TRENDS IN TELECOMMUNICATION REFORM 1999

Convergence and Regulation

EXECUTIVE SUMMARY

October 1999

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EXECUTIVE SUMMARY

The world is on the threshold of a new industrial revolution. A revolution which promises to be at least as significant as that which has brought most of the growth of the world's economy in the past two centuries. A revolution which promises to have just as far reaching an impact on a wide variety of aspects of life. And a revolution with global reach. Telecommunications are at the epicenter of this revolution.

A new age is being born where goods are bought, delivered, used and paid for without ever leaving the information systems and communications networks on which they were created in the first place. In this networked economy, the investment capital is knowledge and the means of production the human intellect. This is the Information Age.

The driving force behind all of these changes is digital technology. The common language of the new Information Age is not a human language but a machine language: the zeros and ones, highs and lows, ons and offs of binary code. It allows for the first time the automated handling of information creation, processing, distribution and communication in a common format at a common level. Digital technology is what allows the convergence of media (from print to television) with telecommunications (fixed or mobile) and computing (hardware and software) to create "something" which will be greater than the sum of its parts. While promising great advantages, this "something", however, also challenges a safe and familiar status quo which it will take courage to renounce.

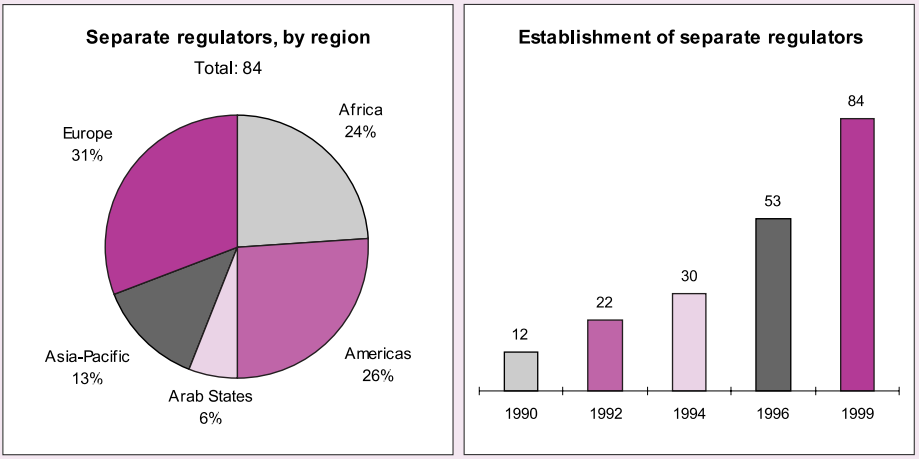
There appears to be plenty of courage around in this industry. The 1990s have seen the greatest period of policy reform the telecommunications world has ever seen. National carriers were privatized, new competitors licensed and new services allowed. The trend is likely to continue into the new century. Old orders are being overthrown by the pace of technological change. Even relatively new orders are finding it hard to keep up.

1. New laws, new regulators

Technological developments are giving rise to the convergence of the telecommunications, broadcasting and IT industries. Advances in information and communications technology, particularly the advent of the Internet, have brought about new challenges in the regulatory and legislative regimes, and have begun to blur traditional regulatory definitions and jurisdictional boundaries.

Since the beginning of the 1990s, more than one hundred and fifty countries have introduced new telecommunication legislation, or modified existing regulations. Malaysia's 1998 Communications and Multimedia Act may be, for the time being, a unique piece of legislation. But also, perhaps, a representative of the type of legislative reform to take place in other countries

Figure 1: Booming growth of regulators, 1990-1999



Source: ITU World Telecommunication Regulatory Database.

in the beginning of the next millennium. Malaysia's Act groups telecommunications, broadcasting and the computing industries into one industry with one regulator.

Pressures for convergence in regulation are coming from the increasing overlap of telecommunication regulation with content or broadcasting regulation. These pressures will increase as both telephone and cable television operators begin to provide services previously offered by the other and as the Internet's video delivery capability improves.

