Colombia:

IP Telephony and the Internet

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1 Introduction

In Colombia, the entire telecommunication sector operates in a competitive environment. There are more than 50 operators providing basic local telephone service, four cellular telephone operators, and over a 100 value-added operators. Although the first liberalization provisions were put in place in the early 1990s, it took more than seven years to open up long-distance service to competition, and during that time the process was subject to various pressures from the main players involved.

In December 1998, Colombia became the first country in Latin America[1] to offer long-distance service from mobile telephones using Internet technology. The key factors in the emergence of this service were the steep advances in IP technology, the bold commercial moves on the part of one cellular company and an apparent lack of clear regulations governing cellular and Internet telephony. The process gave rise to three investigations by telecommunication regulatory and oversight bodies and a great upheaval in the sector.

Three operators participated in providing this service, two from their cellular networks and one value-added operator that completed the link. After nearly nine months of operation, the service was suspended at the initiative of the value-added operator.

The authorities have just wound up two of the three investigations. In the first of these cases, the penalty imposed on each of the two cellular operators and the value added operator was a fine (1'000 times the monthly minimum wage, an amount equivalent to approximately US$ 140'000), and in the second, a fine was imposed while the long distance operators were given 15 days to present a claim for the damages generated by the conduct of the IP telephony service provider.

The prosecution of the cellular and value added companies for providing IP telephony services over their networks is one of a number of actions brought by the national administration to deter the diffusion of illegal or unauthorised IP telephony services in the country.

In the second half of 1999, in response to complaints by long-distance operators, and on the basis of allegations to the effect that unauthorized international voice transmission services were being provided by some operators, the judicial authorities conducted inspections of the head offices of more than 20 operators legally established to provide value-added services. Some of the operators were closed down and charges were made; these cases have not yet been resolved. Recently, however, judicial authorities issued detention orders for the general managers or presidents of most of those companies.

In these circumstances, the agencies responsible for regulating telecommunications in Colombia are facing the challenges posed by globalisation and convergence, as well as facing the task of promoting the development of the Internet as laid down in the National Development Plan.[2] These agencies are being called upon to resolve the delicate conflicts that have arisen as a result of operators with value-added licences offering IP telephony services.

2 The Internet in Colombia

Telecom[3] established its first Internet connection in March 1994. The precursor to that connection, however, dates back to 1986, when a group of Colombian institutions joined together in an effort to establish computer services for the country's higher education system. The institutions taking part were the University of the Andes, the National University, the Instituto Colombiano para el Fomento de la Educación Superior [Colombian Institute to Promote Higher Education] (ICFES) and Telecom – the dominant State owned telecommunication operator in Colombia. The network they established was the Red Universitaria Nacional Colombiana [National University Network of Colombia] (RUNCOL). By entering into payment-for-service contracts and by skirting administrative rules and procedures, this group

1 According to the operator's advertising when it began offering the service.

2 On February 2000 the President of the country issue a document entitled "The Connectivity Agenda: The Internet Jump", that presents a number of strategies and actions calling the country to embrace the information technologies with the aim of constructing the information society as national goal.

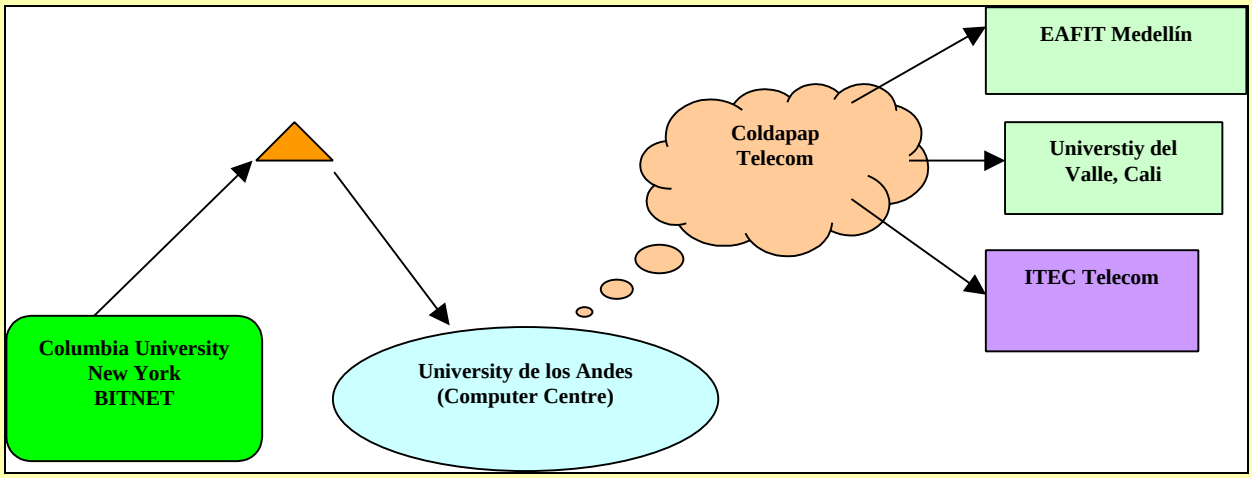
3 Telecom is a corporation established in 1947, which held a monopoly on long-distance service until 1997.

of institutions succeeded, in 1990, in establishing a 9'600 bps satellite link between the University of the Andes in Colombia and Columbia University in New York. This was the first step in providing access to a global data network through connection to Bitnet[4] (see Figure 1). This access was initially used as a working tool by the academic and scientific community, such as the Instituto Técnico de Telecomunicaciones [Telecommunications Institute], (ITEC) an arm of Telecom dedicated to teaching and research, and other pioneering universities in this field.

Thanks to a joint effort by several universities, with support from Panamsat[5] and assistance from ICFES and Colciencias [the Science Council of Colombia], an Internet connection was established in May 1994 for the node of the University of the Andes Computing Centre[6]. Initially, this provided direct access for the entire Andes academic community. Access was gradually extended to the general public, free of charge, and the number of users eventually totalled more than a thousand. Subsequently, this venture became CETCOL [Colombian Science, Education and Technology]; it used the network known as INTERED and opened as a fee-paying service available to the general public[7]. For its part, the University of the Andes succeeded in being assigned responsibility for administering the <.co> domain and the Class B address in 1991.

Initially, the spread of the Internet was a great concern for Telecom, since Telecom's commercial arm assumed that the Internet would lead to a reduction in the use of the X.25 data network. Nevertheless, in 1994, Telecom connected itself to the Internet to provide an internal service for consultation by its staff, at speeds of 9 600 bits/s. Soon after, this connection was opened to the general public and a special service was set up called SAITEL (Servicio de Acceso a Internet de Telecom [Telecom Internet Access Service]).[8] This was the first commercial Internet service provider (ISP) available to the general public in Colombia.

Figure 1: Connection to Bitnet



Source: Prepared by the author on the basis of interviews.

4 In the late 1980s, Telecom built the X.25 data network This was critical in connecting the Colombian universities to Bitnet.

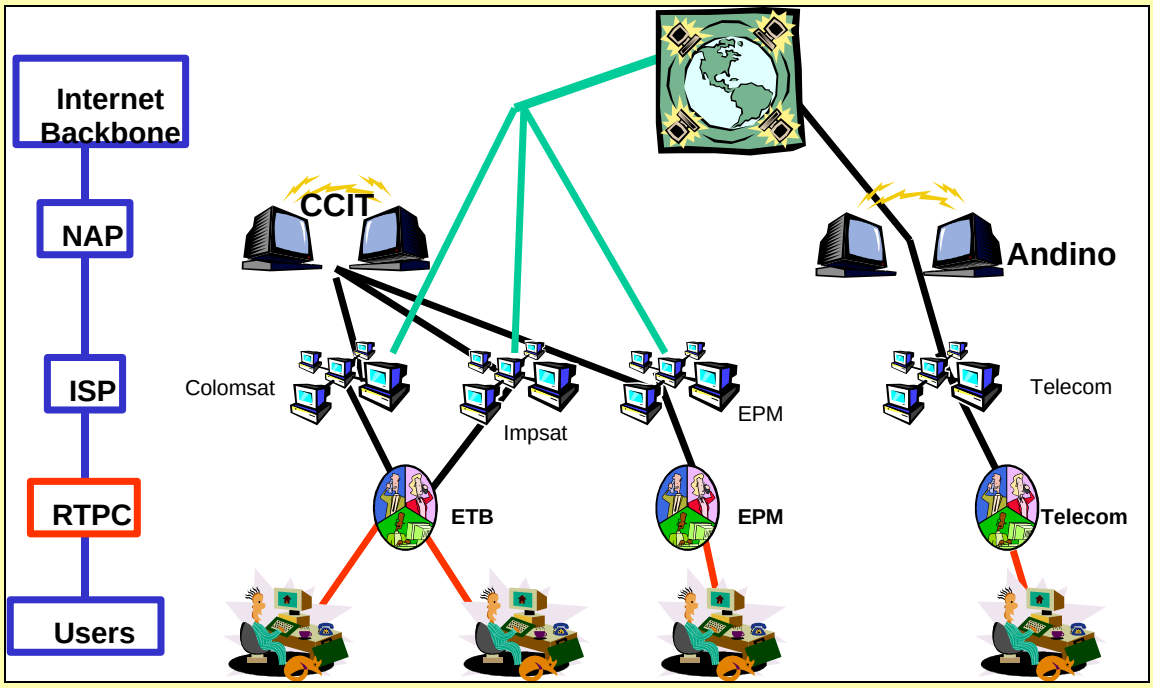
5 Panamsat offered a 50-per cent discount on the service cost for a 128-kbit connection in Homestead, Florida, which was in turn connected to NSFNET.

6 An important feature in the development of the Internet in Colombia was the design and implementation of the internal network of the University of the Andes, using TCP/IP protocols. Once access to Bitnet was in place, this made it possible for coverage to be extended to both student and faculty alike, and created a ready-made pool of users for eventual connection to the Internet.

7 CETCOL, which was established with the cooperation of Colciencias, ICFES and the main universities, was designed according to the NSF concept to promote the establishment of a database shared by universities. It was a pioneer in providing Internet access prior to the advent of commercial Internet service providers (ISPs).

