.S.A)
Keynote Speaker	**Mr. Shuji KUSUDA,** *Advisor,* Nomura Research Institute (NRI) and *Chairman* The Japan Committee of Pacific Telecommunication Council (Japan)
Panelists	**Prof. Rohan SAMARAJIVA,** *Associate Professor of Communication, Public Policy and Management,* The Ohio State University (U.S.A.)
	Mr. Robert PHILLIPS, *Director,* Global Technology Resources, GTE (U.S.A.)
	Mr. Bakary K. NJIE, *Managing Director,* Gambia Telecommunications Company Ltd. (Gambia)
	Mr. Leonard S. DOLLEY, *Vice-President, External Affairs* (INTELSAT) Opportunity Knocking: Private Telecommunications Business in the Developing Countries
	Ms. Judith D. O'NEILL, *Partner,* Thelen Reid & Priest LLP (USA)
Rapporteur/Right of Response	**M. Dag NORRBY,** *Information Manager,* TELIA SWEDTEL AB (Sweden)

PALEXPO **DEV.7**

Thursday, 14 October 1999	**14:00 - 17:30**

DEV.7	**The future for Private Companies in the telecommunication markets of Developing Countries**

This panel will be an opportunity for the many representatives of private firms participating, visiting, or working at TELECOM 99+TELECOM Interactive 99 to have an opportunity to interact with the representatives of developing countries for the purpose of exploring the issues concerning investment in and development of emerging telecommunication markets. It would afford an ideal mechanism to bring the telecommunication companies of the industrialized and developing countries together. It would also facilitate companies and governmental representatives of developing countries to air their opinions, views, preoccupations, concerns and goals concerning investment in telecommunications in developing countries.

Mr. Shuji KUSUDA
Advisor, Nomura Research Institute (NRI) and
Chairman, The Japan Committee of Pacific
Telecommunication Council (Japan)

DEV.7

1 Introduction and Global Telecom Market trends

1.1 Overall trends and Market size by region

Since the 1980s, deregulation and exposure to competition have led to dramatic changes in the telecommunication industry, where monopoly was once the norm. The arrival of new entries in the market has led to the collapse of monopolistic fee structures, while the relentless march of technology and increases in network capacity have resulted in plummeting prices and greatly improving service. With the 21st century just around the corner, info-communications, of which telecommunications is a vital part, promise to become one of the world's leading industries. According to ITU statistics for 1997/98, global telecom service revenue totaled some $600 billion in 1995, and should climb to $900 billion by the year 2000. That translates into a projected annual increase of about 10 percent.

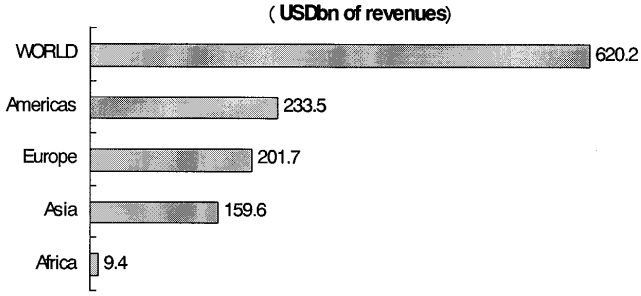
As symbolized by the WTO Telecom Agreement, accelerating deregulation and introduction of competition on a global scale have enabled foreign companies to enter the telecom industry in other nations. Some companies have already emerged as global carriers. As you know, we see reports of mergers, acquisitions and alliances between and among carriers in the major countries in the press practically every day. At the same time, telecom services have extended into more and more advanced sectors, such as Internet and mobile communications, as well as to data and video communications. Indeed, telecom is changing both the paradigms for industry and the daily lives of people.

In light of these changes, what, then, is the situation of telecom markets in the developing nations? This is the topic given to me today.

Figure 1, shows the situation of the world telecom market in 1996. This figure shows that the Asian and African Markets, especially the African market are smaller than other markets. Over the past 10 years, the growth rate of Africa's telecom market has been much greater than the average GDP growth rate. Between 1990 and 1996, telecom revenues grew 7.5 percent annually compared with 2.3 percent for the African economy. In other words, telecom revenues grew more than three times faster than GDP, making telecom the most dynamic sector of the African economy. Nevertheless, the combination of fewer lines and a lower level of income than anywhere else in the world means that Africa is by far the world's smallest telecom market. On the other hand, the Asian market includes Japan, Singapore, South Korea and Hong Kong, where the rate of telephone ownership is very high. Also, thanks to the impact of fast-growing ASEAN states, and China and India, which in themselves are huge markets, the Asian market is 17 times larger than Africa's.

Therefore, I would like to focus on Africa and parts of Asia in my talk on today's theme "The Future of Private Enterprises in the Developing Nations' Telecom Markets."

Figure1 : Size of the telecoms markets in1996
(USDbn of revenues)

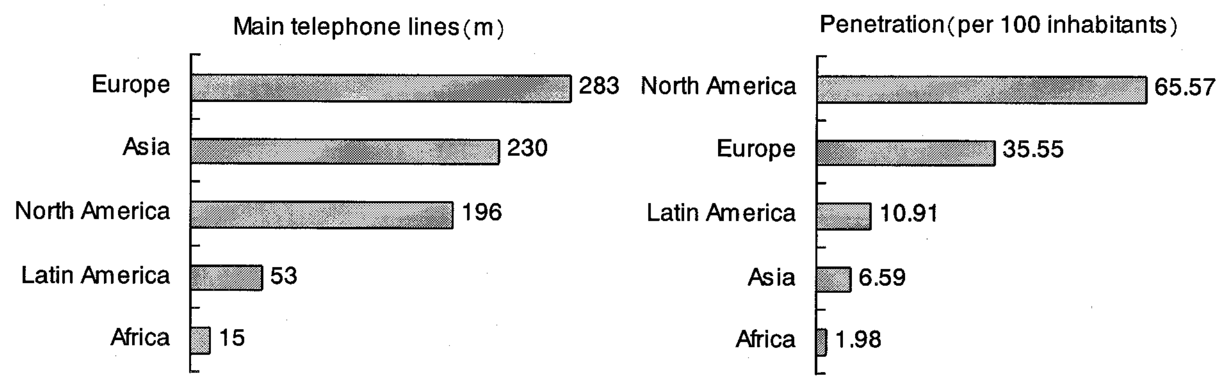


Source : ITU

1.2 Fixed-line market in Asia and Africa

The numbers and diffusion rates of fixed lines in 1997 in the world are shown in Figure 2. With the world's second largest population and only 15 million main lines, Africa has teledensity of only 2 lines per 100 inhabitants, which is by far the lowest in the world. The combination of Africa's vast landmass and rural poverty means that the market for telecom services is largely limited to 265 million people living in urban areas, specifically to 85 million people (11 percent of the total population) who live in the largest cities. Also, due to the low income level of its population, percentage of business lines in Africa at 34 percent is the highest in the world.

