Peru:
IP Telephony and the Internet

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1 Introduction

The development of the Internet in Peru started in 1994. Internet telephony really started to be a policy issue in 1999 when one of the major ISPs, the *Red Científica Peruana* (RCP) (literally: Peruvian scientific network), was accused by the telecommunications incumbent *Telefónica del Perú* (TdP) of acting unlawfully in the long-distance voice market without having a valid license to do so. RCP was commercialising an IP telephone devise called "APLIO",[1] and that was, according to TdP, unlawful because RCP was only authorized to provide value-added services, and although Internet access was one of them, it had no legal authorization to offer long-distance or international telephone service. TdP took this case before the regulatory body OSIPTEL.

The APLIO case was brought at the beginning of the tremendous growth of the Internet and Internet telephony, especially in 2000, as a result of the full liberalization of the telecommunication sector in Peru. The year 2000 has witnessed a radical change in the Internet sector: new firms, new and cheaper services, the provision of some broadband access services to Internet, and new regulatory issues to deal with in terms of prices and interconnection between IP networks and PSTN networks. Most of the new long-distance entrant firms provide their services using the IP platforms.[2] The new long-distance competitors have focused mainly on arbitrage activities, especially on incoming international traffic. A very lucrative arbitrage business for incoming international calls was driven and sustained in Peru by: (i) the presence of international tariffs and settlement rates well above costs, (ii) the liberalization of the market, and (iii) incentives derived from regulatory measures such as *temporary interconnection* using regular telephone lines.

The liberalization of the sector greatly reduced the barriers to entry into the different market segments. The new licence policy adopted since 1998 allowed practically any applicant to obtain a long-distance licence without incurring substantial costs. The TdP monopoly in local and long-distance telephony ended officially in August 1998. However, set of factors, such as TdP dilatory practices when requested to provide interconnection, delayed the beginning of the effective competition in the long-distance market and the first new long-distance carrier consequently began operation more than a year after the liberalisation of the market.

There has been also a tremendous growth in public Internet centres. This growth has led to a reduction in the digital divide in the country because the centres allow Internet access to those, most importantly from low-income groups (perhaps equally important, from locations outside of the cities) who do not have telephone lines, Internet access or a computer. The growth in public Internet centres in Peru is shaping the Internet service as a 'commodity' service and marketed on a "pay as you go" basis.

2 The Supply of Internet Services in Peru

2.1 Initial players

2.1.1 Red Cientifica Peruana (RCP)

As in other countries, when the Internet started off in Peru, it was a network linking the country's scientific community (universities, research centres and non-profit organizations). The Red Científica Peruana (RCP), a non-profit organization, coordinated efforts within the academic and scientific communities, and first enabled academic Internet access services in December 1991. The government of the time granted RCP the right to use an international satellite gateway, through which it could connect with the global Internet. This

[1] APLIO is an apparatus that facilitates the transmission of telephone calls via the Internet, using the Internet Protocol (IP) suite. <http://www.aplio.com/>.

[2] In this paper, it is important to differentiate between the VoIP service and voice by Internet. The first term is general and refers to voice transmission using the Internet Protocol and the second term refers to voice transmission using the Internet Protocol but via the Internet. The main difference is that in the first case, transmission can be performed in a private network (to provide public or private services), where it is possible to ensure the quality of transmission, while when the Internet is used, it is not generally possible to guarantee transmission because there may be congestion generated outside the sphere of operation of interlinked companies

grant from the Government to RCP was in spite of the monopoly franchises that both state-owned enterprises had at that time on local and long-distance markets.

Until 1994, basic telecommunication services in Peru were provided exclusively by two public companies: the Compañia Peruana de Teléfonos (CPT) and the long-distance company Entel Perú. In 1994 the two companies were privatised and merged into a single company, Telefónica del Perú S.A. (TdP). As part of its licensing package, TdP was granted exclusive rights over a set of basic services such as local telephony and international leased circuits, which both happen to be key ingredients in the provision of Internet services. Exclusivity was agreed for the period 1994-1999, but, in fact, liberalization went ahead a year before the terms of that agreement expired.