8 Before SAITEL was offered commercially to the public, it was a research division of ITEC. It had about a thousand users connected to the Internet, most of them companies or entities such as the Federación Nacional de Cafeteros [National Federation of Coffee Producers], and Ecopetrol (the Colombian Oil Corporation).

Figure 2: Internet connections in 1999 with NAPs.



Source: CRT. Proposals for the Internet access rate scheme, 24 January 2000.

With the coming of the World Wide Web in 1994, new ISPs emerged, among them IMSAT, CABLENET and COLOMSAT, and started offering Internet connections on a regular commercial basis. In a market entirely open to competition and free from regulatory restrictions, these firms started offering a wide variety of services with different tarrif plans.

At about the same time, in November 1993, the Cámara Colombiana de Informática y Telecomunicaciones [Colombian Information Technology and Telecommunications Association] (CCIT) was established as a trade organization bringing together major private telecommunication and information-technology companies in the country. As of the beginning of 2000, CCIT had flourished with 38 affiliated companies, including telecommunication service operators as well as equipment and technology suppliers and consulting firms. Among its services, CCIT offers an up-to-date information service on rules and regulations governing this field, on the nationwide infrastructure, and on the equipment suppliers operating in the country.

The emergence of CCIT generated certain other major initiatives in the sector, such as the establishment in early 1999 of the first Network Access Point (NAP)[9] in Colombia (see Figure 2), bringing together the country's largest Internet service providers.[10] The purpose of the NAP is to channel and route communications exchanged between users on the various Internet access networks.[11] Since it was implemented, it has offered equal conditions and opportunities to all operators linked to the NAP and information concerning traffic volume, speed, traffic ratio, utilization time, degree of congestion and other operational matters.

9 Network Access Point: a junction point where major Internet service providers interconnect with each other. Also known as Internet Exchanges (IXs), connection at one or more of these NAPs means "connected to the Internet"

10 These ISPs include Americatel Colombia, Andinet-on-Line, Colomsat S.A., Comsat, Corporación inter red, Emtelco S.A., Empresas Públicas de Medellín, Global One Communications, S.A., IBM de Colombia, S.A., Impsat S.A., Rey Moreno Ltda., Teleglobe Colombia S.A., Firstcom, and Diginet Colombia Ltda.

11 Cisco Systems, Inc., donated the routing equipment for the connection of the first 16 ISPs connected to the NAP.

3 Profile of the Internet market

The number of Internet servers in Colombia has grown exponentially, rising from 63 in 1994 to 47'155 in July 1999. As of early 2000, there were some 162'000 Internet accounts, including some 18'000 business accounts. Taking into consideration those users who access the Internet from cafes, or from universities, and those who have access through local networks in companies and organizations, it is estimated that there are some 500'000 regular Internet users in Colombia.[12]

However, many users still have limited access to PCs and modems and are, at present, unable to acquire their own due to the low level of the average income and the high cost of such equipment. The monthly income per capita in 1996 was US$ 182 and the cost of purchasing a computer and a modem was approximately US$ 1'300, so purchasing the necessary equipment to access the Internet would require more than seven times the average monthly income. In comparison, the cost of a television set is approximately US$ 150, which means that buying a television requires less than the average monthly income.[13] Consequently, it will be some years before Internet access is extended to the majority of Colombians, unless a clear national strategy is developed and successfully implemented.

There is a considerable number of ISPs operating in the Colombian market. Of the 134 firms that hold a value-added licence issued by the Ministry of Communications, only the larger players like Telecom, Latinonet, Impsat, Cablenet, EPM, Telesat, Colomsat, Global One, Rey Moreno, and 54 others of various sizes, offer Internet connections. However, the bulk of market share in Colombia is divided between only a few of these ISPs (see Box 1).

As of early 2000, a wide variety of rate plans were to be found, starting at as little as three dollars for four hours a month. The rate for unlimited Internet access ranged between US$ 15 and US$ 40 per month, at speeds of 30 to 56.6 kbit/s.. Cable television operators in Bogotá offered home Internet access in addition to the regular television service for US$ 34, plus US$ 60 per month for 300 MB. Although this price included a modem, installation and a network card, clearly, these are not competitive prices for residential service.

The wide variety of existing ISPs have brought a great deal of competition and, consequently, a broad array of services, prices and promotions are being offered. Since January 2000, for example, one company has been offering Internet access free of charge, a development that will surely lead to significant changes in the pricing scheme currently in force in the market. Another company has been offering a computer with an Internet connection for US$ 50 per month under a locked-in three-year contract, and many firms are offering special rates for students.

Most ISPs are connected to basic local networks by means of switched lines or access connections, or by means of E1 lines leased under individual contracts which are usually the same sort of standard-clause contracts established for any user. Thus, approximately 50 E1 lines account for the total transmission capacity of all Colombian ISPs having servers in the United States. Some ISPs, however, have the potential to expand that capacity immediately, among them Telecom and Global One. In 1999, IP connections grew by 250 per cent (20 per cent of the capacity is by fibre optics and 80 per cent by satellite).[14]

Recent months have seen a spurt in the volume of Internet traffic originated by the ISPs linked to the NAP (see Figure 3, right-hand chart). This is evidence of the clear growth trend for all service providers.

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[12] CRT, "Propuestas al Esquema Tarifario de Acceso a Internet, Enero 24 de 2000" ["Internet access rate proposals, 24 January 2000"]. This provided for 380'000 dedicated and university users, 110'000 dial up users and 4'000 users connected by cable modem.

[13] The density of television sets per 100 inhabitants is a better indicator, which suggests that a Web-TV system could gain acceptance in Colombia. Even though, with nearly 22 television sets for every 100 inhabitants, Colombia ranks 98th among countries worldwide, it ranks close to its Latin American neighbours. On the other hand, it does indeed fall behind in comparison with the most developed countries, which in every case have more than 45 television sets per 100 inhabitants.

[14] "Los servicios de Internet en Colombia" ["Internet services in Colombia"], R. Lievano, Adviser to the General Coordinator of CRT. Paper given in La Jolla, California, on 9 November 1999.

Box 1: Market leaders

The main Internet service providers in Colombia, 1999

Telecom: Telecom entered the Internet business in 1994, offering service by means of its digital microwave network to 1 000 users in Colombia's main cities. By the end of 1999, Telecom had 35 000 residential subscribers – representing a 35-fold increase in six years – and some 190 corporate subscribers[15]. By these figures, Telecom ranks as the country's largest ISP. Through its extensive IP network, Telecom offers Internet services in more than 35 cities in the country. Thanks to its national fibre optic network, the company is positioning itself as the most technically advanced ISP in Colombia. In 1998, it began offering high-speed broadband connections for residential and commercial subscribers using xDSL lines. It has plans to put a NAP into service, to be situated in Barranquilla at the landing point of the Pan American cable where it will be linked to Telecom's fibre network. This NAP will serve ISPs not only in Colombia, but also in Ecuador. Telecom also has a national SDH microwave network. It uses a 50-teleport DOMSAT satellite system as a back-up, and offers packet-connection services through ITEC, the arm of Telecom that is developing applications for distance education and other services.

Colomsat: Colomsat, which is part of the NAP operated by the CCIT, has been providing Internet access since 1995, offering dial-up access and dedicated connections by means of digital lines and ISDN connections for residential and commercial subscribers. At the end of 1999, it had over 20 000 subscribers. In 1998, with a view to strengthening its corporate customer base, Colomsat entered into an agreement with CompuServe to provide integrated Internet solutions for corporate users. Colomsat offers microwave connections and local last-mile connections by cable in Bogotá, and its customers in Cali and Medellín can access the service through ISDN lines. The company uses its microwave infrastructure for domestic Internet transmission and an international Texcom satellite access to Florida to connect to the Internet infrastructure of MCI, based on a frame relay platform. The company has also concluded contracts for other international connections to double its transmission capacity. Speeds range between 33.6 kbit/s for dial-up access to 64 kbit/s and above for high-speed access. Colomsat does not offer its own content, but it does have a webpage that provides connections to a number of content and electronic-commerce sites.

ImpSat: ImpSat began operations in Colombia in 1996, and has become another of the country's main Internet service providers. It was bought in August 1999 by the pan-regional El Sitio portal. The firm is now conducting IP voice tests. ImpSat has operating nodes in Medellín and Bogotá, and is in the process of installing network nodes in Viejo Caldas and Barranquilla. The average Internet access speed is 33 kbit/s, and most clients are migrating to 56 kbit/s. ImpSat uses its own international link for its Internet infrastructure. It does not offer any content of its own in Colombia, but it does now form part of the network of El Sitio portals[16].

Source: Telecom, Colomsat and ImpSat

Most of the rapidly growing traffic is linked to the various services offered by companies in the market, such as e-mail, VPN, application hosting, content services, Web browsing, distance learning and network management (see Figure 3, left-hand chart). At the end of 1999, the sites most often visited included banks, radio news programmes, a newspaper, the Ministry of Health, the Chamber of Commerce, a university and an airline.[17]

Most government agencies have created their own webpages, where they post information about their respective areas of responsibility. Prospects for increasing the scope of application of Internet services are excellent. In Bogotá, for instance, a network has been set up to connect institutions of learning, and it is hoped that by the end of this year they will all be connected to the Internet by means of a city-wide network. Some public utilities are now set up to accept requests and enquiries via the Internet. Another example, involves a procedure that the CRT has established for issuing regulatory documents and other materials[18]. A group of professors at the National University of Colombia is investigating possible applications in the field of medicine, and banks and businesses have already produced Web applications and means of contact via the Internet. The newspaper El Tiempo has participated in the Grupo de Diarios América [Newspaper Group of the Americas] Project –<http://www.gda.com>– which operates an Internet portal geared to the Spanish and Portuguese content market.

[15] According to information provided by the ITEC research division.

[16] Another major provider is Global One, inasmuch as it administers the end cable television connection which offers not only cable television reception but also Internet connectivity.

[17] See <http://www.nap.com.co>.

[18] See Part VIII, Chapter IV, Article 8.40 of Resolution 87 of 1997, which can be consulted on-line at <http://www.crt.gov.co>.