Figure2 : Main telephone lines and penetration in1997



Source : ITU, Nomura International calculations

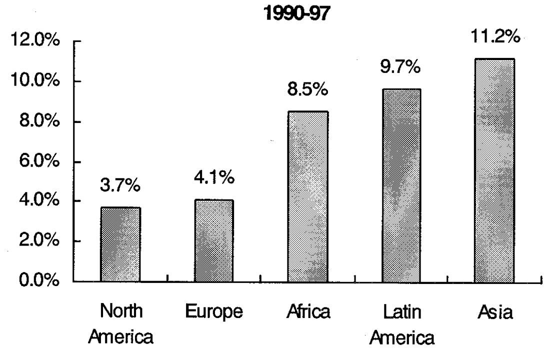
Although the total number of lines in Asia is very large, the average ownership rate for the region is low. This is because the Asian market comprises East Asian nations, where population densities are very high and telecom markets are large, newly industrialized emerging economies, where markets are expanding, and a number of least less developed countries (LLDCs). Therefore, these markets should be considered separately from one another.

Figure 3, shows that between 1990 and 1997, the rate of network growth in Africa was greater than in the mature markets of the advanced, industrialized nations but lower than in Latin America or Asia, where there was heavy demand for telecom services. So, the gap in the total number of lines will continue to widen.

1.3 Cellular market in Asia and Africa

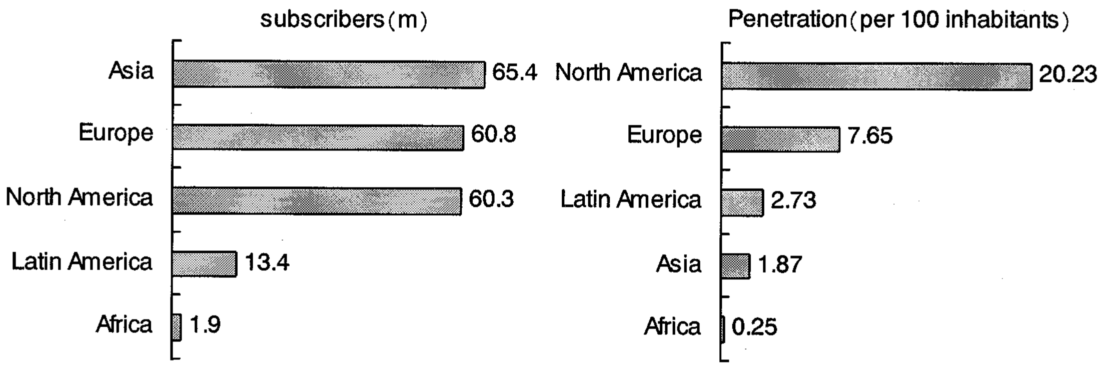
The situation of the cellular market in 1997 is shown in Figure 4. Since the 1980s, most Asian countries have adopted the policy of promoting competition in the cellular market by granting licenses to more than one carrier. As a result, cellular phones have increased dramatically.

Figure3 : Growth in main telephone lines - CAGR 1990-97



Source : ITU, Nomura International calculations

Figure4 : Cellular subscribers and penetration in1997



These countries have introduced foreign capital to their domestic markets rather aggressively, and the rapid increase in cellular phones has made it possible to meet the fast-growing demand for telecom services, especially in countries where there were long waiting lists for fixed lines. In contrast, as of 1990 only a handful of African nations offered cellular services, with subscribers numbering only 14,000 in that year. Subsequently, however, the number of cellular subscribers in Africa more than doubled each year, making it the fastest growing market in the world. This was because cellular service was one of the few segments of the telecom market in which the government allowed competition and investments by private parties. Today, cellular service is offered in almost all African nations, but the number of subscribers is still very small. Perhaps it is better to take 1994 as the starting point of cellular service in Africa. In that year, South Africa issued GSM license to two parties, which triggered a rapid growth of cellular business in almost all African nations. Today, large international telecos are becoming increasingly involved in Africa, while previously only those cellular operators that focused primarily on emerging markets were willing to invest in this continent.

Figure5 : Cellular subscribers as % of total subscribers in 1997

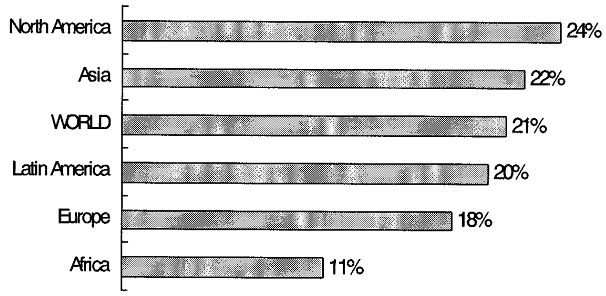
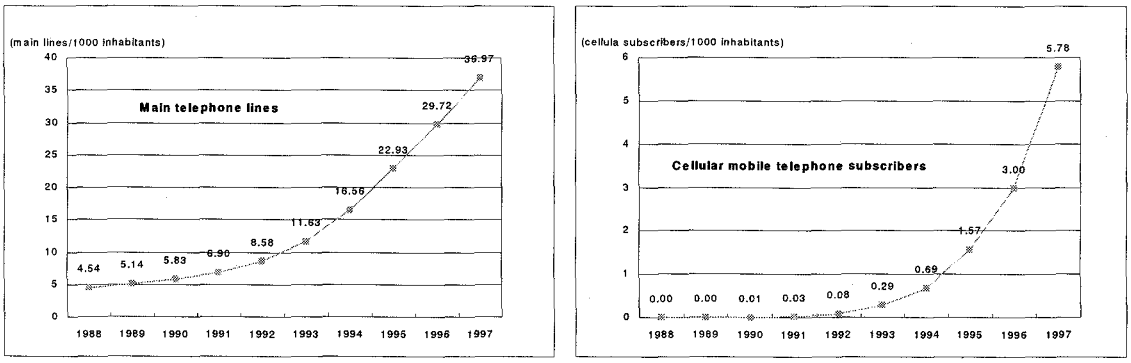


Figure 6 – Telephone lines and mobile telephone subscribers in Asian developping countries



2 Private investments in the Developing Nations' Telecom Market

2.1 Private investment in Asia

In the developing countries of Asia, the telecom markets are growing dramatically and have huge potential for future development. Japan, South Korea, Singapore and Malaysia have already privatized basic services. Thailand and India plan to privatize the state-owned enterprises that provide these services. Almost all Asian countries have introduced or are planning to introduce competition in one form or another, primarily in the cellular market.