New legislation has given rise to new, separate telecommunication regulatory agencies. As of August 1999, there were 84 separate regulators, nine of which have been established since the middle of 1998. New, separate regulatory bodies have spread throughout the world very quickly. At the beginning of the 1990s there were only 10 separate telecommunication regulators in the world. Europe has currently the largest number of separate regulators, followed by the Americas and Africa. Another fifteen are expected by the end of 2000.

The governing structure of the new separate regulators, despite significant national and regional diversity, seem to point to a new model for telecommunication regulatory bodies. Among the nine regulators created from July 1998 to August 1999, six were established as collegiate bodies (e.g. a commission) composed of between five and eleven members. This emerging trend is in clear contrast with the approach mainly adopted prior to July 1998, in which the great majority of new separate regulators (70 per cent) were headed by a single person (e.g. a director general).

The convergence of services and markets necessitates a convergence of laws, and may also necessitate the convergence of institutions or, at a minimum, mandate coordination. In Asia, Malaysia and Singapore's regulators have been most progressive, bringing under one entity all communication

and information technology-related functions. Other countries, like Namibia and China, are establishing single Ministries to deal with convergence and a new regulator may come later.

While the increase in regulators and legislative reform is certainly encouraging, new technologies and services are moving faster than the bodies that regulate them. Convergence is not a simple issue for telecommunication regulators. The challenge is to determine ways to regulate technologies that are continually evolving and, more importantly, to determine the role of the regulator in a converged sector. The challenge for regulators, as we enter the next millennium, is to develop consistent and relevant regulations which do not inhibit the growth of the sector, but rather encourage technological innovation.

2. Opening markets to competition

The monopoly-based system of service supply, which has dominated the world's telecommunications markets for over three-quarters of a century, continues to decline in popularity. The opening up of the European telecommunication market and further liberalization in a number of markets around the world, have meant that competition is moving towards becoming the dominant mode of service supply.

OECD member states have progressed further than others in allowing competition in their national markets. During 1998, a further 19 per cent of OECD access lines became open to full competition. With this move, 96 per cent of the OECD market, on the basis of telecommunication revenues, was, at the beginning of 1999, open to unrestricted competition.

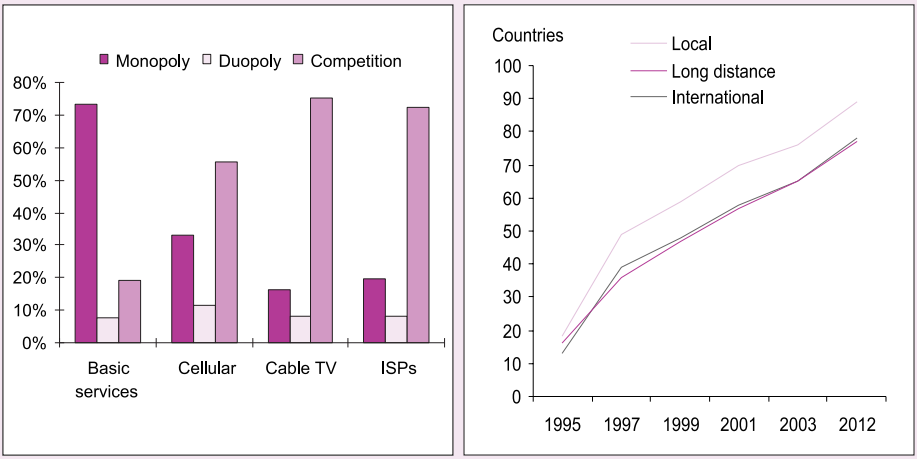
In the developing world, market liberalization is expanding in a consistent and sustained way. In Africa, for example, Uganda opened basic services to full competition, while the Democratic Republic of Congo and Madagascar shifted from a duopoly to full competition. Three other countries in the continent – Eritrea, Kenya and Nigeria – are planning to do so in the next two years. In the Americas, Brazil and Suriname opened basic services to full competition, while Peru shifted from a duopoly to competition. Argentina, Bolivia, Costa Rica, and Venezuela plan to open their basic service market to full, international competition before the end of 2001. In the Arab States, Sudan opened basic services to competition and Kuwait plans to do so in the near future.