In summary, the entry into service of the NAP, the enacting of the law on electronic commerce, and the increase in the installed capacity of the country's networks as a result of the long-distance service being opened to competition, have all been positive factors for the development of the Internet. On the other hand, limited international connections, old analogue hardware in parts of the national network, regulatory problems as highlighted by the Comcel case (see section 6.2), and the difficulties in applying rules and regulations to value-added services, have been working against the rapid rise of the Internet in Columbia.

4 Legislation and regulations related to the Internet

In 1999, the national government transferred most regulatory functions for telecommunication services from the Ministerio de Comunicaciones [Ministry of Communications] to the Comisión de Regulación de Telecomunicaciones [CRT].[19]

While responsible for regulating telecommunication services, the Ministry had not taken any kind of specific regulatory action in this regard. From the national policy standpoint, the Ministry had officially announced it would not regulate the Internet.

Although this has not been explicitly stated in any rule or regulation, Internet access is being considered by the country's telecommunication authorities to be a service that should be made available to the entire population, falling in this way within the framework of universal-access programmes.

The rules for opening long-distance service to competition, which were implemented in September 1997, required long-distance operators to establish "centros integrados de telefonía social" [integrated social telephony centres] (CITSs). The Compartel II plan, under the aegis of the Fondo de Comunicaciones [Communications Fund], also plans to establish over 80 centres similar to those provided for under the rules for long-distance operators[20]. Furthermore, in January 2000, the CRT, taking a rather proactive approach to the development of the Internet, prepared a full report on an appropriate rate structure to promote the Internet.

In a complementary action, the National Congress took its first action to clarify regulatory matters in the area of electronic commerce by enacting Law 527 of 1999.In this Law, provisions have been made and regulations laid down with respect to the use of electronic communications, covering electronic commerce, the use of electronic signatures, and provisions for the creation of certification bodies(see Box 2).

At the end of October 1999, a public charge was brought against Law 527 by the representative of the Colegio Colombiano de Abogados Notarios [Colombian College of Notaries], who claimed that the law was unconstitutional. The grounds of this complaint were that the law gave the certification bodies (natural or corporate persons), and the Chamber of Commerce, the power to attest to authenticity, whereas this was a function properly reserved to notaries. The charge also stated that in Colombia, not only did the Constitution provide for public attestation to be a public service, but it also provided that it was a function reserved to notaries, and hence all documents were the fundamental, principal and final purpose of the notarial profession. Consequently, there was a need to update provisions regarding such mechanisms as electronic signatures so such services could be provided by notaries. The plaintiff also considered that there was no justification for transferring the supervision of international attestations of authenticity done by notaries and notary functions to a Superintendent other than the Superintendent responsible for notary and registration functions. The Constitutional Court is expected to decide the case by the middle of 2000.

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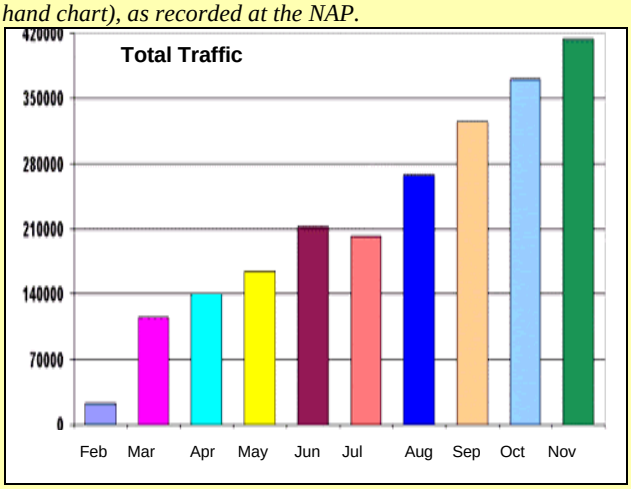
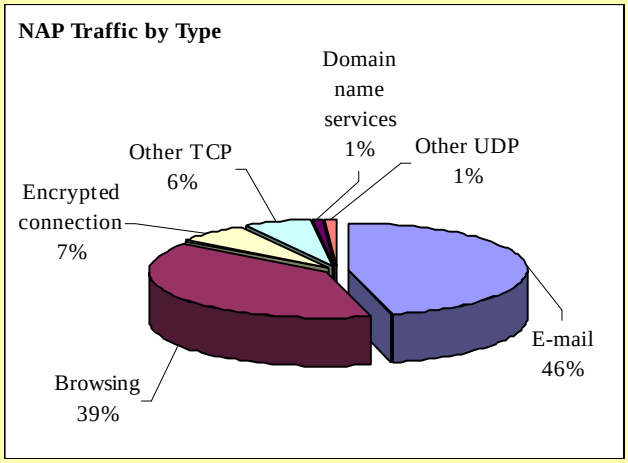
[19] See Regular Decree 1 130 of 1999, for provisions established at the time of Ministerial restructuring.

[20] CRT Resolutions 86 and 87 govern the opening of the market. Resolution 86 (Articles 26 and 27) provides that long-distance operators are required to build and operate "centros integrados de telefonía social" (CITSs) offering the following services as a minimum: (a) automatic domestic and international long distance service, which must be made available to the entire community and be able to serve at least five users simultaneously, with access to the switched public telephone network; (b) two computer terminals with Internet connections, which permit direct access to the Internet and provide electronic mail services, with individual mailboxes made available for distributing electronic mail to the community, and with the student population being given priority for their use; and (c) two fax machines providing the community with direct access to this service, with the student population being given priority for their use. The CITSs are preferably to be located in public educational institutions, and must be accessible to the community on a continuous basis. For more details on the Compartel plan, see the website <http://www.compartel.gov.co>

Figure 3: What Colombians do on the Internet

Usage in November 1999 (left-hand chart) and Internet traffic growth in November 1999 on the NAP operated by the CCIT (right-hand chart), as recorded at the NAP.





Source: Cámara Colombiana de Informática y Telecomunicaciones, NAP

Box 2: Changing the rules of the game

Law 527 of 1999 lays out principles with respect to the admissibility and legal force of electronic communications, such as the presumption that when such a communication can subsequently be retrieved for purposes of consultation, this will satisfy the requirement that the communication in question be set forth in writing. It is also made clear that an electronic communication is deemed a document and is presumed genuine on the affirmation of the person who prepared, wrote or signed it. It is in this respect that the certification bodies take on special importance, and pursuant to the law, they must be authorized by the Superintendencia de Industria y Comercio [Office of the Superintendent for Trade and Industry]. These bodies may be public or private corporate entities, whether domestic or foreign, or chambers of commerce. From this it can be seen that a contract remains valid and binding even if one or more electronic communications were used to conclude it. Finally, the law establishes clearly that consumer rights must not in any way be impaired; and it provides an appropriate period (12 months) for the Superintendencia de Industria y Comercio to make the necessary organizational provisions in order to discharge the responsibilities assigned to it. Under the law, electronic communications are accepted as authoritative under the Code of Civil Procedure, and an electronic signature has the same force and effect as a handwritten signature.

5 IP telephony in Colombia

In the various sectors of the economy, the Internet is seen as something that is necessary for the development of modern society and very important for economic development. However, most telecommunication operators in Colombia have not been thinking seriously until recently of using Internet technology to offer their services.

The first and only case until early 2000 has a cellular phone company—Comcel—which apparently was not able to offer the service according to existing laws and regulations.

In local telephony, which is completely open and where there are no regulatory restrictions, there is no evidence at all of any initiative on the part of these operators.[21] The largest cable television service provider in Bogotá—Tvcable—with more than 200'000 subscribers and a cable network installed in good part of the city, is awaiting numbering assignment by the CRT to start providing local telephony. Their forthcoming service packages will include television service, Internet service, and basic telephone service.

[21] Even in Compartel I, the programme recently launched by the Fondo Nacional de Comunicaciones [National Communications Fund] with the aim of providing low cost communication services IP services have not been considered at all. In Compartel II, a move towards the Internet services is expected.

Another company that could easily get into the local IP market is the recently AT&T acquired Firstcom, a former subsidiary of Telecom as Teleductos. The company has a good infrastructure in Bogotá and other cities throughout the country.

In long-distance, Orbitel recently began testing a voice communication service that provides a connection to the operator from a computer, using Ericsson software. ETB hopes to be able to offer long distance IP service this year, but has no plans for local service. Telecom appears to be planning to offer IP voice services this year at lower cost.

Value-added companies have very good prospects of getting into the local IP telephony business, since they know the business, they have the equipment, and have operating structure in place. There is, however, strong constraints imposed by the cost of long-distance service licences (US$ 150 million) and pressures of companies that have already paid for such a licence to keep the market closed to new entrants. Hence, it will be difficult to open up the long-distance market entirely unless some significant regulatory reforms are carried forward.

6 Legal aspects of Internet voice service

It has been recognized since the advent of Internet access in 1994 that value-added service operators are legally authorized to permit access to the network and that such operators may connect to local networks by means of switched access or any other interconnection provided that it is acceptable to the interconnecting operators. Value-added operators may also build and operate their own bearer or transport networks, if they have the proper licence. These general principles were set forth at the beginning of the 1990s by Decree-Law No. 1900 that was later regulated by Regulatory Decree 1794 of 1991. [22]

Colombia's new Constitution[23], which came into force in 1991, established that, while public services are inherent to the social aims of the State, private providers may still supply these services. This had not been explicitly stated before. Pursuant to the Constitution, Law 142, better known as the Law on Public Utilities was enacted in 1994. In addition to creating the CRT with a view to promoting competition in basic local telephone services, this law required the long-distance service be opened to competition, established that companies could freely enter the market for local telephone services, and set out the principles governing such services. This Law also created the Superintendencia de Servicios Públicos Domiciliarios [Office of the Superintendent of Public Utilities] and established it as the agency responsible for monitoring and overseeing telecommunication, water, electricity, sewerage and gas services. The enacting of this law, in 1994, coincided with the arrival of the Internet in Colombia.

It was not until 1997 that the CRT, after a lengthy reform process, managed to open the market by issuing Resolutions 86 and 87 of 1997. Although those Resolutions did not contain any specific provisions with respect to the Internet, they did set a price of US$ 150 million for licences for new long-distance operators. Taken together, this fact and the existing provisions have caused problems in the overall regulatory structure, particularly in regard to the desired atmosphere of liberalization for promoting the use of the Internet and its applications.