These countries have accepted foreign capital using the BTO, BOT, BCC or a similar scheme, all of which is a form of project finance.

Carriers from the United States, Western Europe or Asia are investing in cellular and domestic and international fixed line services in Asia. (see Table 1) However, U.S.-based carriers' interests are concentrated in huge markets, such as India, Indonesia, China and Japan, and their presence in the rest of Asia is small. From Western Europe, British, French, Deutsche, and Swiss Telecoms have made conspicuous inroads into Asia, but their destinations are still rather limited. Meanwhile, the Australian-based Telestra has a large presence in Vietnam and Indonesia. Singapore Telecom has invested in Indonesia, Vietnam, Thailand and Cambodia, while the Thais have investments in Laos and Cambodia. Japan's Nippon Telegraph and Telephone (NTT) has recently begun to build domestic telecom networks primarily in Asian countries like Thailand, Vietnam, Indonesia, Sri Lanka and the Philippines, but its operations in these countries are not yet in full gear.

Investments from carriers based in Asia or other regions in the Asian telecom markets have picked up recently, as these companies expect high growth in these markets. As a result, a great deal is going on in these markets. However, though the Asian economies have recently made a turnaround, many Asian countries are beset with structural problems. In fact, in a number of LLDCs, foreign investments have been limited to cellular service and a few other areas. The foreign companies which have made investments through the BTO or BOT scheme are recently re-examining their investments, as the depreciation of Asian currencies has increased their burden of dollar-denominated liabilities and made it impossible for them to realize the level of return which they had initially hoped to achieve. Foreign investors want (1) stability of their long-term contracts, and (2) minimization of risks arising from political situations or changes in the system as well as (3) Market profitability of the market. At the same time, although licensing schemes are popular in the cellular market, today the licensing fee is sometimes too high to make the investments profitable for foreign carriers. As a result, foreign investments in Asia will bifurcate to those in markets which are expected to completely liberalize foreign investments (like Japan, Singapore and South Korea) and those in countries which allow foreign participation only on a limited basis. Needless to say, investments in the former are expected to grow more rapidly than those in the latter.

2.3 Private investment in Africa

Africa has the world's least developed telecom market. It accounts for less than 2 percent of global telecom revenues. Africa also has the lowest teledensity in the world. The low density is due to Africa's economy, which is not yet developed, low population density and a high proportion of people living in rural areas. Therefore, telecom revenues are derived mostly from the continent's largest markets. African telecoms are also highly dependent on international revenues. But, these revenues are expected to fall due to likely changes in the system of international accounting rates.

What, then, are the impediments to the development of telecom in Africa? Network expansion in Africa has been slower than in other emerging markets, not because of a lack of demand but rather due to limits on the supply side. The main reason for the supply constraints has been a lack of funding for telecom investment programs. So far, some 60 percent of all such investments in Africa have been financed by operators themselves.

There is a number of reasons for a lack of funds from other sources. They include the following. (1) African governments have often been unable to spend more on telecom because of the poor state of public finances. They must give priority to more pressing infrastructure projects, such as electricity and water supply. (2) Africa's line costs are extremely high. They are around US$ 6,000, or four times the world average of US$ 1,500. This is due not only to low population density and a high ratio of rural population but also to non-transparent practices in awarding investment tenders. (3) So far, 17 out of 55 operators have been privatized. Foreign ownership regulations vary from country to country, but most countries have limits on the level of foreign ownership. Basic services have been fully liberalized in only two countries, while only four countries allow competition.

Table 1 – Major foreign companies involved with telecom operation in some developing countries in Asia

Country	Owner, Carrier	Operating ways	Operator	Main foreign companies	Asian foreign companies
Malaysia	Celcom	Direct	Celcom	Deutsche Telecom	–
	Digi	Direct	Digi	Swiss Telecom	–
	Binariang	Direct	Binariang	Singapore Telecom	O
Philippines	Philcom/Major	Direct	Philcom/Major	Comsat	–
	Smart	Direct	Smart	First Pacific, NTT	O
	ETPI	Direct	ETPI	C&W	–
	Bayantel/ICC	Direct	Bayantel/ICC	Bell Aflantic	–
	Extelecom	Direct	Extelecom		
	Globe	Direct	Globe	Singapore Telecom	O
	Digitel	Direct	Digitel	Telia	–
	Capwire/PT&T	Direct	Capwire/PT&T	Korean Telecom	O
	Islacom	Direct	Islacom	Shinawatra G., Deutsche Telecom	O
Indonesia	P.T. Telecom	KSO (BOT)	Pramindo Ikat	France Telecom, Marubeni	O
		KSO (BOT)	AWI	US West	–
		KSO (BOT)	MGTI	Telestra, NTT	O
		KSO (BOT)	DMM	C&W	–
		KSO (BOT)	BS	Singapore Telecom	O
	Telkomsel	Direct	Telkomsel	PTT Telecom	–
	Satelindo	Direct	Satelindo	Dete Mobil	–
	Excelcomindo	Direct	Excelcomindo	Bell Aflantic, Mitsui	O
Thailand	TOT	BTO	TT&T	NTT	O
	TOT	BTO	TA	Bell Atlantic	–
	TOT	BTO	AIS	Singapore Telecom	O
	CAT	BTO	DPC	Telecom Malaysia	O
Viet Nam	VNPT	BCC	NTT	NTT	O
	VNPT	BCC	C&W	C&W	–
	VNPT	BCC	France Telecom	France Telecom	–
	VNPT	BCC	Telestra	Telestra	–
	VTI	BCC	Telestra	Telestra	–

Source: Nomura Research Institute

However, the scope of development is enormous. At present, telecom spending in most African nations accounts for only 1 percent of GDP, which is half the world average. Nevertheless, huge changes are expected in African telecoms. For example, 1999 is set to become a year of telecom privatization in Africa, with 10 African telecoms scheduled to be privatized during the year. This is more than all the privatization made so far in this decade. The telecoms slated for privatization this year include four of the five largest telecoms in Africa in terms of revenues, and they are located in Egypt, Nigeria, Morocco and Kenya. (See Table 2, Upcoming Telecom Privatization in Africa).