In the Asia-Pacific region, the Republic of Korea has moved from a duopoly to competition in the provision of basic services and some newly industrialized countries, like Singapore, are planning to open the market sometime in 2000. Finally, in Eastern Europe, Kazakhstan opened national long distance and international services to full competition. The Czech Republic and Croatia plan to follow suit sometime between 2000 and 2001.

Cellular communications along with the provision of Internet services remain the most competitive markets. In 1999, more than 67 per cent of the global cellular market and 72 per cent of the Internet market were open to competition. Basic services, however, with 73 per cent of the markets still maintaining a monopoly, remain a fairly closed segment of the global telecommunication market.

Figure 2: Increasingly competitive, but still fairly closed

Competition on cellular, leased lines, Internet, and CATV services, worldwide, 1999 (left-hand chart). Growth of competition in local, long distance and international services, worldwide, 1995-2005 (right-hand chart).



Source: ITU World Telecommunication Regulatory Database and WTO.

In both the cellular and Internet markets, however, consumers were not gainings, in terms of lower prices, the full benefits often associated with competition. In cellular services, for example, the absence of certain regulatory measures, such as mobile number portability, is leading to less than effective competition. In Internet markets across the globe, but mainly in developing countries, despite widespread competition among Internet Service Providers (ISPs), prices to end users remain considerably high due to the lack of or deficient competition in leased line supply.

3. Ownership trends

Since 1997, the percentage of Asian countries that have privatized their operators increased to almost 55 per cent. In Europe, of the 53 European ITU Member States, almost 50 per cent partially privatized their operators by mid 1999.

With more than 20 countries that have privatized their incumbents, the Americas region has the largest number of fully privatized operators. African countries have moved quickly in reducing local and foreign private ownership limitations. As a result, of the 42 African Member States, 14 have privatized their operators and another eight have plans to privatize in the near future. In contrast, in the Arab States, there are presently no fixed-link operators which are 100 per cent privately-owned.

Many countries have increased private sector participation in their telecommunication sectors by allowing new market entrants which are privately owned. In general, even countries that are reluctant to privatize their operators have been willing to allow and have even encouraged private sector participation in cellular and other value-added services. As a result, most of the cellular networks around the world are at least partially owned by foreign investors. Recent estimates consider that more than one hundred cellular networks around the world have investments from foreign sources.

Licensing of new entrants has been used also as a way of increasing private investment in the ISP market in most countries around the world.

The technological developments underlying digital convergence have enabled many services to be available over different platforms. To avoid losing market share or to increase it in new markets, companies have merged, acquired and formed alliances with other companies. By forming such partnerships, companies have benefited from the established brand name of their partners as well as achieving efficiencies like economies of scale and scope and the reduction of transaction costs.

As the markets continue to converge, not only is the distinction between markets and products disappearing, but so are international boundaries.

Digital convergence continues to lead the consolidation of markets. Telecommunications, cable, satellite and content/entertainment companies, as well as ISPs, benefit from consolidation of markets. However, there is no evidence that the consumers will also benefit from this convergence. For that reason, governments are becoming increasingly proactive in ensuring that the consolidating markets does not lead to anti-competitive practices.