6.1 Long-distance operators and value-added operators

Without a doubt, value-added operators can offer more services nowadays through the Internet than those referred to (in a non-exclusive listing) in Decree-Law 1900 of 1990.[24] In the early licences, there is tacit acceptance of value-added operators being able to handle voice traffic, if they do so under special conditions. The CRT and the Ministry of Communications have just made their official decision public in this matter, by means of an opinion (see Box 3) and Resolution 70/00, whereby the Comcel case was resolved.

[22] Decree 1900 of 1990, which has the validity of a law as it was issued pursuant to the special powers given by the Congress to the President.

[23] This did not amend Decree 1900 of 1990.

[24] According to Article 31 of the Decree-Law, "These services consist, *inter alia*, of the accessing, sending, handling, storage and retrieval of information, electronic fund transfer, videotext, teletext and electronic mail."

Table 1: Defining Telecommunication Services

Decree Law 1900 of 1990

Services		Definition	Criteria for the granting of telecommunication service concessions
Basic	Carrier services	Those services which supply the necessary capacity for the transmission of signals between two or more specified points in the telecommunication network. They include those services that are provided over circuit-switching or packet switching networks and those that are provided over non-switched networks. Examples of such services are those for the leasing of insulated pairs and of dedicated circuits.	May be granted to duly constituted specialized companies. Holders of concessions for basic services may not provide telematic or value-added services unless they hold the corresponding licence. Concession contracts for telecommunication services covering the operation and exploitation of the different types of basic service and of indirect broadcasting services are administrative contracts governed by the provisions of Decree Law 222 of 1983, or by any provisions that replace, modify or amplify it, or by the present Decree.
	Teleservices	Those services which in themselves provide the full capacity for communication between users, including terminal equipment functions. Such services include telephony (fixed, mobile and cellular mobile), telegraphy and telex.	
Broadcasting services		Those services in which communication is effected simultaneously and in one direction to various points of reception. Such services include sound and television broadcasting.	Through direct contracting, with the proviso indicated in the following article.
Telematic services		Those services which, using basic services as their support, provide for the exchange of information between terminals with established protocols for open interconnection systems. Such services include telefax, publifax, teletext, videotex and datafax.	Granted by means of a licence, within a framework of free competition, for both the national and international services.
Value-added services		Those services which, using basic, telematic or broadcasting services, or any combination thereof, provide full capacity for the transmission or exchange of information and which add additional facilities to the support service or satisfy specific new telecommunication requirements. Such services include the accessing, transmission, processing, delivery and recovery of stored information, electronic fund transfer, videotext, teletext and e-mail. Only those services that can be differentiated from basic services may be considered value-added services.	
Auxiliary assistance services		Telecommunication services that are linked to other public services for the purpose of ensuring the safety of human life, State security or for humanitarian purposes. Such services include radio services for distress and the safety of human life, and to assist in meteorological provision and aeronautical or maritime navigation.	Granted by means of a licence.
Special services		Those services intended to satisfy, without any kind of profit or business motive, needs of a cultural or scientific nature. Such services include the amateur service, experimental services and services relating to industrial, scientific and technical research.	

Source: Decree 1900 of 1990.

Rapid technological innovations and the convergence of technologies and services have posed significant challenges to the existing regulatory frameworks in most countries. Colombia has been no exception in that regard, and a number of value added operators in the country became increasingly involved in the transmission of voice over data networks.

Several of these operators have been affected recently by the actions taken by the Fiscalía [Office of the Inspector General], at the end of 1999, which started investigating at least 20 of them on the basis of accusations made by Telecom that they were transmitting voice over their networks.

Apparently, there was a considerable amount of traffic being routed in the form of data over IP networks, because the three long distance operators—namely Telecom, ETB and Orbitel—saw their traffic increase considerably after Fiscalía started investigating the value-added operators—according to unconfirmed reports, traffic to and from the United States increased as much as 50 percent.[25]

Countries, such as Argentina and Colombia (whose settlement rates with the United States on 1 March 2000 stood at 27 and 32.5 US cents per minute respectively), have been 'punished' by US carriers that have routed increasing volumes of traffic to those countries via refile or routes which bypass the accounting rate mechanism, such as the Internet (see Figure 4). In the case of Argentina, estimated bypass traffic amounts to almost the same as the total reported volume of traffic on the route to the United States in 1998 (i.e., just over 200 million minutes). In the case of Colombia, where call-turnaround was historically less significant, estimated bypass traffic amounts to around 160 million minutes. At the level of settlement rates that prevailed in 1998, the losses incurred by Argentina and Colombia from bypass traffic were over US$ 60 million for each country.

In the process of opening the Colombian market to competition, telecommunication legislation has become very complex. In the course of this process, penalties including imprisonment can been imposed[26] for failure to abide by telecommunication rules and regulations. As new services emerge the legislation often has to be amended or supplemented with opinions.These usually arouse controversy and debate amongst those concerned, namely the value-added operators, long-distance operators, and cellular operators.

These difficulties can be compounded by technological issues.To take the case quoted above, when an operator is in a position in which it is practically impossible to control or stop the service. How can an operator tell the difference between Internet traffic originating by means of web-to-phone software and traffic originating at a telephone on the basic switched network? The question then arises as to whether hardware or software is available that the operator can use to filter communications transmitted on its network in order to ensure that it is not providing the unauthorized service and, if such hardware or software does exist, whether it is logical to force the operator to buy it or to force the user to deprive himself of the service. Whether regulation focuses on how the Internet is used or on the user's experience, the outcome is the same.

It is important to recognize that all the voice services that can be offered over the Internet are liberalized. Voice over the Internet is not subject to any regulatory restriction of any kind if it is provided from or to a computer.[27] On the other hand, existing provisions establish regulatory barriers which restrict access to international long-distance voice services via the Internet when such service is offered to or from a cellular telephone by operators other than those authorized to provide international long-distance service[28] or when the communication originates and terminates at a telephone.[29] This does not imply that authorized

[25] One problem for the regulatory authorities is the lack of reliable information, particularly in regard to long-distance traffic. Initially Telecom considered this information confidential, and this has made it difficult to obtain historical series that would provide accurate and reliable data, and hence valid studies. Responsibility in this area has subsequently been scattered among a number of bodies, particularly the Ministry of Communications, the CRT and the Office of the Superintendent of Public Utilities, and of course these bodies have had no structure in place to handle or process the data, or produce timely reports. The most recent reforms have brought institutional clarity to the issue, giving the CRT responsibility for preparing a corpus of data on the sector, with the Ministry of Communications and the SSP as participants in this effort. The CRT is now setting about this important task, which will be of great benefit to the entire sector.

[26] Law 422 of 1998 states in Article 6: "Anyone who accesses or uses the cellular mobile telephone service or any other telecommunication service by means of the unauthorized copying or reproduction of signals which identify terminal equipment for such services, or taps, or use of unauthorized lines of the local switched basic public telephone service, extended local service, or long-distance service, or who provides or engages in unauthorized telecommunication services or activities for profit shall be subject to imprisonment for a period of from four to 10 years and a fine of from 500 times to 1000 times the monthly minimum wage established by law."

[27] It is worth stressing, however, that the regime governing both basic service and value-added service is one of open competition, and that while basic long-distance telephone service has to meet certain conditions, there is no express limitation on the number of operators that may be authorized to provide it.

[28] See Resolution 70 of January 2000.

[29] CRT opinion, "Concepto sobre criterios diferenciales de los servicios de valor agregado" ["Opinion regarding differential criteria for value-added services"], 19 January 2000.

operators have any restriction on using IP technology or any other technology of their choosing in their services or networks. It is the government's policy to promote the Internet, as set forth in the development plan, and clear activities in support of this are envisaged, such as considering Internet access to form part of the universal service.

As Internet coverage and access are broadened, there are ever more opportunities to use the Internet to offer voice services. The fact that all Colombian ISPs can be accessed from the United States means that the free calling offered via the Internet in the United States, or via toll-free "1 800" numbers, can also be offered from Colombia.[30]

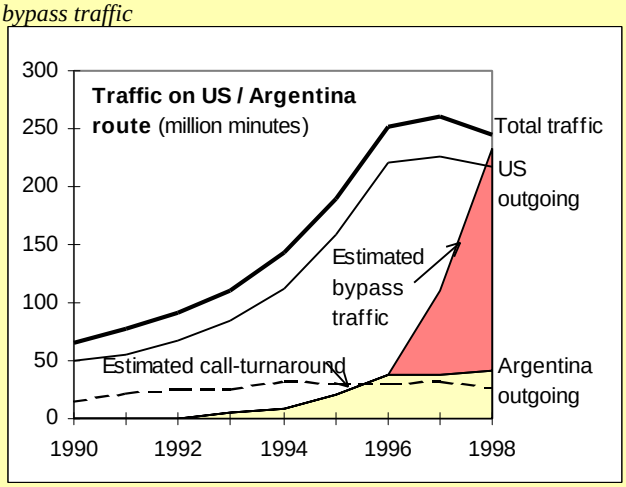
It is very difficult, if not impossible, to maintain the regulatory structure that has existed in the past without taking into account the rapid technological change that the industry is experiencing. To what extent can services which are perceived by the user to be the same be defined in the rules and regulations as being different

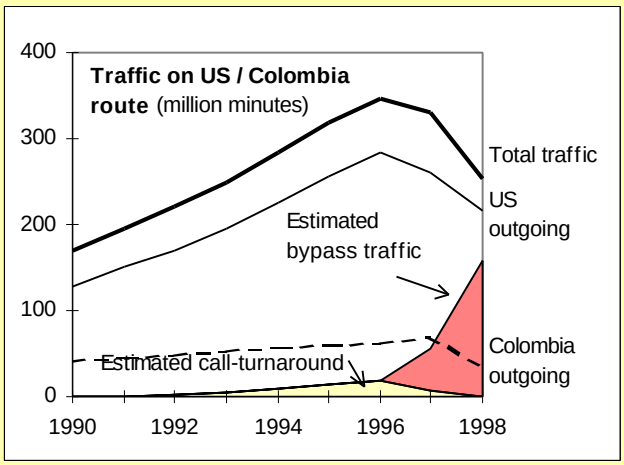
6.2 The case of Comcel

In late 1998, Comunicación Celular S.A. [Cellular Communications Inc.] (Comcel), one of the operators holding a cellular mobile telephone service licence, concluded a contract with another value-added operator to offer a voice service via the Internet, which in the view of many in the telecommunication sector was illegal.[31] The companies that had just received licences to provide long-distance services for which they had paid US$ 150 million each, immediately raised formal complaints on the legality of the service offered by Comcel. The national administration subsequently launched three investigations, of which two were completed by the beginning of 2000.