During this period of exclusive rights over basic services, if any organization or firm wished to provide Internet services, they had to lease the required basic services from TdP. [3] RCP, for example, had to lease all of its long-distance dedicated or switched lines from TdP, with the exception of access to the international gateway granted by the Government. Other services or equipment, such as external routers and international circuits, however, were provided by RCP or sub-contracted to other companies.

As early as 1994, RCP started selling commercial Internet services. These services are now commercialised in two ways:

- As a retailer, RCP delivers services directly to Internet subscribers.
- As a wholesaler, RCP sells Internet access to other service providers, which in turn sell Internet services to subscribers (Figure 1)

As of December 2000, RCP offers four different price plans for dial-up Internet access: “Gold,” “Silver,” “Copper,” and “Steel”, with average monthly payments of US$ 14.6, US$ 10.4, US$ 5.8, and US$ 3.0, respectively. The Cooper and Steel plans are much cheaper because they allow Internet access via InfoVía, a TdP service, while in the other cases access is via RCP lines. The main difference between these services lies in the speed of end-user access. A maximum downstream speed of up to 56 Kbit/s is possible under the Gold and Silver schemes, while that of the Copper scheme is 33.6 Kbit/s, owing to the fact that this is the maximum permissible speed for InfoVía. RCP also offers dedicated Internet access at US$ 310 for 64 Kbit/s access, while 128 Kbit/s costs US$ 540 per month.[4]

In 1999, RCP’s total revenue was believed to have exceeded US$ 6 million, which constituted an increase of around 40 per cent over the previous year. At the end of 1999, RCP’s backbone of network connections was composed by points of presence in 5 cities of Peru in addition to Lima.[5] The transmission links connecting these points were:

- Lima-Trujillo: 256 Kbit/s
- Lima-Chiclayo: 128 Kbit/s
- Lima-Piura: 64 Kbit/s
- Lima-Cuzco: 64 Kbit/s
- Lima-Arequipa: 64 Kbit/s.

At the end of 1999, RCP acquired licences for the provision of long-distance and local services. RCP formed a partnership with a United States investment fund, Westphere, in order to develop its investments as a telecommunication operator. It announced an investment plan of between US$ 50 million and US$ 60 million for the following two years, with RCP providing 52 per cent of the funding. The aim of the

[3] Even though TdP was not granted the monopoly in the provision of local dedicated circuits services, it was only in 1996 that a second competitor entered the market (BellSouth). However in terms of market share, TdP had more than 95 per cent of the market during 1996-98.

[4] In the case of dedicated Internet access, it is necessary to sign up separately for a dedicated circuit with a company that has a licence to offer this service.

[5] Torres, Enrique. (1999). “ La Infraestructura Tecnica de Comunicacion y el estado de Desarrollo Tecnico en Peru.” Prepared for the Research Project *Regulacion y Uso de las nuevas tecnologias de informacion y comunicacion en America Latina frente a los procesos politicos y economicos de transformacion.* Volkswagen Foundation.

new company, called "Infoductos", was to provide not only Internet services but also to offer others, too, such as long-distance telephony and television.[6]

Infoductos started operations of national and international long-distance IP Telephony services in the first half of 2000 by using prepaid calling cards. The commercial name of this service is "Tarjeta Rojo y Blanco" (red and white card) and prices are cheaper than those of TdP for international long-distance calls. However, after this service was launched, TdP blocked the access of prepaid cards from TdP's public payphones. This gave raise to a controversy between Infoductos and TdP, which is still unresolved.[7] (see Box 6)