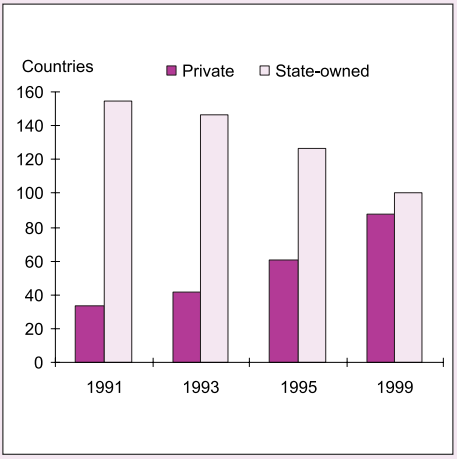
4. Licensing

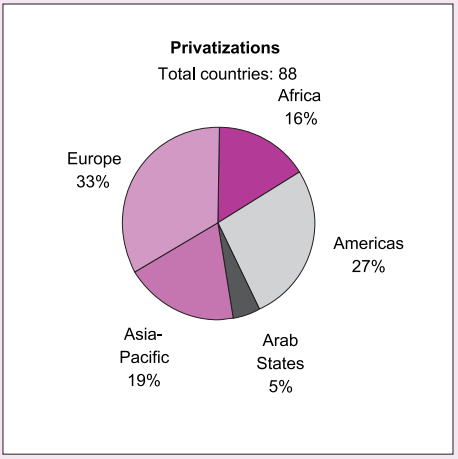
Perhaps the single most important characteristic of emerging licensing frameworks is the degree of diversity among them. The differences reflect a wide variety of views from one country to the next on the functions and objectives of licensing. It is clear that there is no perfect approach. Partly, this is due to the fact that each country must build its liberalization programme on the foundation of the particular governmental and industry structure that already exists. Other factors then come into play, including the overall objectives of the licensing process: to control the rate of competitive entry, to minimize or maximize foreign investment, to promote infrastructure investment, to maximize revenue production, to attract advanced services for multinational business, or to minimize adverse economic impact on a national carrier, etc.

The diversity of licensing regimes is an important regulatory issue in the age of globalization. Asymmetrical licensing regimes may impede the growth and implementation of global services, and make more complex the transition to new generation regulatory frameworks that will be required for the age of cybernetworks. Pressure will increase for greater simplicity and harmonization.

Figure 3: Privatization of the incumbent

Privatizations from 1991-1999. Regional distribution of privatizations 1999





Source: ITU World Telecommunication Regulatory Database.

In spite of this diversity of licensing regimes across the world, most licenses granted today are built around central notions of the public interest. There are three themes underlying individual country licensing regimes: (1) ensuring the availability of public services, (2) promoting the expansion of telecommunications infrastructure, and (3) controlling competitive entry and/or anti-competitive conduct. These themes are not mutually exclusive. All three are usually addressed within a country's licensing scheme.

Certain telecommunication services, particularly voice telephony, have been considered to be a public good. Countries that have taken this approach have tried to create a demarcation between public and non-public services, leaving little room for carrier self-selection or gradation. However, concepts such as common carrier services and public services are difficult to maintain in a dynamic industry. In the United States, the Federal Communications Commission (FCC), for example, has had to exercise the limits of its creativity to maintain a rational demarcation point between services that fall under regulation and those that do not.

Facilities licensing regimes based upon the types of services provided over the facilities have similar problems. It is difficult to maintain sustainable distinctions based solely upon the physical characteristics of certain facilities. Fixed and mobile networks are now largely substitutable. Any notion of infrastructure licensing which tends to create regulatory advantages or disadvantages for different technologies introduces market distortions. This will become more critical as digitalization becomes pervasive and networks become more substitutable, as well as more distributed and stratified.

5. Universal Access

Universal access policy has become an important aspect of communications regulation. It is, perhaps, one of the few areas where sector-specific regulation may be required indefinitely, even when competition has spread across market boundaries. This is because it aims to meet needs for basic telecommunications which are thought impossible to be met by purely commercial means.

Technological innovation (and the reduction of costs generally associated with it) is, no doubt, a major force in the increase in networks and services. Today's intelligent networks and peripherals, especially when coupled with sophisticated voice technology, offer several new opportunities for extending communications access and use. Best known is perhaps the notion of *virtual telephony*, which has become quite widespread among homeless people in the United States and is also being sold successfully in other countries like Botswana and Chile. Virtual telephony gives a subscriber a telephone number and a voice mailbox, enabling him or her to receive messages and access them from any phone. An upgraded but still economical service radiopages the subscriber when new messages arrive.