Figure 4: Bypassing the incumbents

Traffic balance on routes between US and Argentina and between US and Colombia, including estimates of call-turnaround and bypass traffic





Note: "Estimated call-turnaround" traffic is the volume of traffic on a particular route that has been re-routed so that it appears that it is coming from the United States. This includes call-back, calling card and home-country direct traffic. It is estimated by applying the ratio between incoming and outgoing traffic that applied before 1992 to the subsequent traffic balance. "Estimated bypass traffic" is the volume of traffic on a particular route which is estimated to be rerouted via a least cost route (e.g., refile) or outside the accounting rate mechanism (e.g., via the Internet) such that it is not reported in official traffic statistics. It is estimated by comparing the projected growth in the total volume of traffic on the route, based on trends before 1996, with what actually happened after that date.

Source: ITU estimates. ITU/TeleGeography Inc. "Direction of Traffic" Database.

[30] Dialpad offers free calling throughout the United States; Net2phone offers free calling from Colombia through a toll-free number.

[31] Although this paper refers to the case of Comcel, it in fact covers both Comcel and Occel as Comcel has purchased Occel and both are administered by a single president. The two continue to exist as separate entities because they cover different geographic areas of the country.

Box 3: Setting boundaries
Opinion by the Comisión de Regulación de Telecomunicaciones on the classification of value added services.

CCIT question: " A particular telecommunication service can be described as operating as follows: A company outside the country receives a voice communication from the local switched public telephone network and puts it through technical coding, packing and routing procedures, and then delivers it to another company, in Colombia, which provides value-added services. The second company puts the communication through the reverse process, unpacking and decoding it and routing it so that it will be delivered as a voice communication once again on the local switched basic public telephone network of another operator. Following on from your previous responses, we would like to know whether the service just described can be considered a value-added service, or whether it is a switched long-distance basic public telephone service."

CRT answer: "As the question is put, and in keeping with the views expressed, we believe that the service described cannot be considered to be a value-added service distinguishable from basic international switched public telephone service. The reason is very simple. Even though there may be a connection between the networks of the value-added service in Colombia and switched public telephone networks, and even though the latter may be used as means of access or termination for communications sent to or from the authorized value-added network, whether in Colombia or abroad, as provided for by Articles 5 and 11 of Regulatory Decree 1 794 of 1991, it is also clear that the value-added service, in so far as it involves the full capacity to convey a communication – that is, from one end to the other of a communication between user premises or terminals – must of necessity have distinguishing characteristics throughout the entire telecommunication transmission path."

Source: "Concepto sobre criterios diferenciales de los servicios de valor agregado" ["Opinion regarding differential criteria for value-added services"], 19 January 2000.CRT opinion on added value services.

The conflict erupted at the end of 1998 when Comcel (of which Bell Canada International was the majority shareholder) published on 20 December 1998 in *El Tiempo,* one of the country's leading newspapers, an advertisement announcing that it was offering its more than 500'000 users a new service based on IP telephony. The advertisement stated:

> *"Exclusively for Comcel users. Now it costs less to phone anywhere in the world with your Comcel cellphone than from a regular telephone. Using your Comcel cellphone you can call anywhere in the world and talk for just 770 pesos a minute (plus VAT) all inclusive, any time, any day. Just dial #124 + country code + area code + telephone number + Send."* [32]

Orbitel, one of the new long-distance operators, immediately accused Comcel of operating in breach of telecommunication rules and regulations.

The next day, the CRT issued two Resolutions:

- The first established that all companies other than basic service providers that provided telephony services or were preparing to provide telephony services, regardless of the technology used, were brought under the regulatory function of the CRT and the oversight of the Office of the Superintendent of Public Utilities (SSP).
- The second ordered that an administrative investigation be started against Comcel S.A. to determine whether the service being offered by that firm could constitute unfair competition or lead to a reduction of competition between public telecommunication service companies.[33]

The Ministry of Communications also opened a preliminary investigation on 22 December 1998. Its purpose was to determine whether there were grounds for Comcel being considered in breach of the telecommunication rules and regulations, and in particular in breach of the system for licensing the mobile cellular telephone service, by providing IP voice service for long-distance communications.

[32] The advertisement made clear reference to the fact that the new service would be based on IP technology, saying, "Thanks to Internet Protocol technology, talk to […]. The new service […] is based on the latest IP technology, […] Comcel is the first operator in Latin America to offer this IP service […]" and so on.

[33] The CRT investigation, owing to meticulous respect for due process and the right of defence, took more than a year and produced a dossier of more than 1'500 pages. The last action taken as part of the investigation was the issuance of Resolution 176 of December 1999, which left the CRT's decision in abeyance pending a decision by the Ministry.

Finally, the Superintendencia de Industria y Comercio opened an investigation as well to determine whether Comcel had engaged in unfair competition or had obtained an illegal competitive advantage.

While from the standpoint of the relevant regulations and authorities, Comcel may have been in breach of rules governing the provision of services in the telecommunication sector, from the standpoint of the user, Comcel offered inexpensive international calls to any other telephone located anywhere in the world. Furthermore, the quality of the service, which often undermines IP Telephony services to the public, seemed to be quite reasonable.[34]

The arguments presented by Comcel, Occel and Rey Moreno to defend their service were oriented towards demonstrating that Rey Moreno was providing its service to a specific group of users of the basic Comcel and Occel support service, and that Rey Moreno was adding value. The communications in question were neither basic switched international long-distance telephony nor cellular mobile telephony (for a technical description of how the service was carried out, see Box 4). Accordingly, the provisions requiring long-distance communications to be handled through licensed operators did not apply.

The curious point about Comcel's activities is that it is a major, well organized cellular provider. With over 26 per cent of the country's cellular-telephone market, it is ranked among the top companies in the country, and it is in a good position to compete and expand its presence in the market.[35] Why then would such a company decide to offer a service that would cause it such great problems?

The most reasonable explanations revolve around the notions that Comcel managers:

- were sure that they could provide IP telephony services and were empowered to do so under the existing rules and regulations;
- were not satisfied with the original conditions of their licence, and believed that the lack of regulatory clarity gave them good reason to take risks and press for regulatory change; [36]
- believed that offering IP Telephony service through their network was an effective way to compete and to open new horizons in the market, while the legal risk of doing it was very low and could justified the decision to offer the service.

Indeed, the regulations in place include two important distorting factors, and taken together they make for a competitive environment which has certain deficiencies. For example:

- Cellular service operators are required to use legally established operators and do not receive any compensation for initiating or completing an international long-distance call through the companies that hold long-distance licences;
- Billing is based on the "calling party pays" principle.

[34] Indeed, in the investigation carried out by the Comisión de Regulación de Telecomunicaciones [Telecommunication Regulatory Commission] (CRT) on the provision of IP voice service, the following exchange took place, as transcribed in the background information included in the dossier: "Question: 'We're doing that test I told you about. Would you please tell me what time it is now in your location and how good the connection seems? How well can you hear me?' Reply: 'I can hear you very clearly.' Question: 'Do you sense any difference between this service and the service that you usually use for your international calls?' Reply: 'No, no difference. Sometimes there's an echo on regular calls to Colombia, but there's no echo on this line, I can hear you just fine.' "

[35] Although there are nominally six companies in Colombia's cellular-telephone market (two in each geographic region), effectively they have become consolidated into four service providers as two of them have been taken over by companies operating in the central region. In the central and coastal regions, operators have split the market fairly evenly, with each having won about 50 per cent of the subscriber base, while in the western region one of the operators has taken a lead, having won 56 per cent of the subscriber base compared to the other's 44 per cent.

[36] This latter approach is in part reflected by the "laws" that the president of Comcel seemed to go by. In his office's reception area they hand out a brochure that begins with the sentence "Laws should be broken if the circumstances require and you are willing to face the consequences, especially if they are obsolete and stand in the way of success. Three of what have come to be known as Peter's Laws are: "9. If you can't win, change the rules! 10. If you can't change the rules, ignore them! 15. Bureaucracy, like any other challenge, can be beaten by an unflinching approach, a tolerance for stupidity and, if necessary, a bulldozer."

Box 4: Convergence in action
Technical aspects of the provision of international IP voice service from Comcel's cellular service.

From the standpoint of the user: (a) A user who is a subscriber to the service dials on his cellular telephone #124 + country code + area code + telephone number + Send. (b) The user hears a recorded message that says, "Welcome to Comcel 124. The cost of this service is 770 pesos plus VAT. Your transmission is being processed." (c) Following the recorded message, after a wait of about 20 seconds, he hears a ringing tone telling him that the dialled number is ringing. (d) The called party answers, and the communication begins, continuing until one of the two parties ends the call. (e) The voice delay perceived by the parties during the communication is similar to the delay experienced in a conversation carried by a geostationary satellite link.

From the standpoint of the Comcel cellular network: (a) The user dials on his cellular telephone #124 + country code + area code + telephone number + Send. (b) The signalling reaches the current call meter (CCM) on the control channel, the cellular handset is validated on the network, the user takes a voice channel and the call is processed. (c) The CCM filters out all dialled numbers of fewer than 13 digits or more than 18 digits, as well as all calls which immediately after the #124 include 57 (for Colombia) or the numbers 0 to 11 (which are country codes not used). Calls filtered out in this way are routed to a recorded message which advises the caller that an error has been made in dialling. (d) Calls not filtered out are routed to a recorded message that says, "Welcome to Comcel 124. The cost of this service is 770 pesos plus VAT. Your transmission is being processed." The calls are then sent to one of Rey Moreno's trunk lines and delivered by means of two E1 satellites with Colombian R2 signalling without being sent to ANI (although they could be sent to ANI if the called party were to request it). For the number of the called party, the entire number dialled by the cellular user is sent, except for the initial character #. (e) When the called party answers, an answering signal is sent on R2 to the CCM from Rey Moreno. (f) The call is over when one of the two parties ends the communication, freeing the voice channel. (g) Each call generates its corresponding record of charges at the CCM, which is processed in Comcel's billing system.