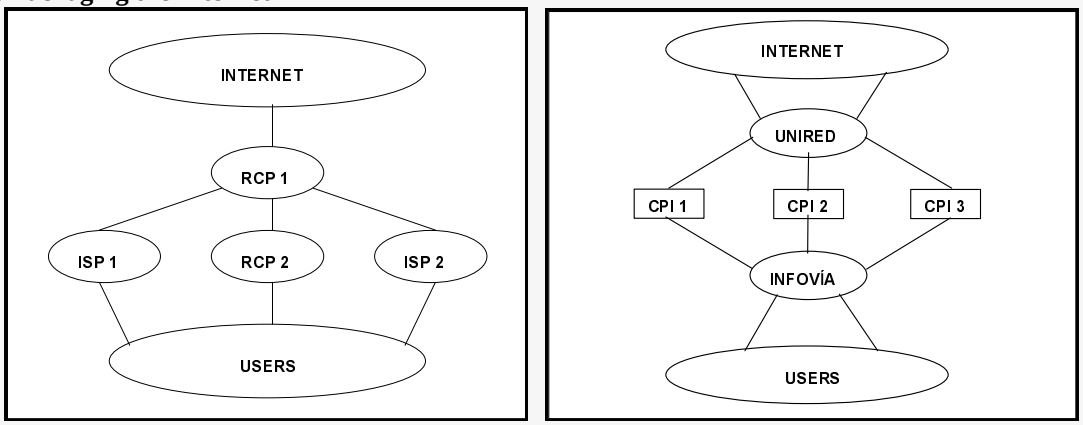
RCP was supposed to continue the development of public Internet centres by installing an additional 400 public centres and to start a new project for the implementation of a network of several "mono-centres" for access to integrated Internet and VoIP services. A "mono-centre" is a multimedia centre open to drop-in users giving access to the full range of media: TV, radio, Internet and telephony. The project also envisaged the development of a major information network supporting urban management in commercial circles, sharing and backing up State administrative management. Covering the 23 departments of the country, the project was going to be implemented in the next three years, it would have had its own satellite network and required an investment of US$ 12 million.[8] Unfortunately, all of these projects have been halted for now, due, amongst other things, to an unexpected cut of committed investment funds from Westphere, and the RCP's lacklustre business performance.

At the beginning, RCP was the only ISP in Peru. Before 1996, IBM had also offered services, but mainly to commercial clients. The high rates IBM charged for metered use discouraged dial-up residential users from signing up. By contrast, RCP imposed a flat-rate monthly charge for unlimited access. In both cases, the user had to add on the cost of telephone line use, also charged according to time spent on the line, or the monthly rent, in the case of dedicated (leased) lines.

2.1.2 Telefonica del Peru (TdP)

In 1996, TdP decided to enter the field of Internet service provision. Its licensing agreements enabled TdP to convert itself into a fully integrated telecommunication operator, without any restriction relating to share ownership or lines of business. The only competitive safeguards imposed were accounting separation, in addition to general regulations concerning the legal framework, and the licensing agreements themselves, in which it was laid down that competition should be fair and non-discriminatory. TdP is the dominant telecommunication company and the biggest company in terms of revenue.

Figure 1: Packaging the Internet



Note: CPI refers to an ISP that markets TdP's Internet services (called Centro Proveedor de Información or "CPI").
Source: Business strategies of Telefónica del Perú (TdP) and Red Científica Peruana (RCP).

[6] The Westphere fund plans to invest US$ 400 million in two years in various Latin American countries, including Peru, with the aim of developing public centres.

[7] The controversy is fully explained in the last section of this report.

[8] Plans are also said to have been made to supply broadband Internet access (up to 45 Mb) using the satellite link.

2.1.3 TdP Internet services

The commercial name given by TdP to its dedicated access service was Unired. The feature of this service was to provide Internet access solely via dedicated lines and to have, in common with RCP as a wholesale provider (RCP1 in Figure 1), a long-distance international connection or gateway to the Internet. TdP did not directly enter the dial-up market, but rather encouraged the entry of a large number of companies, which subsequently marketed TdP services. To this end, TdP launched its wholesale service, named "InfoVía," through which it leased the necessary infrastructure to smaller firms.