This year, at least five new cellular licenses are expected to be granted in Africa. (see Table 3, Upcoming Cellular Licences) This indicates that an increasing number of African nations are opening up their cellular markets to competition. But, given the size of telecom investments needed for Africa to catch up with the rest of the world, new cellular operators are likely to also tap domestic and international capital markets.

Although Africa as a whole may not be able to catch up with the rest of the world in the foreseeable future, we believe that the largest telecom markets in Africa, as well as a number of smaller but relatively well-developed ones, have sufficient potential to narrow the gap with the rest of the world. However, Africa must meet the following conditions and also take into account the following risks for its telecom markets to develop further.

Table 2 – Upcoming telecoms privatisations in Africa

Country	Operator	State owned	Strategic partner	Share to sell	Type of sale	Sale date
Cote d'Ivoire	CI-Telecom	35%	France Telecom 51%	n.a.	IPO	2000
Egypt	Telecom Egypt	100%	None	20%	IPO	March '99
Eritrea	TSE	100%	None	45%	Strategic sale	1999-2000
Ghana	Ghana Telecom	70%	Telekom Malaysia 30%	n.a.	Not determined	2000
Kenya	Telkom Kenya Telkom Kenya	100%	None	26% 20%	Strategic sale IPO	Q1 1999 1999
Mauritius	Mauritius Telecom	100%	None	n.a.	IPO/Strategic	H1 1999
Morocco	Ittissalat Al-Maghrib	100%	None	n.a.	IPO/Strategic	Sep/Oct.'99
Nigeria	Nitel Nitel	100%	None	40% 20%	Strategic sale IPO	1999 1999
South Africa	Telkom	70%	SBC/Telekom Malaysia 30%	50% 20%	IPO/Strategic Employees/Public	2003 2003
Tanzania	Tanzania Telecom	100%	None	100%	Not determined	1999
Uganda	Uganda Telecoms Uganda Telecoms	100%	None	51% 49%	Strategic sale IPO	H1 1999 2000
Zambia	Zamtel	100%	None	n.a.	Not determined	1999-2000
Zimbabwe	PTC	100%	None	n.a.	Not determined	1999

Source: Nomura Intentional

Table 3 – Upcoming Cellular licences

Country	Licence	Expected timing
Cameroon	2nd cellular licence	H1 1999
Kenya	2nd GSM licence	1999
Morocco	2nd GSM licence	May 1999
Niger	1st GSM licence	1999
South Africa	3rd and 4th cellular licence	Q2 1999
Tunisia	2nd cellular licence	2000

Source: Nomura Intentional

Table 4 – Africa's largest telecom markets in 1996

	Telecoms revenues (USD m)	% of total	As a % of GDP	Revenue growth (CAGR 1990-96)
South Africa	3,802	41%	3.0%	9.2%
Egypt	774	8%	1.1%	6.3%
Nigeria	771	8%	1.1%	18.7%
Morocco	696	7%	1.9%	12.8%
Kenya	298	3%	3.2%	8.5%
Tunisia	296	3%	1.5%	13.6%
Algeria	228	2%	0.6%	8.3%
Cote d'Ivoire	181	2%	1.7%	1.9%
Reunion	156	2%	2.6%	8.6%
Zimbabwe	138	1%	1.6%	2.3%
Senegal	121	1%	2.2%	1.6%
Mauritius	114	1%	2.6%	24.8%
Zambia	109	1%	3.1%	1.9%
Ghana	100	1%	1.5%	16.9%
North Africa	2,227	24%	1.2%	5.2%
Sub-Saharan Africa*	3,231	35%	1.5%	7.5%
AFRICA	9,261	100%	1.7%	7.5%

Source: ITU, Nomura Intentional calculations

* Excluding South Africa

First, there must be a political will to reform the economy in general and the telecom sector in particular. Second, Africa's demographic structure must also be taken into account. The potential market for telecom services is limited at best to the one third of the population, or 265 million people, who live in the urban areas, due to the continent's large landmass and rural poverty. Third, the ability of the African economies to create and distribute wealth more evenly will be critical for the further development of their telecom sectors. (see Exhibit 4. Africa's Largest Telecom Markets in 1996)

3 Telecom Privatization and Associated Issues in the Developing Countries

3.1 General perspective

I would now like to talk about telecom privatization and associated issues in the developing countries in general.

Developing countries generally have the following characteristics: (1) a nationwide telecom network has yet to be completed. (2) Domestic capital is in short supply, while the domestic market is too small to attract foreign investments. (3) There are huge regional gaps between the urban and rural areas. Yet at the same time (4) There is further opening up of the telecom markets.

Behaviors of foreign investors in the telecom markets are changing, too. They appear to be shifting their investments from a full range of telecom services to those sectors that are most profitable. This means that investors are probably interested in the cellular and international telecom services but not in domestic rural networks, which usually involve BOT or BTO scheme.

The BOT and BTO investment schemes have been used for building both mobile and fixed-line networks in some emerging countries where direct foreign investments were limited, but these schemes have come to present the following problems: (1) It is extremely difficult to change conditions on revenue sharing and concession periods in BOT or BTO scheme. (2) In the case of BOT, it seems that foreign investors are increasingly unwilling to agree to transfer infrastructure to the host government. And (3) Due to such risk factors as the foreign exchange rate and the emergence of new technology, long concession periods, as long as 15 years, are becoming impractical. In the future, it will be necessary to seek investments through licensing or joint venture schemes, which is regarded as more transparent and fair.