From the standpoint of the value-added service operator: (a) The value-added service operator receives a call on its two E1s coming from Comcel, with the corresponding signalling on R2 indicating 124 plus the international telephone number. (b) When it reaches an MMCS switch, it is routed by an outgoing E1 trunk line and the signalling is converted to R2 international. (c) From the switch, the voice passes to an NKO-MiniPOP device, where it is compressed, packed, and converted to IP protocol, together with its signalling. (d) The information is sent by means of an IP session to the correspondent in the United States by means of a 640 kbit/s satellite link leased from Intelsat, and the correspondent in turn delivers it to its destination by means of a direct or indirect connection to the international telephone network. The IP address used by Rey Moreno is 10.10.3.1, which belongs to an intranet and does not have an assigned Internet address. (e) The MMCS system has the ability to charge for and differentiate between services using the first digits of the number it receives. (f) When the communication is ended by one of the parties, the session is ended and the links are freed at both ends.

Source: Dossier of the Comcel case, Telecommunication Regulatory Commission (CRT), Colombia.

For these reasons, the cellular companies had in various ways restricted long-distance service from cellular telephones. Not all users can access domestic or international long-distance service. In the case of Comcel, only 3 to 5 per cent[37] of its subscribers have the service because subscribers must make a separate application for it, must demonstrate their ability to pay and must complete other procedures that makes it cumbersome and difficult to obtain the service.

When Comcel started offering its new service in December 1998, this coincided with the start of operations of the new companies that had obtained their long-distance licences a year earlier. Both the new long-distance operators and the established provider did a great deal of advertising suggesting that international long-distance charges were falling, and this caused an increase in the amount of traffic on cellular networks connecting to long-distance services. This brought about an increase in the amount of long-distance traffic being carried on cellular services, yet without the cellular services receiving any compensation for it. This distortion altered the structure of the cellular companies' revenues and expenses.

If one analyses the telecommunication services price structure, the prices offered by the #124 service would not make the cellular user a clear winner, since most of the traffic is to the United States, and the promotional rates to that country offered by the new long-distance operators were lower and with a much higher level of quality than those offered by Comcel's IP Telephony service.

[37] Statement by the president of Comcel in the CRT investigation dossier, Resolution 132, Comcel.

Generally speaking, the new service seemed to be aimed at broadening the alternatives available to cellular users and serving a market artificially closed by the same operator. This is borne out by the traffic volumes that the #124 service attracted in December 1998[38], when calling demand was high because of the holidays. Perhaps the appeal to a cellular user is being able to access the long-distance service from his automobile or when he is on the move.

Comcel's IP telephony service was offered for more than nine months, until the value-added company decided to suspend it. The company was taken over in the first half of 1999, and this could be a determining factor in the decision to suspend the service, alongside the pressure of government investigations.

The most important issue related to the introduction of this new service is that it gave a clear signal of the change in the structure of telecommunication services that was forthcoming thanks to the advent of the Internet, and particularly the need for the regulatory structure to evolve, accepting this new world and keeping pace with its development.

This situation led to great concern on the part of the CRT, and consideration is being given to courses of action which would lead to removing regulatory barriers without creating alarm amongst operators and other players. What is clear from the government's standpoint is that it believes in the importance of promoting the development and implementation of new uses of the Internet as they arise.

During preparation of the present report, the Ministry of Communications and the Superintendencia de Industria y Comercio wound up their administrative investigations. The Ministry imposed penalties on the three operators Comcel, Occel and Rey Moreno (see Box 5). The decision was appealed by Comcel and confirmed by Resolution 984 of 8 May 2000. The Superintendencias decision to fine Comcel and allow damage claims by the long distance operators has been appealed and a final decision is expected by mid June 2000. It is expected also that CRT will probably conclude its investigation soon. Most likely the regulatory agency will close the case without a specific pronunciation because it has become evident through the other two resolutions that the services were illegal, and, in such cases CRT would have not jurisdiction.

7 Conclusion

IP telephony in Colombia, as elsewhere in the world, has been emerging in an environment which is open to competition but in which operators are subject to regulatory restrictions in the form of many permits, too many regulatory bodies, costly licences, and the prospect of imprisonment for anyone in breach of the telecommunication rules and regulations.

Regulatory restrictions, like artificial barriers, do not just foster the emergence of services outside the strict scope of application of the rules, as in the case of voice service offered by a cellular company, such situations also sew confusion and regulatory uncertainty.

In conclusion, the limitations imposed by the traditional regulation of communication services, coupled with a lengthy process of liberalization, has helped to produce levels of confusion that may be exploited by companies that are aggressive in their approach to the market and their application of new technology.

In the case of Comcel, the outcome of the investigations was one that maintained the market structure in the sector. However, the pressure of technological advances will make it impossible for the small apparent limitations that exist in the regulation of telecommunications in Colombia to be maintained for much longer.

[38] According to the CRT dossier, traffic volume was between 6 000 and 20 000 minutes per day in December 1998.

Box 5: Enforcing the law

The Ministry of Communications issued Resolution 70 on 2 February 2000, by which it ended an administrative investigation concerning the three companies involved in the IP telephony case and imposed penalties on them. The main body of the document, accounting for 14 pages out of the total 30-page length of the resolution, describes the service and analyses it against the criteria for defining a value-added service. It then discusses the four elements that distinguish the nature of a value-added service: that it must be a support service; that it must add features to the support service; that it must have distinguishing characteristics; and that it must satisfy specific new telecommunication needs. It then goes on to say, "It is not sufficient, then, under Colombian law, for it to possess the distinguishing characteristics referred to in Decree 1'794 of 1991, inasmuch as the conditions established in Decree-Law 1'900 of 1990 must be met in their entirety, and it cannot be considered a value-added service if any one of those conditions is not met." Its final conclusions with respect to the #124 service were as follows:

- The providers of the service were Comcel and Occel, the cellular providers, and not Rey Moreno, the operator of the value-added service.
- The communications used Internet Protocol technology but did not access the public Internet.
- "Colombian law classifies telecommunication services on the basis of a methodology and criteria focusing on an analysis of functionality, and not on the basis of purely technical criteria."
- That the #124 service constitutes a teleservice[39] in which a connection is made between the TMC networks and the value-added networks of the operators involved, and one that the operators are not authorized to provide.
- That the definition of teleservices is not exclusive, and permits the provision of services not expressly described in the rules and regulations, provided that such services conform to the applicable terms and conditions and classification criteria.

The penalty imposed on each operator was a fine of 1'000 times the monthly minimum wage, an amount equivalent to approximately US$ 140'000. In the case of the Resolution by the Superintendencia de Industria y Comercio, the penalty was a fine—imposed only on Comcel—of 2'000 times the monthly minimum wage.

Source: Adapted from Resolution 70 of February 2000.

This is borne out by the fact that exclusivity in cellular service has already ended, and that no exclusivity or special rights have been given to the operators that have obtained long-distance licences. As new applications involving the Internet emerge day by day, this will broaden the spectrum of voice communications and cut the price at which this service is offered to the barest minimum, leading users to press for a complete opening of the market. Thus, today's regulatory restrictions will be resolved either by the regulatory agency opening the market altogether, or by these technologies being implemented in ways that bypass regulatory restrictions and are difficult to police.

One lesson to be taken from this situation is that regulatory functions must keep pace with the technology. Rules and regulations have to be devised in such a way as to accommodate change and innovation, they must be clear and simple to avoid confusion, and they must pave the way for economic development without limiting users' access to the most convenient technologies and services available. In the case of Colombia, recent developments in the area of IP Telephony will certainly have negative consequence in the recently launched "Connectivity Agenda"—unless regulatory and policy bodies find positive ways of solving conflicts of the nature of those presented in this case.

[39] Teleservices are telephony, telegraphy, telex services, etc.

Appendix A
Telecommunications in Colombia

Introduction

Although Colombia may enjoy a favorable geographic location, its situation is one of the most controversial and complex among all the countries of the continent. For the past 50 years it has experienced continuous economic growth, despite the social conflict[40] that it has suffered throughout the same period. It was only towards 1999 that the economy experienced a sharp downturn. The country's topography,[41] with a surface area of 1'141'748 km2, mountain ranges, forests, valleys and rivers, and its own characteristic pattern of population distribution, with the main cities being located in the country's interior in the upper parts of the Andes, has constituted key challenges for the development of communications. Most of the Colombia's 40 million inhabitants[42] are concentrated within one-third of its surface area, the security situation having contributed to a higher level of urbanization than might otherwise have been expected, with the result that most of the population is to be found in some 50 cities with over 100'000 inhabitants, and according to DNP (<http://www.dnp.gov.co>) they account for over 71 per cent[43] of the urban population. Moreover, these cities are served by 85 per cent of the country's telephonelines.

According to the National Administrative Department of Statistics (DANE <http://www.dane.gov.co>), the Colombian economy grew by 0.6 per cent in 1998. The growth rate in the communications sector fell from 18.1 per cent in 1997 to 8.8 per cent in 1998. The GDP per capita in 1996 was US$ 2'185.[44] One factor which has had a drastic effect on the economic and social situation of the country in recent years is the high level of unemployment, which, at around 20 per cent, has had a considerable influence on personal safety and the well-being of the community. In 1997, the average number of people per household was 3.5, the average income per household was only 370'000 pesos (some US$ 350) per month, and the illiteracy rate was 11.25. Furthermore, the income was largely concentrated within a small proportion of the population, to be found in the main towns and cities. Despite being one of the world's major coffee producers, Colombia has diversified its output, with oil and other products now making a significant contribution to national production.