InfoVía is a national data network based on frame relay technology. All of its points of presence (POPs) are interconnected so that users can exchange information with any other user. In addition, each POP has a bank of modems enabling it to receive telephone calls originating from any telephone subscriber in the country. Any fixed telephone subscriber who has a computer and free software provided by TdP can access InfoVía by dialling the abbreviated code 155. Users of InfoVía do not need to subscribe to an ISP that markets TdP's Internet services, *Centro Proveedor de Información* (CPI), or any other ISP, to have access to InfoVía. This national presence enables InfoVía to offer access to the network for the price of a local call from anywhere in Peru. However, a user of InfoVía can also access the global Internet through subscription to a CPI of TdP, which provides Internet access in exchange for a subscription payment and monthly fixed payments.

Firms that wish to have a presence on InfoVía, including those that want to provide Internet access to final users, must be connected to the network by leasing a frame relay circuit, which links the firm with an InfoVía POP and by paying the rates for the InfoVía service itself. This allows users to have access to the information offered by these firms, always for the price of a local call, from any point in the country. Hence, the firms that sign up for the InfoVía service can offer connectivity to their users without needing to set up a national network or having to acquire modems to receive calls from their users, because all of the InfoVía infrastructure is provided by TdP. This is particularly important for smaller firms, which instead of making major investments to establish a national network, can lease facilities from InfoVía and offer their Internet service like any other ISP.

Charges for the InfoVía service are based on the bandwidth of each firm's link to the InfoVía network, and maximum rates have been laid down by OSIPTEL (Table 1). Thus, TdP opted for a different commercial set-up from that of RCP. While RCP provides just the Internet connectivity – and each ISP must have its own infrastructure to serve its users – TdP provides infrastructure and information services in an Intranet of associated CPIs. The increased competition engendered by the emergence of many TdP's CPIs resulted in a significant reduction in retail Internet access rates. Average rates of CPIs were US$ 13 per month, with substantial variations among them, ranging from US$ 10 to US$ 18 per month. This forced RCP to reduce its rates to US$ 19 per month from the US$ 35 to US$ 40 that it had been charging two years previously. Faced with the impossibility of continuing to reduce its rates, and with the lower rates offered by the CPIs, RCP decided also to offer access to the Internet as a CPI, that is, through both the Unired network, as well as TdP's InfoVía. As a CPI, RCP could offer rates that were competitive with those of other CPIs belonging to TdP, and at the same time continue to offer the other services which it provided previously.

The first company to enter the Internet market as a CPI (using InfoVía and Unired) was Cosapidata, which was operating until early 1997 as a specialist provider of hardware, software and network solutions for companies. The dial-up access rate of this company was US$ 13 per month, which has been falling since then to an average of US$ 5 per month under a one-year contract. These rate reductions enabled it to capture clients rapidly, achieving a total of around 10'000 users in the second half of 1999, thus becoming, together with RCP, the largest Internet provider in Peru. It should be pointed out that Cosapidata only offered dial-up access to the Internet, not dedicated access. In general, hardly any CPI offers access via dedicated lines. Cosapidata was the TdP's CPI with the largest number of clients, but it is also engaged in offering integrated telecommunication solutions to major corporations. These solutions included implementation of internal company networks for voice and data transmission, using frame relay technology in some cases and IP in others.