3.2 Telecom privatization in Emerging Economies

In the emerging economies (those that have taken off in terms of economic development), the following facts need to be noted. (1) When new entries are authorized under a privatization policy, new businesses tend to focus only on highly profitable services, such as mobile, international and data communications, and/or services in the urban areas. (2) The host governments should not insist upon the construction of full rural trunk line networks or universal services. (3) Depending on the domestic situation, the BOO and management contract schemes should also be considered as a means of bringing in foreign investments.

3.3 Telecom privatization in LLDCs and Rural Areas of Emerging Economies

For the rural areas of these emerging economies and also least less-developed countries (LLDCs), where it is difficult to bring private investments, one must consider other schemes or measures. They include official development assistance (ODA) and non-profit organizations (NPOs).

Roles of ODA

Projects such as electric power and water projects are attractive for BOT schemes, since governments can agree to buy the total output of such schemes. Telecommunications does not provide such a safety net to investors. As a result, investments in this sector seem relatively unattractive, especially in low-profit rural areas and LLDCs.

Therefore, ODA should play an important role in the development of rural networks. The construction of networks only for telecom purposes with ODA financing, however, is often not cost effective. Therefore, it is essential to create multipurpose ODA projects, such as telecom development projects which also meet local needs for vocational training and other types of education, and community development. The ITU should play a crucial and catalytic role in promoting such projects.

Roles of NPOs

Before concluding my remarks, I would like to stress that NPOs' activities in the telecom sector that also contribute to vocational training and other aspects of education and community development, for example, should be encouraged. NPOs' roles in meeting basic telecommunications needs as well as other basic needs of the people will become even more important in the next century.

I would like to introduce the example of Basic Human Needs (BHN) Association of Japan. BHN is organized primarily by former workers of NTT and asks reasonable donations from carriers and equipment manufacturers to undertake projects primarily in the LLDCs that meet basic human needs through the use of telecom. These projects are multi-purpose projects in that they combine telecom technology with other means of meeting human needs. Government funds are sometimes injected in these projects. For example, the "Gratis Grass Root Funds", part of Japan's ODA projects, are for use by Japanese NGOs and NPOs, and BHN is one of their recipients.

It is reported that some carriers and equipment manufacturers in other countries are also funding NGOs and NPOs for similar aid projects.

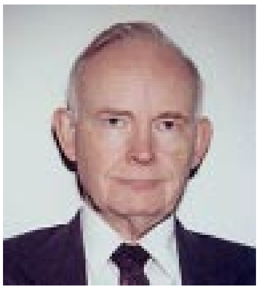
As far as funding is concerned, donations to NGOs and NPO's are voluntary, or active participation in projects, on the part of private enterprises, individuals or governments, while government contributions to international agencies like ITU are often mandatory, or passive. So, the idea of making voluntary donations is more or less acceptable, especially for private enterprises (carriers and equipment manufacturers in the case of telecom.)

The NGOs and NPOs projects financed by such donations indirectly benefit donor telecoms in many ways. First, they boost corporate images of donors. Second, multipurpose telecom projects undertaken by the NGOs and NPOs spread the recognition that telecom is a very effective means of also meeting other basic human needs, such as healthcare, education and employment. Third, they help explore possibility of expanding telecom markets in LLDCs and rural areas of other developing countries. NGOs and NPOs projects are basically flexible both at the planning and implementation stage, and produce immediate results. Since many former telecom workers, including engineers, are willing to work for less remuneration than that received by state or international agency employees, these projects are also very cost effective.

We must enhance NGOs and NPOs and encourage networking among such organizations in all fields to improve info-telecommunication networks in LLDCs and rural areas of developing countries. Virtual organization of network information and its information exchanges via the Internet would greatly help promote such movements. By enhancing its activities to provide information to support NGOs and NPOs, ITU can play an important role as a catalyst until such time as when NGOs and NPOs can play major roles in this area on their own.

Biography

Mr. Shuji Kusuda joined Japan's Ministry of Posts and Telecommunications (MPT) in 1965 after graduating from Tokyo University with a bachelor's degree of law. In 1989 he headed the Japanese delegation to the UPU Washington Congress as Assistant Vice Minister. In 1991 he became Director General of the International Affairs Department at MPT and headed the Japanese delegation to the APT Conference in Bangkok and also acted as a delegate to ITU Plenipotentiary in Geneva. In 1994 he became Deputy Minister for Policy Coordination and participated in G7 Ministerial Conference on Information Society in Brussels. In this capacity he also served as a delegate to ITU Kyoto Plenipotentiary Conference to deliver general statement of Japan. In 1995 he became Director General of the Broadcasting Bureau and initiated digitalization policy for the Japanese broadcasting industry. After advancing to the post of Vice Minister for International Affairs at MPT in 1997, he was invited to join Nomura Research Institute Ltd. as an advisor in 1998 and participated in ITU Plenipotentiary Conference at Minneapolis as a senior advisor to the Minister. Since 1991 he has visited more than 50 developing countries and regions to exchange views with top leaders on international cooperation in the field of telecommunications. He is also Chairman of the Japan Committee of the Pacific Telecommunication Council.



Mr. Robert R. PHILLIPS
Director of Global Technology Resources, GTE
(U.S.A.)

DEV.7

The future for private companies in the telecommunications markets of developing countries

Biography

EDUCATION: BSEE degree

PROFESSIONAL EXPERIENCE

Mr. Phillips joined GTE in September 1957 and is currently responsible for supporting the GTE corporate technology plan. During his 40 years with GTE, he has had numerous technical and management assignments. In his current position he also provides technical guidance to a number of GTE organizations, both domestic and international. In support of the technology plan, his responsibilities involve tracking foreign technology and technology transfer within the corporation.

He is presently an associate member of the advisory committee of the International Teletraffic Congress and was the co-chair of the ITC-15 Congress held in Washington, DC in 1997. It hosted over 400 people from 40 different countries. In the past he was one of the GTE representatives to the European and Pacific CCS #7 Planning Meetings. He has served as a telecommunications technology advisor to the US Government for over 15 years. He also has participated in meetings concerned with the future of the ITU and has presented briefings to various government committees and industry panels in the United States, Europe and China.

Before his present assignment, Mr. Phillips was responsible for the design of several major communication and processing systems. He also has had numerous assignments throughout the world for GTE.