Open markets have proven to be major drivers in the expansion of services across nations. Some regulators, convinced of the virtues of open markets, are going further and introducing an element of competition in the fulfilment of universal access goals. Competitive tendering for payphone provision to unserved villages has been in place for some years now in Chile and in Peru last year. In Chile, a specially constituted council examines the applications and awards each tender to the best bid. At first, this meant the bid requiring the lowest subsidy, but now other factors such as speed of provision are also being considered. Australia's Ministry for Communications has recently announced its intention of developing a process for also putting the USO out to competitive tender.

Many new policies geared towards improving universal communication services share a new emphasis on the importance of public access points for broadening access to whatever communications technology has been installed. Regulators may require licensees to provide a certain number or percentage of public access points as a condition of their license. But they may also encourage the provision of public access by non-licensees by permitting or requiring service that will be resold at a low price, to permit a margin for the reseller and/or limiting the permitted mark-up. Others are aiming instead at more complex schemes, which might include some or all of the features of a multimedia telecentre.

6. Interconnection

Interconnection is accepted to be a key factor in the development of competition in the telecommunication industry. In simple terms, interconnection is the set of legal, technical and economic arrangements between network operators that enable customers connected to one network to communicate with customers of other networks. The convergence of different technologies and networks, along with the development of new applications and services, is

Table 1: Comparison of selected licensing regimes in Latin America

Operation	*Argentina*	*Brazil*	*Chile*	*Colombia*	*Mexico*	*Venezuela*
Data processing	VAS license	Unregulated	Unregulated	VAS license (can include VSAT)	VAS registration	VAS concession
Data transmission	Data trans. license	Specialized limited services authorization	Limited services license	N/A	Public service concession	Switched data concession
Private network	License	Private limited service authorization		Unregulated	Unregulated	Private network permit
Limited network or closed user group	N/A	Private limited service authorization		N/A	N/A	
Satellite (VSAT)	License	Specialized or private services license	License	Carrier service license	Concession	VSAT concession
Private wireless	License		License			Private network permit
Carrier services	N/A	N/A	N/A		N/A	
Public mobile voice telephony	Limited concession	Limited concession	Limited concession	Limited concession	Limited concession	Limited concession
Public network resale	N/A	N/A	Concession	Local service unregulated		N/A
Public fixed voice telephony		Duopoly		LD & Int'l License	Concession	

Source: A. Pisciotta and ITU.

Table 2: USO funding mechanisms

Universal service funding strategies

Mechanism	*Environment*	*Example countries*	*Explanation*	*Key advantage(s)*	*Key disadvantage(s)*
Cross-subsidization	Traditional monopoly	Czech Republic, Pakistan	Profitable services (e.g. international) subsidize universal access	Well-established, easy for incumbent	Long-term, incompatible with competition
Cooperatives	Independent local telecoms operators	Argentina, Finland	Residents invest and own local telecoms operators	Local control	No help to high-cost areas or low-income communities
License obligations, absorbed cost	Transition from monopoly to competition	UK	Net cost of universal access presumed negligible, outside funding unnecessary	Low administration cost	Little incentive for new entrants to take on USOs
Access charges	Liberalizing	Canada	Interconnecting operators contribute to access deficit	Compatible with early stages of competition	Hard to get charge levels (and incentives) right
Central fund (real or virtual)	Competitive	Australia, Chile, France, USA	All competitors share in net cost (in cash or kind)	Potentially fair	High admin. cost, especially when agreeing costing approach
Direct assistance	Competitive	Finland	Government support for needy areas or households	Should minimize market distortion	Have to secure outside funding, identify eligible recipients

Source: ITU adapted from Ovum 1999.

forcing regulators to look at how to deal with the interconnection issues arising from developments such as voice over Internet Protocol (IP) or frame relay, fax over IP, video conferencing, electronic commerce, etc.