The Telecommunication Sector in Colombia

General status of telecommunications

Colombia's geographic features, the distribution of its population, the fact that the main cities are located in the upper parts of the Andes mountains, the existence of isolated areas that are inaccessible by means of transport and the tropical and inhospitable conditions that prevail, are all factors which make the telecommunication sector one of the most important for the country's development. It is for this reason that intensive use of the Internet is, and will continue to be, of key importance. The concentration of wealth in Colombia has been a critical factor in the country's economic and social development and will prevent most of the population from accessing the services provided by the Internet. According to DNP, the "unsatisfied basic need indicators" fluctuated in 1993 between 59.5 and 21.7, as with most developing countries, the rural areas are where the most unfavorable conditions are to be found. As already mentioned, 70 per cent of the country's population lives in cities with over 50'000 inhabitants, which is precisely where the basic telephone service is available, with 84 per cent of lines, accentuating the difficulty that people in rural areas and on low incomes have in gaining access to service. One has, moreover, to take into

[40] According to Nicanor Restrepo in "El derecho a la Esperanza", if the security situation in Colombia was similar to that in neighbouring countries, the average annual economic growth rate would have been 9 per cent, which in his estimation would amount to US$ 42'999 million.

[41] Source : Atlas de Colombia, Instituto Geográfico Agustín Codazzi, fourth edition, 1992.

[42] Source: DANE (<www.dane.gov.co>).

[43] Source: DNP (<www.dnp.gob.co>).

[44] For economic performance data for the period 1950 to 1997 see <http://www.banrep.gov.co/estad/dsbb/srea_001.pdf>.

account the peculiar manner in which local telephone companies are called upon to provide their service, since they are obliged to provide subsidies to low-income population groups[45]. The situation is therefore one in which a relatively high penetration of telephones has been achieved in the cities, even in low-income groups.

There is a certain degree of competition in the area of local telephony[46], and although the fixed line penetration rate in most cities is relatively high, with high level income groups having at least one telephone line per dwelling, and with low-income groups the rate averaging between 10 and 20 per cent, the lack of subsidies and the high overall cost of access has led to low levels of Internet penetration. Fortunately, many parts of the country have been witnessing the spontaneous appearance, thanks to private initiatives, of Internet cafes, kiosks or public facilities where computer terminals are available to provide access to the network at more or less reasonable prices (5'000 pesos - or US$ 2.80 - per hour of connection time).

In 1990, when a process of opening up began in the telecommunication sector, the first comprehensive provisions were put into place. However, the pressures exerted by certain players (unions within the monopoly enterprise, economic and political sectors) resulted in the process taking seven years and being structured within the framework of coercive forces that prevails in Colombia. The long-distance service effectively remained a monopoly until 1999, when two new companies came onto the market following its deregulation in 1997. Until 1997, tariffs were kept at a high level - a situation that seems to have been exploited by value-added operators. Licences granted after 1992 and following the Telecom strike[47] were fairly broad in scope, specifying little in terms of what they authorized[48], all of which has resulted in a lack of regulatory clarity.

Table 2: Telecommunications objectives for Colombia: 1998 to 2002

	Units	1998	1999	2000	2001	2002
Population	Inhabitants	40'772'994	41'539'011	42'229'301	43'035'394	43'775'839
Investment	US$ 10 x 6	1'003	1'471	1'301	1'363	1'466
Fixed lines	lines	7'593'419	8'231'889	8'949'279	9'351'823	9'935'212
Mobile Cellular	subscribers	1'800'229	2'227'000	2'620'000	2'937'000	3'237'000
Paging	subscribers	112'000	164'690	220'650	271'730	312'790
Teledensity	%	18.62%	19.82%	21.19%	21.73%	22.70%
Mobile density	%	4.42%	5.36%	6.20%	6.82%	7.39%

Source: adapted from Mincom, 1999

[45] Dwellings have been classified according to their quality, and not in terms of a direct relationship with the owner's income. This system is known as stratification, the dwellings having been categorized into six strata, where stratum six denotes the highest income and stratum one the lowest. The tariff structure established in the past enables and obliges each company in each city to impose a surcharge of up to 20 per cent for service provision at strata five and six, i.e. those relating to the highest income brackets. This surcharge, known as a contribution, is intended to subsidize subscribers in the lowest income strata (i.e. 1, 2 and 3) with respect to tariffs for fixed and variable consumption and connection charges. This system makes it possible, within a single company and city, to provide for tariff-based cross-subsidies in the basic telephone service between high-income and low-income subscribers.

[46] Three companies are operating in Bogotá, one with two million lines, another with 300 000 lines and the other with 30 000 lines. Competition is also present in other cities.

[47] In 1992, when the first attempt was made to deregulate the telecommunication sector through the privatization of Telecom, the country was paralysed by a major strike lasting over ten days.

[48] Licences for the provision of value-added and telematic services with national and international coverage, establishing that the services in question lie in the realm of data-processing. Services lying in the realm of transmission, including point-to-point and point-to-multipoint voice transmission services without connection to the public switched telephone network. Also, authorization for the installation of a value-added network for the provision of this service, with national and international coverage, using radio waves, physical cables and satellite systems coordinated for Colombia, including the corresponding uplinks and downlinks. Taken from a licence granted in 1993.

Furthermore, as from 1994, cellular operators became new players in the field of telephone service provision, including the domestic long-distance service[49], as a result of the way in which the regulations and licences were structured. In the absence of any clear regulatory provisions governing interconnection, the Government exerted its power over Telecom, the sole long-distance operator at the time, forcing connection without all of the corresponding economic and financial issues having been resolved. The six cellular mobile service operators accepted three principles as part of the regulations governing the opening up of this service:

- the "calling party pays"[50] system;
- long-distance calls would not give rise to entitlement to a share of long-distance charges, to any access charge[51] or to any payment for incoming or outgoing calls; and
- that such calls had to be made through the legally established long-distance operator.[52] This situation had a particular impact when Comcel decided to provide voice services over the Internet in late 1998.

Finally, the trunked access (trunking) service, given the nature of the equipment it uses and of its network, is in a position to compete with the mobile service, and possibly to an even greater degree were it to be assigned numbering[53].

Thus, the local basic telephony service is provided by 50 companies which form five corporate groups (the majority owned by municipalities or the State), with almost seven million lines in service, concentrated in the largest cities, where the regulations make it mandatory to subsidize low-income users through the revenue generated by imposing a surcharge on high-income users. The long-distance sector comprises three operators, two of which began providing service in early 1999; two of them are State-owned[54], while the other is 50 per cent privately owned by Colombian interests. The mobile service is provided by four companies to which the A and B bands are assigned; together they account for some two million users. The value-added service is available from over 100 companies, and the trunking service is provided by four companies with national coverage, one of which possesses a system and network that are fairly similar to those of the cellular operators, as was mentioned earlier.

Prices and tariffs

Since its creation, CRT has been responsible for tariff regulation throughout the sector; however, it has been active only in the regulation of tariffs for the basic (local and long-distance) service. Its regulations provided for controlled tariffs through adjustments on the basis of formulas geared to ensuring efficiency[55] for incumbent operators and tariff-setting freedom for new operators or entrants.

[49] Article 1 of Act No. 37 of 1993 provides that the cellular mobile telephony service is a public service of national scope and providing national coverage.

[50] Article 7, paragraph 1, of Decree No. 2061 of 1993.

[51] Article 7, paragraph 3, of Decree No. 2061 of 1993 provides that cellular mobile telephony operators shall in no case be entitled to a share in any charges arising from national or international long-distance calls made by or to their subscribers.

[52] Article 60 of Regulatory Decree No. 741 of 1993 provides that international long-distance calls originating with or received by cellular mobile telephony service users shall be made through the PSTN, and that cellular mobile telephony operators shall under no circumstances be authorized to provide direct international long-distance telephony services, other than in cases where the cellular mobile telephony operator is legally authorized to provide such service.

[53] Local numbering has been assigned to it by CRT during the course of the present month.

[54] Telecom: 100 per cent State-owned; ETB: owned 100 per cent by the city of Bogota; Orbitel: owned 51 per cent by the city of Medellín.

[55] The CRT report entitled "..." refers to the following achievements:

✓ Access charges are fully operational, following a levelling process lasting almost two years.

✓ Local service tariffs have risen in real terms by a little over 20 per cent in the past two years, with an estimated real growth in local telephony service prices of some 30 per cent.

The cellular mobile service, like other telecommunication services, has unregulated tariffs, although they could be regulated at any time if CRT so decides. The tariff regulations have been modified by Acts[56] intended to change the prevailing structure in certain services. Such interventions have served to create confusion in the regulatory structure, all the more so if one bears in mind that legislation in Colombia, as in most other countries, undergoes many changes in the processes of study and adoption.

Generally speaking, the tariff regulations adopted by CRT seek to do away with subsidies and to set up pricing mechanism closer to a cost based system. To this end, and at this entity's initiative, SSP established regulations for a single accounting system of prices and costs for companies providing basic services. This system was first put into practice in 1999.

A process of tariff rebalancing was begun in 1996, including the setting up of an economic procedure for interconnection and involving far-reaching changes to the system of participation agreements between local and long-distance companies by establishing charges for access and use that represent real call termination costs. The results of this restructuring, as yet unfinished, will have a strong impact on Internet access, since the charges per time unit of local connection have increased considerably, benefiting users of the long-distance service, where charges have been substantially reduced, and those users are experiencing the impact of the wide variety of economically attractive offers currently being made.

Composition of the market and competition

The competition in local telephony remains confined to State-owned companies. In the international long-distance sector, three of the five entities involved are State-owned, and the remaining two private companies are linked to one of the three operators. The domestic long-distance sector, however, includes cellular operators and companies of private and mixed origin, associated with two private investors participating with a long-distance operator in the provision of this service, these being investors who in turn compete with one another in the mobile service. In a way, the trunking service competes, or seeks to compete, with cellular and value-added operators when they carry voice and when they intervene in the long-distance market.

Table 3 shows a comparison of the prices of the services provided by the different operators. It does so from a broad point of view, without taking into account the regulatory restrictions that prevail within Colombia's market structure. The convergence of different services, many of which present similar features, is a fact. For example, cellular operators compete with fixed or basic operators, the trunked service competes with cellular operators, and so on.

As can be seen from Table 3,, the price structures of the different services where competition is possible, are marked by significant discrepancies. At the regulatory level, the local market prices are regulated when the operator is established, and when cellular and trunking services may compete with one another. Price structures are subject to different marketing and competition programmes, since each service has its own level of competition. Although the Internet does not influence cost structures and levels of service internally, it does have an effect on the external market, where since 1999 it has constantly been providing special offers and discounts.