Mr. Bakary K. Njie
Managing Director
Gambia Telecommunications Company Limited
(Gambia)

DEV.7

The future of private companies in the telecommunications market of developing countries

1 Introduction

At the Harare African Telecom Conference in 1990, a resolution was adopted that African governments and administrations should create an appropriate investment climate in the telecommunications sector that will ensure commercial operations and free market participation by key players in the sector. WorldTel, the ITU's investment fund was created as a result of the findings of the feasibility study by McKinsly and Co. to provide the requisite financing gap sought by investing countries in the rapid growth of telecommunications in the developing countries. "Remote and rural areas in Africa are fast becoming the next battleground for telecom players..." asserted IIR Telecom of London, despite the low per capita income.

2 Present State of the Telecommunications Industry

The fact that in Africa most telecommunications operators are state-owned monopolies with direct government control is largely responsible for the poor state of the industry. The industry is regarded as a national status symbol and is not run on a commercially profitable basis, but rather is required to provide a number of non-profitable social services. This has resulted in limited funds being available for reinvestment and growth, and at the same time has discouraged private sector investment. A conducive legal and regulatory environment does not also exist to encourage private sector involvement and only a handful of African countries have set up a regulatory commission.

Africa, with over 12% of the world's population, has only about 2% of the telephone lines and an estimated tele-density of 0.5, this made even more serious by the fact that the vast majority of these lines are in the urban areas although some 80% of the population is rural.

3 Why Private sector participation

There is a vast market for telephone expansion in Africa and developments in wireless technology will facilitate penetration into the rural areas. The waiting list in The Gambia, for example, is 50% of the connected lines.

Opportunities for rapid penetration are enhanced by a number of on-going cable projects and the RASCOM satellite project with micro V-SAT connections should accelerate access to rural areas.

4 How should the private sector be involved

Liberalisation and deregulation of the industry through leasing, joint ventures, operators licensing, turnkey contracts and management contracts will attract private participation.

Those African countries, such as Ghana, Guinea, Ivory Coast and South Africa, who have taken this road have begun to realise the benefits.

5 Benefits of Privatisation

Increased penetration and a steady growth in mainline telephones are evident in CAPA countries after privatisation, while low teledensities should attract private investment since any well managed telecommunications entity in Africa is potentially profitable (The Gambia, Egypt, Botswana, Senegal).

6 Post-privatisation

Although capital would be needed, this is no reason to hand over the market to foreign companies. Local capital could be forthcoming and workers participation provides that sense of ownership that will serve to develop the market. In Senegal company ownership is divided as 34% government, 33% foreign investors, 10% employees, 18% public and 5% African operators. Such an approach also ensures that public monopolies are not simple transformed into private monopolies.

The regulator must be vigilant in protecting the rights of the end user and ensure that the costs do not mitigate against access to the services.

Privatisation may be more readily acceptable if training programs cater for the development of indigenous human resources, the public is allowed to acquire shares and the national employees of the company are considered as prime movers in the proper operation and management of the privatised entity.

Biography

Bakary K. Njie is presently the Managing Director of Gambia Telecommunications Company Ltd. (GAMTEL), which was established in 1984. He graduated from the Norwood College of Technology in England in 1968 as Technician Engineer and has since attained numerous professional qualifications in telecommunications, sector operation and management.

His career in telecommunications started in 1972 as Training Officer at The Gambia Telecommunications Training Centre. Between 1975 and 1980 he was Chief Engineer responsible for the overall planning, operations and maintenance of the national telecommunications system for The Gambia.

As Managing Director he spearheaded the three phase development programmes of Gamtel between 1985/86 and 1992/93, and the much acclaimed current position of efficiency of service and proper management of telecommunications in The Gambia is attributed to his personal leadership qualities.

Mr. Njie is the current Chairman of the Commonwealth Telecommunications Organisation (CTO), a position he has held since September 1997

TELECOM 99 AND INTERACTIVE 99
DEVELOPMENT SUMMIT
EXHIBITION

The Future of Private Companies in the Telecommunications Market of Developing Countries
(The African Condition)

Friday 15th October, 1999 - ITU Geneva

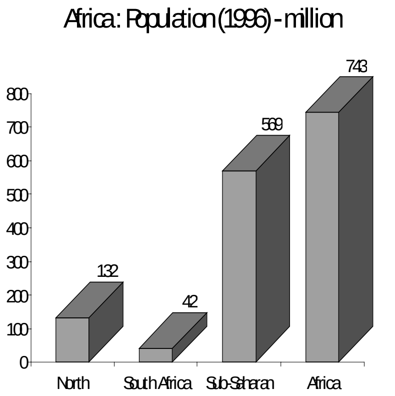
B K Njie
Managing Director,GAMTEL

Present State of Telecom Market

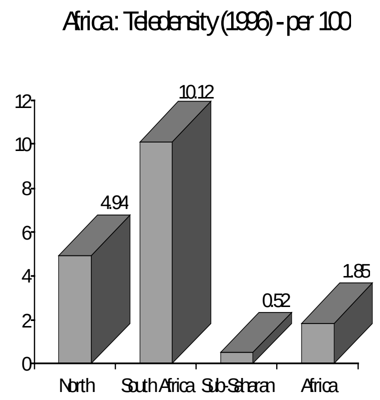
- most telecommunications operators are government monopolies
  - regarded as national status symbol
  - not operated on commercial basis - low collection efficiency for viable operation
- substantial investment funds beyond capacity of operator/public sector for meaningful development to satisfy demand
- inadequate legal and regulatory frameworks discourage genuine investors in the sector
- high import duties and sales tax on equipment
- poor penetration particularly in the rural areas

Slide 2 Bakary K Njie, Gamtel

A look at tele-densities



Source : ITU - African Telecom. Indicators 1998



Source : ITU - African Telecom. Indicators 1998

Slide 3 Bakary K Njie, Gamtel

Why Private Sector Participation

- a ready market exists because of low penetration
- untapped revenue potential of developing world's rural market is over US$20.0 billion (Intelcom estimates, 1999)
- Sub-Saharan Africa needs US$3-4 billion annually to raise tele-density to 1/100
- current private sector cable projects (Project Oxygen, SAT 3, Africa One) will interconnect Africa and provide international access
- regional satellite project (RASCOM) targeting rural access
- GATS opening new challenges and opportunities for African Countries