In general, the national regulatory authority of a given country may adopt one or a mix of the following approaches to different interconnection issues: (a) leave the issue entirely to commercial negotiation between parties; if parties fail to agree, they may appeal to general competition and anti-trust law; (b) leave the issue entirely to commercial negotiation between parties, but subject to regulatory intervention if the parties fail to agree; (c) leave the issue entirely to commercial negotiation between parties, but the regulatory authority sets the framework for negotiations and it has to approve the agreement or intervene if the parties fail to agree; (d) specific issues are prescribed from the outset by the regulatory authority, and parties negotiate over the remaining issues.

Approach (a) and (b) rely on market forces rather than regulation. Some countries in the Asia-Pacific region, such as New Zealand, have taken this approach, letting market forces be the drivers for interconnection agreements. Most of the African countries also let the parties negotiate most of the fundamental issues of interconnection, but for different reasons. In many cases, the regulatory authority is unable to develop an interconnection policy simply due to the lack of expertise, staffing or funding problems, as well as jurisdictional issues. In the Americas and Europe, the regulatory frameworks rely more on approaches (c) and (d).

From a regulatory point of view, the technical and operational issues of interconnection may become a potential source of anti-competitive behaviour, since they may be used by the incumbent operator to discriminate against the entrant or simply as a means to delay interconnection negotiations. The regulatory framework may help to achieve efficient and fair competition as long as some of the most relevant technical issues are prescribed under specific rules or procedures, which at the same time must be efficient and easy to enforce.

Continued Internet growth may only be sustainable if adequate interconnection agreements are in place. There are four main models of interconnection among ISPs: (1) Peer-to-peer bilateral, (2) Hierarchical bilateral, (3) Third-party administrator and (4) Cooperative agreement. The first two models currently represent the dominant models of interconnection between ISPs.

Up to now, the dominant model of Internet interconnection used to be the peer-to-peer bilateral model, by which two ISPs of similar size, experience, technology, and customer base agree to interconnect their networks under a "sender keeps all" agreement (i.e. on a settlement-free basis model or peering). As the Internet has grown dramatically over recent years, the proliferation of new ISPs has also risen at a dramatic pace. Since ISPs come in different shapes and sizes, the bigger networks have started adopting a hierarchical bilateral interconnection agreement with their smaller counterparts.

Table 3: Tariff and interconnection regulation

Selected countries, as of 1 January 1999

Country	*Type of regulation of end-user tariffs*	*Rebalancing of end-user tariffs*	*Access deficit charges*	*Access deficit in interconnection charges*	*Cross subsidy from long distance*
Argentina	Price cap	Completed	Yes	No	Yes
Australia	Price cap	N/A	Yes	No	
Austria	Price cap, cost orientation of tariffs	Almost completed	Yes	No	No (rebalancing soon)
Azerbaijan	Price cap	Completed	No	No	Yes
Canada	Price cap	Almost completed	Yes	No	Yes
Chile	Price cap	Completed	Yes	No	No
Finland	No (operators can freely set tariffs without approval)	Completed	No	No	No
Ghana	Price cap	Not started yet	No	No	No
Israel	Price cap	Almost completed	Yes	No	No
Korea, Republic of	Rate of return	Just started	Yes	Yes	No
Mexico	Price cap	Almost completed	Yes	Yes	Yes
Morocco	N/A	Just started	Yes	Yes	No
Netherlands	Price caps for the overall and small packages	Almost completed	Yes	N/A	N/A
Peru	Price cap	Completed	No	No	No
South Africa	Price cap	Almost completed	Yes	No	No
Spain	No (incumbent sets up tariffs with government approval)	No	Yes	No	N/A
Thailand	Government approval	No	Yes	No	N/A
United Kingdom	Price cap for final-user tariffs and interconnection services	Almost completed	Yes	No	No
United States	Price cap	Almost completed	Yes	No	No
Zimbabwe	PTO set tariff with approval by Ministry	Just started	No	No	No

Key: N/A = not available
Note: This table is intended to be indicative rather than exhaustive.
Source: ITU World Telecommunication Regulatory Database, OECD (1997).