The attitude of the user with respect to such services varies according to the type of call in question. While many users are not concerned with quality but cost, provided the connection is of an acceptable standard, whereas, corporate users or individuals within a company attach far more importance to quality than to price. Within this context, the business user requires high traffic volumes, seeking data handling solutions or direct private connections with remote offices, while the medium-sized business customer will use public services, and the medium and high-income domestic user will make use of all the available options, but still making cost a priority.

[56] Act No. 422 of 1998 provides that users of a telecommunication operator who set up a call that requires the services of one or more interconnected operators shall pay for those services in full at the tariff established by each of the operators or by the competent authorities, in accordance with the tariffs in force for each service.

Table 3: Telecommunication service prices in Colombia

Service	Average price per minute in 1999 (US$)	Remarks
Local telephony	0.007 to 0.015	High and medium incomes
Regional telephony	0.04 to 0.14	Service within *departamentos* or *estado*
Domestic long distance	0.04 to 0.22	Service throughout the country. The cellular service is also national.
Cellular to cellular	0.03 to 0.20	Calls within the country
Fixed or local to cellular	0.19 to 0.42	
Comcel service (#124)	0.42	Service provision ceased in September 1999
Cellular to fixed	0.03 to 0.20	The value of long distance is added
Fixed to trunking	0.34	
Trunking to trunking to fixed	0.16	Charged by the second on-air
Long distance with neighbouring countries	0.19 to 0.30	Average, taking account of special offers
Long distance to United States	0.19 to 0.41	Average, taking account of special offers
Long distance with other countries	0.19 to 0.49	Average for European countries
Access to Internet - switched ISP	16.22 per month	Same charge regardless of use
Access to Internet via cable	70 per month	Same charge regardless of use

Note: All the above values are exclusive of Value Added Tax at 16%.
Source: Research by the author

Organization

In the past, the telecommunication sector in Colombia was governed by the Ministry of Communications. In 1990, however, Act No. 1900 of 1990 was passed, marking the first steps toward the opening-up of the sector. In 1991, the new Political Constitution was adopted, marking a new step towards deregulation. The provision of domestic public services was given a structure and the *Comisión Nacional de Televisión* (CNTV) was established, consolidating in principle the legal framework for the deregulation of telecommunications, which was developed with the passing of the Act on Domestic Public Services in 1994 and put into its final form in July 1999. At the institutional level, there remained five government entities governing telecommunications, each having a different regulatory function:

1. the Ministry of Communications (Mincom), responsible for policy, the granting of licences and spectrum management;
2. CNTV, a constitutional body responsible for all functions relating to television, including management of the spectrum allocated to this service;
3. the *Comisión de Regulación de Telecomunicaciones* (CRT), responsible for regulatory matters relating to competition, tariffs and interconnection for basic local and long-distance telephony, set up under the Act on public services, and having last year been made additionally responsible, under Decree No. 1130, for the regulation of all other telecommunication services, for the definition and drawing up of basic technical plans and for proposing the national telecommunication plan;
4. the *Superintendencia de Servicios Públicos Domiciliarios* (office of the superintendent for domestic public services) (SSP), responsible for supervising and monitoring the provision of domestic public telecommunication services, including local basic and long-distance telephony;

5. the *Superintendencia de Industria y Comercio* (office of the superintendent for industry and trade) (SIC), responsible for detecting and controlling restrictive and unfair practices in the area of competition in telecommunication services of a non-domestic nature. There are also a number of trade union organizations within the sector, including the *Cámara Colombiana de la Informática y las Telecomunicaciones* (Colombian chamber of informatics and telecommunications) (CCIT), the *Asociación de Empresas de Servicios Públicos Andesco* (Andean association of public service enterprises), and the *Asociación Nacional de Empresas de Telecomunicaciones de Colombia* (national association of Colombian telecommunication enterprises) (ADETELCO).

The Plan

The aim of the present Government's National Development Plan, called "Goals for Constructing Peace", is to open up access to communication services for all citizens through extending coverage to all parts of the national territory[17].

In addition, the Plan sets out five strategies: consolidating the national coverage provided of telecommunication services; strengthening the regulatory and institutional framework; consolidating the deregulation of the telecommunication market; fostering the private participation of new players in the provision of services; and facilitating the development of the information infrastructure. The goals established under the Plan are shown in quantified form in Table 2. Moreover, the National Informatics Plan establishes, among other things, strategies for developing a Government intranet, for using the Internet with emphasis on intercommunication, and for periodically updating standards for the standardization of technological guidelines.

Services

Table 4 shows, within the context of the regulations in force, information relating to licences granted by the Ministry of Communications, income for each of the services and the corresponding number of users. It will be seen that there are various operators and that there is generally competition within the sector, particularly if one takes into account technological convergence and the manner in which the differences between the services established under Colombian legislation are becoming blurred.

Table 4: Licences and income for services in 1997

	SERVICES	Lincence	Gross Revenue (US$ Million)	Users
1	Local	55	1'090	6'000'000
2	Long-Distance	3	1'262	
3	Mobile Cellular	6	415	1'500'000
4	Trunking	38	9	30'000
5	Paging	120	60	200'000
7	Value added services and Telematics	164	309	n.a.
			3'145	7'730'000

Note: In 1999, there were 12 mobile licences and two for global systems (Iridium and Globalstar)
Source: CRT, information for 1997.

[17] Telecommunication sector - current situation and forecasts, Ministry of Communications, May 1999.

Basic telephony

In the area of local basic telephony, there are more than 50 authorized enterprises and 39 providing this service. In some cities there are up to three operators, each with its own network, generating a degree of competition. These smaller operators, working on the local level, have in some cases joined together to form larger groups, operating at the national level.

Telecom, owned by the Government, which held the monopoly for the national and international long-distance service, now owns the controlling share in 16 smaller companies providing service in secondary and tertiary cities and in other areas of the national territory, including Bucaramanga, Bogotá, Barranquilla, Cali and Manizales, owning a little over 35 per cent of the country's internal lines.

Empresa de Teléfonos de Bogotá (ETB), under municipal ownership and currently in the process of privatisation, holds 29 per cent of the country's lines, and is a new entrant in the provision of long-distance service.

Empresas Públicas de Medellín (EPM), also under municipal ownership, with 18 per cent of lines, is the third long-distance operator.

Transtel S.A. is owned by private investors, with three per cent of Columbia's internal lines.

Empresas Independientes, primarily under municipal ownership, with 14 per cent of the lines. The dominant player in this group being the *Empresa de Telecomunicaciones de Cali*, with over 500 000 lines in service.

Although basic local telephony has been deregulated and is fully open to competition, today no genuine competition can be seen between these five groups, and as the recent sale of ETB and the probable sale of one or two the other groups shows, in the future two or three corporate groups will retain control over this service, effectively reducing the forces of competition..

The long-distance service was effectively opened up to competition in 1999, with the introduction of two new operators, after many false starts, and in the face of strong union and political pressure. Although in theory, it was fully deregulated much earlier, there remained significant entry barriers, including the cost of the licence (US$ 150 million) and the requirement to have over 150 000 local lines in service as at December 1996, all of which limited the ability of new competitors to enter the market. Cellular mobile telephony operators are authorized to provide long-distance service at the domestic level and indeed do so, since the cellular service is considered to be national. New long-distance operators therefore compete with one another in providing the international long-distance service, and with the cellular companies in providing the domestic service, this being a key factor to take into account when studying the structure of the sector as a whole, particularly in view of the convergence of services that is happening to a greater degree in the context of the Internet.

Cellular mobile telephony

Provision of this service began in 1994, with the country being divided into three zones, within a structure involving one private and one mixed operator per zone (i.e. a total of six operators), and allowed these operators to enjoy a five-year period of exclusivity (which came to an end on 1 September 1999). The Congress recently adopted regulations for PCS licences, and the corresponding competition is expected to be held next year. So far as the process of company consolidation is concerned, there are currently only four operators, and there is little doubt that at the national level this will fall to only two in the long term, thereby doing away with the zones originally established.

Value-added and telematic services

As from 1992, and following a major Telecom strike, the Ministry of Communications made this service subject to regulation and began issuing licences. To date, 164 companies are authorized to provide value-added services, in addition to which they are generally authorized to provide services through the Internet.

Other services

In the area of trunking there are 38 companies, ten of them using their licence for private telecommunication activities and only four being authorized to operate at the national level. They have over 50'000 users. In the area of radio paging, there are 120 local operators accounting for over 200'000 users. Twelve licences have been issued for the carrier service. Private networks have in all cases to be authorized by the Ministry of Communications. Global systems (Iridium and Globalstar) were authorized in 1999.

In the area of sound broadcasting, there has been a great proliferation of commercial AM and FM radio stations, with a total of 1'338 licences having been granted to community stations providing a public service.

So far as television broadcasting is concerned, the National Television Commission has granted over ten licences to subscription television operators, and there are licences for five national, seven regional and four local channels.

Networks

The national networks operated by Telecom reach almost every corner of the country, while those of *Interconexión Eléctrica S.A.* (ISA), cellular operators and a number of private network and value-added network operators provide regional coverage and connection to other countries. Telecom's network was constructed within the framework of a monopoly enterprise providing all services, and, as in most other countries at that time, the operator also performed regulatory activities. It now has a digital microwave network covering most of the national territory, a fibre-optic network exceeding 4 000 km in length, and an analogue microwave network. In addition to this, it has a PDH, an SDH and a fibre-optic trunk network.

For its network, ISA took advantage of the national grid to construct a fibre-optic network using digital technology based on STM-16 systems, linking the main cities of Bogotá, Medellín, Cali and Barranquilla, and the company expects to extend the network to 18 further cities in the near future. It also has a digital microwave radio-relay network using SDH technology in a 1 + 1 configuration, with a number of satellite connections.

In addition to the above, the new long-distance operators have supplemented ISA's network with extensions which comply with their service provision expectations. Likewise, the cellular operators have constructed networks of their own that are supplemented by a number of leased portions. Finally, a number of regional operators such as ERT and EDATEL have constructed networks of their own, covering the regions of Antioquía and Valle del Cauca.