Slide 4 Bakary K Njie, Gamtel

How To Involve Private Sector

- ☎ leasing
- ☎ joint venture
- ☎ management contract
- ☎ operators license
- ☎ turnkey contracts

Slide 5 Bakary K Njie, Gamtel

Benefits of Privatisation

- ☎ annual growth in mainline telephones (Fig. 1)
- ☎ Increased penetration in CAPA countries after privatisation (Fig. 2)
- ☎ any well managed telecommunications entity in Africa is potentially profitable (The Gambia, Egypt, Botswana, Senegal).
- ☎ low telephone density is an opportunity rather than a perpetual deterrent
- ☎ gradual shift of government's responsibility from that of owner and management to that of provider of policy and legal and regulatory framework

Slide 6 Bakary K Njie, Gamtel

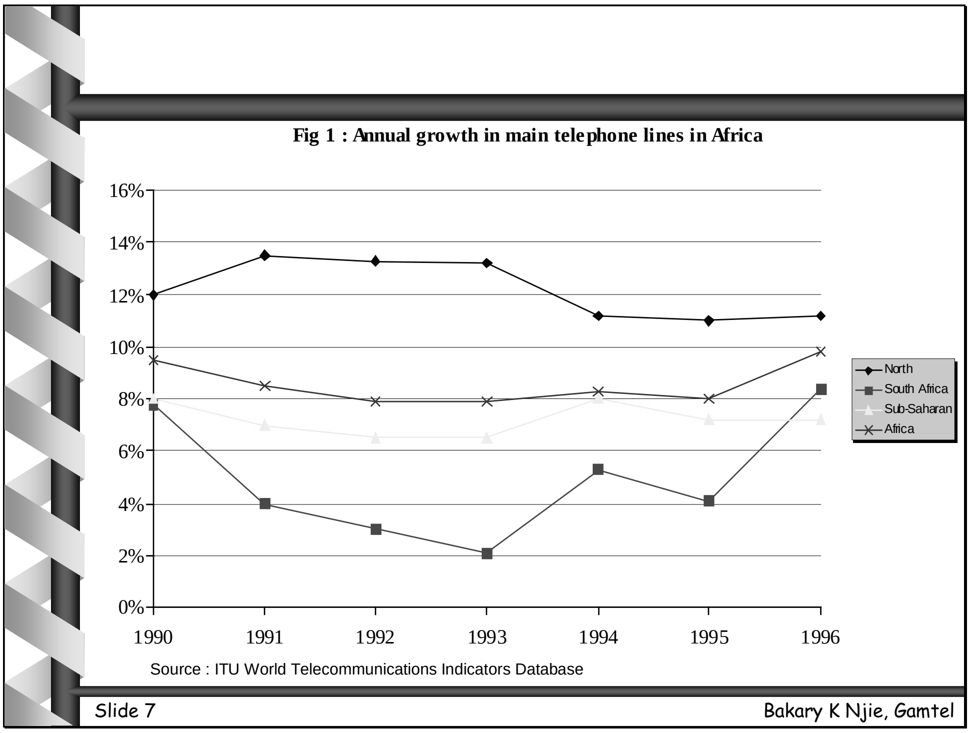


Fig 1 : Annual growth in main telephone lines in Africa
16%
14%
12%
10%
8%
6%
4%
2%
0%
1990
1991
1992
1993
1994
1995
1996
North
South Africa
Sub-Saharan
Africa
Source : ITU World Telecommunications Indicators Database
Slide 7
Bakary K Njie, Gamtel

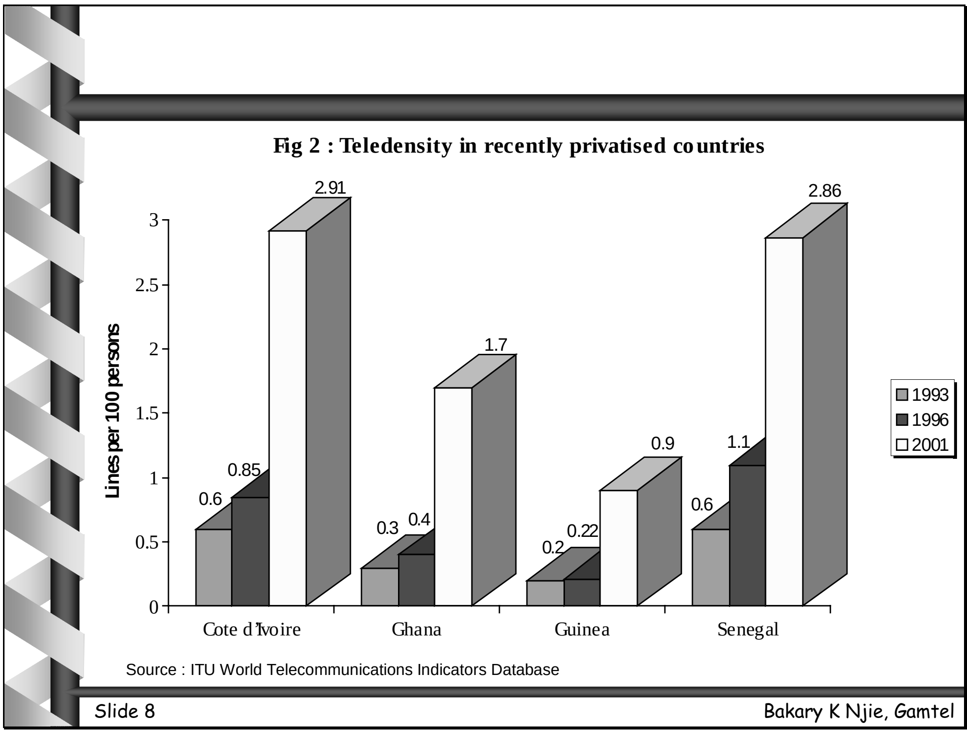


Fig 2 : Teledensity in recently privatised countries
Lines per 100 persons
0.6
0.85
2.91
0.3
0.4
1.7
0.2
0.22
0.9
0.6
1.1
2.86
Cote d'Ivoire
Ghana
Guinea
Senegal
1993
1996
2001
Source : ITU World Telecommunications Indicators Database
Slide 8
Bakary K Njie, Gamtel
b

Post-privatisation

- ☎ develop HR and provide training in new approaches to management
- ☎ encourage local capital investment and participation
- ☎ mindful of transfer from a public monopoly to a private monopoly
- ☎ create safety net for workers who may have to be laid off as a result of restructuring
- ☎ regulate cost of the services to end users
- ☎ indigenous culture and customs must be acknowledged and respected for motivation

Slide 9 Bakary K Njie, Gamtel

Mr. Leonard DOLLEY
Vice President, External Affairs
INTELSAT
(USA)

DEV.7

The future for private companies in the telecommunication markets of developing countries

Biography

Len Dooley is Vice President, External Affairs, of the International Telecommunications Satellite Organization (INTELSAT), a commercial consortium of more than 140 countries which owns and operates a global system of satellites providing worldwide telecommunications services.