The established relationship is provider-customer rather than peer-to-peer as in the previous model. This is the interconnection model that now appears to be dominating the Internet world.

7. Pricing Services on Digital Networks

Prices are extremely important to the development of products and services, industries and national economies. Inappropriate pricing structures can restrict development. Innovative pricing structures can stimulate demand and promote development. Prices are particularly important in the field of telecommunications because of its network characteristics. But prices are not always set appropriately to match the quantity supplied with the quantity demanded.

The most commonly used standards for judging the overall reasonableness of an incumbent PTO's prices and profits are return on investment and productivity improvement. Although both standards establish a general cap on prices, the productivity improvement standard is widely known as the price cap standard. Overall price cap regulation is not sufficient to ensure that specific price levels for individual services are reasonable. In a market environment where the incumbent PTO has a monopoly in some services and must compete in other services, there is a powerful incentive to combine price increases in monopoly services with price decreases in competitive services so the overall level of prices stays within the price cap. Thus, reasonable overall prices for a PTO can be associated with unreasonable prices for both monopoly and competitive services.

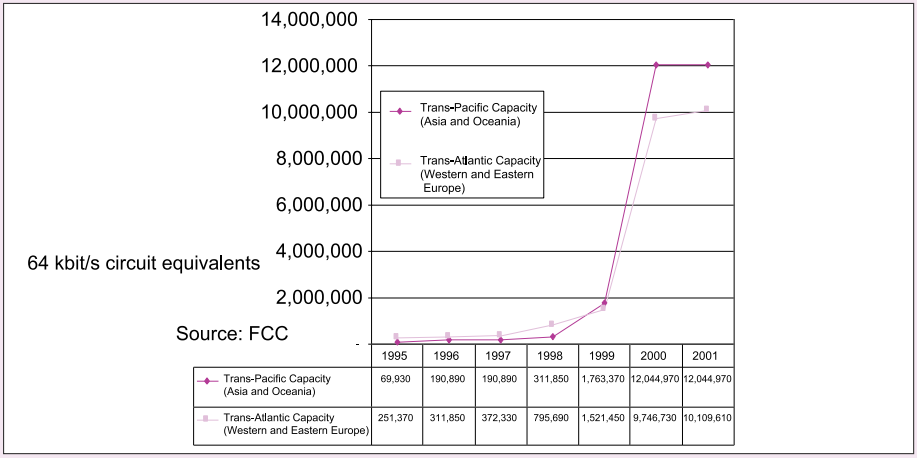
Competition has developed more rapidly in international telecommunication services than most others. As a result, the traditional system for international revenue settlements (IRS) among correspondent national PTOs is being undermined in a variety of ways (refile, callback, private networks, IP telephony, etc.).

Furthermore, if current plans for new transoceanic cables and satellites over the Atlantic and Pacific oceans are completed on time, there will be an increase in current capacity of about 6.5 times by the end of 2000. This will be accompanied by major price reductions reflecting the dramatic reduction in the unit costs for circuits, bandwidth capacity and telephone calls using the new technologies.

Digital networks enable the provision of the value-added and information services (e.g. electronic commerce) that will be applied throughout the entire economy and support the development of information societies. Thus, leased line bandwidth prices are extremely important for the development of information economy services.

In many countries, leased line prices have been kept artificially high by the incumbent PTOs because of concern that they would be used to provide competitive services. This has had a major impact on the development of Internet traffic. For example, European 2 Mbit/s leased line cross-border prices have been 15 times higher than United States prices. As a result, most Internet traffic between countries in Europe travels to the United States and back,

Figure 4: The forthcoming explosion in international network capacity



Source: *Building Capacity for Electronic Commerce - Leased line Developments and Pricing.* DSTI/ICCP/TISP(99)4, OECD, June 11, 1999. http://www.oecd.org/dsti/sti/it/index.htm