Mr. Dooley is an Australian citizen who joined INTELSAT in August of 1993. Prior to INTELSAT, Mr. Dooley had more than 27 years of experience with the former OTC, which was responsible for all external telecommunications of Australia, and is now part of Telstra, Australia's Signatory to the INTELSAT treaty. Mr. Dooley's tenure at OTC/Telstra included experience in the management of Australia's representation in INTELSAT, Inmarsat, Cable Consortia, the Commonwealth Telecommunications Organization, International Telecommunications Union, Asia-Pacific Telecommunity and other international organizations. From the period June 1992 through June 1993, Mr. Dooley served as Chairman of INTELSAT's Board of Governors.

Prior to joining OTC, Mr. Dooley held various positions with the Sydney Port Authority. He holds an Economics degree from the University of Sydney, from which he graduated in 1964.

PALEXPO **TDS.5**

Friday, 15 October 1999	09:00 - 12:30

TDS.5 PARALLEL WORKING GROUPS

Panel 1

Working Group A	Centre of Excellence Concept
Chairperson	**Mr. Cheikh Tidiane MBAYE,** *Director-General,* SONATEL (Senegal)
Panelists	(Member States)
Rapporteur/Right of Response	**Mr. Mario MANIEWICZ,** *Regional Officer in Human Resources Management and Development,* Americas Division (ITU/BDT)

Working Group B	Settlement and Accounting Rates Reform
Chairperson	**H.E. Ambassador Anthony HILL,** *Ambassador,* Permanent Mission of Jamaica (Switzerland)
Panelists	(Member States)
Rapporteur/Right of Response	**Dr. Michael A. CALVANO,** *Area Representative, Asia & Pacific* (ITU/BDT)

Working Group C	Multipurpose Community Telecentres and Telecoms for teleapplications
Chairperson	**Mr. Terrefe RAS-WORK,** *Director,* Business Development (WorldTel)
Panelists	(Member States)
Rapporteur/Right of Response	**Mr. Renato CORTINOVIS,** *Officer,* Human Resources Development (ITU/BDT)

Friday, 15 October 1999	14:00 - 17:00

TDS.5 PARALLEL WORKING GROUPS

Panel 2

Parallel Working Groups A, B & C (Cont'd)	14:00 - 15:30

Coffee Break 15:30-16:00

PALEXPO

DEV.8

Friday, 15 October 1999	16:00 - 17:00

DEV.8 PARALLEL WORKING GROUPS

DEV.8	Development Summit Closing Session

Chairperson	**Mr. David MELLOR,** *President,* United Kingdom Telecommunications Academy (United Kingdom)
Keynote Speaker	**Mr. Roberto BLOIS,** *Deputy Secretary-General* (ITU)

Mr. Roberto BLOIS MONTES DE SOUZA
Deputy Secretary-General
(International Telecommunication Union)

DEV.8

A GENERAL INFORMATION

Name	Roberto Blois Montes de Souza
Nationality	Brazilian
Date of birth	10 November, 1950
Place of birth	Rio de Janeiro, Brazil

B EDUCATION

1974	Electronics/Telecommunications Engineer University of Brasilia.

C PROFESSIONAL EXPERIENCE

From February 1999	Deputy Secretary-General, International Telecommunication Union (Geneva, Switzerland).
1994-1999	Executive Secretary of Inter-American Telecommunication Commission – CITEL of the Organization of American States – OAS.
1990-1994	Director of the Department of Private Telecommunication Services, Ministry of Communications of Brazil.
1987-1990	Director of the National Telecommunication Department, Ministry of Communications of Brazil.
1979-1987	Director of the Broadcasting Division of the National Telecommunications Department, Ministry of Communications of Brazil.
1974-1979	Engineer, Broadcasting Services Secretariat, Ministry of Communications of Brazil.

D OTHER ACTIVITIES

1991-1993	Representative of Brazil in the Permanent Executive Committee of the Inter-american Telecommunication Conference COM/CITEL (OAS).
1990-1993	Representative of Brazil in the Administrative Council of the International Telecommunication Union – ITU (UNO).

1987-1990	Member of the Administrative Council of the Telephone Company of São Paulo.
1990-1993	Chairman of the Administrative Council of the Telephone Company of Rio de Janeiro, São Paulo and Rio Grande do Sul, Brazil.
1975-1994	As Representative of Brazil, participated in various meetings of the International Telecommunications Union – ITU and Interamerican Telecommunication Commission – CITEL, having acted as head of the Brazilian Delegation on many occasions.

E OTHER INFORMATIONS

Lecturer in various national and international policy, planning and technical seminars/workshops. Some of these papers have been published.

Biography

Roberto Blois Montes de Souza has held the position of Deputy Secretary-General of the International Telecommunication Union since February 1999. From 1994-1999, Mr. Blois was the Executive Secretary of the Inter-American Telecommunication Commission (CITEL) of the Organization of American Sates (OAS). Prior to becoming the Executive Secretary of CITEL in 1994, Mr. Blois held several key positions in the Ministry of Communications in Brazil including Director of the National Telecommunication Department and Director of the Department of Private Telecommunication Services. Mr. Blois has served as Chairman of the Administrative Council of the Telephone Companies of Rio de Janeiro, São Paulo and Rio Grande do Sul in Brazil. He has headed numerous Brazilian Delegations to conferences and meetings of the International Telecommunication Union (ITU) and CITEL. Mr. Blois holds an Engineering Degree in Electronics and Telecommunications from the University of Brasilia.