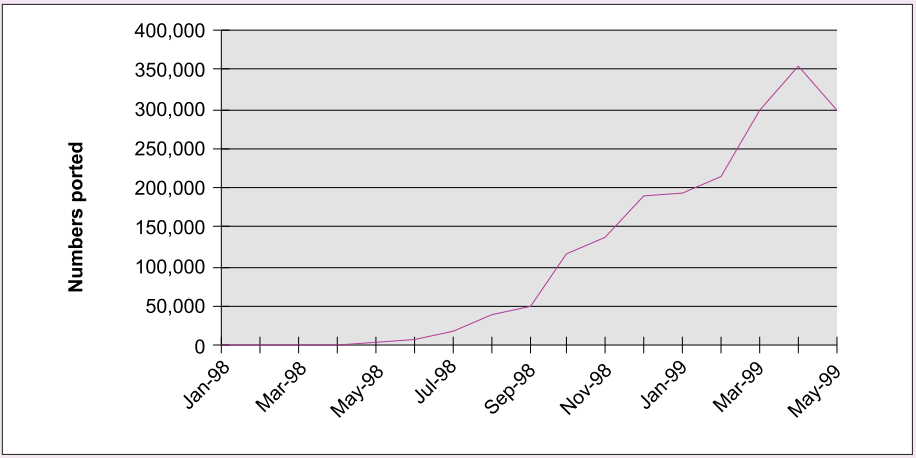
making the United States the primary beneficiary of this intra-European traffic. Almost all countries, including developing countries, are experiencing this same phenomenon. The way to resolve this problem is for these countries to lower leased line prices and expand leased line capacity.

8. Numbering in a digital world

Names and addresses are markers that guide the movement of information from a source to a destination. Once regarded as an obscure and rather uninteresting technical aspect of a network, numbering and addressing are now important aspects of telecommunication policy. In a networked economy and an information-saturated environment, names and addresses on networks can become public identifiers with important implications for marketing, visibility, and ease of use.

Three major trends are shaping the evolution of telephone numbering spaces. One is rising demand caused by the popularity of new communications devices that require numbers, such as facsimile machines, pagers, satellite telephones and mobile phones. The second reason is the increase in new services, such as freephone (800 number), international premium rate and shared cost services, which require separate numbering domains. Many of these services require international and even global coordination of numbering. The third trend is the liberalization of the telecommunication sector. This requires the allocation of numbers to competing service providers, the addition of carrier access codes to numbering plans, and portability of numbers across service providers.

Figure 5: Local numbers ported in the United States



Source: Lockheed Martin Number Portability Administration Center.

Many of the trends operating on telephone numbers are beginning to make telephone network addresses more like domain names on computer networks. Computer networks have the potential to create a far more flexible and user-friendly, but also more complicated, naming environment. This is because the Internet is not restricted to a purely numerical input of the telephone dial, and because the Internet Domain Name System (DNS) can almost instantly translate a name into a cryptic Internet Protocol (IP) address. The issues related to Internet domain names, therefore, provide a foretaste of the kinds of issues that may arise as the telephone system progresses to a fully portable, globally harmonized, intelligent network-based system of addressing.

The registration of second-level domain names generated somewhere around US$250 million in revenue in 1999. The number of domains registered, now over 8.5 million, is expected to rise to 28 million by 2002.

Domain names have become the focal point of change in Internet governance arrangements. Sweeping global changes in Internet administration have been set in motion by a problem that may seem to be fairly simple: adding new top-level domains (TLDs) to the root of the Internet. The unexpectedly rapid rise of the Internet, however, has highlighted a number of unresolved issues including who has the right to add top-level domain names, how many TLDs should there be, how should conflicts between domain name registrations and trademark rights be resolved? These are all issues which need addressing, but in such a way that the maximum amount of innovation can be encouraged while individuals, and organizations, rights are adequately protected.

The second edition of the ITU's Trends in Telecommunication Reform – published in October 1999 to coincide with TELECOM 99 – explores the theme of convergence and regulation by taking a detailed look at the impact of digital convergence on the reform of the telecommunication sector, in particular on national regulatory regimes.

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