Table 1: Tariffs for TdP's InfoVía services, as of December 2000

Transmission speed	Monthly tariff (US$)
64 Kbit/s	**594**
128 Kbit/s	**942**
256 Kbit/s	**1,227**
512 Kbit/s	**1,593**
1024 Kbit/s	**2,070**
2048 Kbit/s	**2,691**

Source: Telefónica del Perú. Taxes not included

2.1.4 TdP Terra Networks

During July to December 1998, the number of ISPs decreased due to a partial consolidation of the industry in the hands of TdP via the bigger CPIs affiliated to it (Box 1). The purchase of the domestic Internet business from TdP by Telefónica de España was preceded by a partial consolidation of CPIs. During September 1999, the CPI, Telefónica Servicios Internet (a subsidiary of TdP) acquired the client portfolios of various other CPIs at an average cost of US$ 58 per user. At least, a total of 58 000 users were acquired in this way, thereby making Telefónica Servicios Internet the market leader at that time, reaching 120 000 dial-up users. Then, on 29 October, 1999, TdP approved the purchase of shares in Terra Networks S.A., worth some US$ 30 million (Box 2). Following the acquisition of the portfolios of various CPIs, TdP transferred all those users to Terra Networks S.A., under an exclusivity contract giving the latter the operating rights and the rights to develop the Internet residential customer segment. The most significant outcome of this agreement is that Terra Networks can only use TdP telecommunications services. The dynamism and variety of Terra Networks' activities ought to result in an increase in local traffic for TdP. Dial-up Internet access calls have been to date the principal source of revenue for TdP in Internet related business.

TdP bought 2.6 million of shares of Terra, equivalent to a share of 0.83 per cent in the total capital of Terra.[9] On 28 January 2000, the value of TdP's stock in Terra was US$ 229 million at market prices.[10] With this deal, TdP consolidated its strategy of not participating as a direct provider of Internet access services in the residential segment, but continuing to specialize in the business and corporate segment, while Terra takes care of the dial-up market.

The plans of Terra Networks Peru are also said to include stimulating the public Internet centres market. Terra is negotiating with the operators of various existing public Internet centre services to assist them in their functioning. At the same time, it is planning to set up new public centres with the aim of expanding Internet access. It is already operating more than 25 public Internet centres, and any new centres would be run by third parties.

2.1.5 Telefonica Data Peru SAC

Since 1996/97, TdP has been implementing an IP network in Peru, in the same way as the other subsidiaries of Telefónica de España have been doing elsewhere. TdP is already using an IP network for routing part of its long-distance and international traffic to other countries in the region.[11] In October 2000, Telefonica was granted a concession to provide bearer services (local and long-distance) using its newly deployed IP network. The new unit will have the name of Telefonica Data Peru SAC, which will have the capacity to

[9] This option was also used by Telefónica de Chile (CTC), which is understood to own 1.1 per cent of the firm (US$ 40 million) and also sold in a similar way the administration of its domestic Internet clients to Terra.

[10] TdP Quarterly Report, October-December 1999. See <http://www.tp.com.pe>.

[11] No official data are available to confirm this. However, at least the following aspects suggest that some level of international traffic is being transmitted over IP to reduce costs. First, Globus, in Chile, a subsidiary of CTC, launched voice and fax services over IP to certain countries in April 1999. The experiment appears to have had mixed results, but the feasibility was proven of offering such services through IP networks. Second, TdP is said to have contracted with Lucent for the implementation of its IP network. Third, a number of publications specializing in telecommunication subjects mention that 4 per cent of international traffic carried by conventional telephony operators is carried over the Internet as a way of cutting costs in comparison with traditional switched telephony. (See "To VoIP or not to VoIP" in *Latincom*, 22 April 1999).

deliver virtual private network services with local and long-distance coverage. Telefonica Data Peru's network will have initially four nodes connected at 622 Mbit/s. Each node will be also connected to a router through an ATM STM-1 interface for Lima and ATM E3 for provinces. The switch in each node will be Cisco BPX 8650, with capacities to use IP or ATM technologies, and it will be connected to Routers Cisco 7513 (Lima) and Cisco 7507 (in provinces). The projected investment would be US$ 2 million in the first year and the accumulated investment at the fifth year would be US$ 8.2 million.

Telefonica Data Peru SAC will offer a range of services to corporate users such as: web hosting, application hosting, and co-location services. It will offer integrated Internet solutions to corporate users, by combining in one-stop shopping data, voice and video services. It is expected that Telefonica Data will deliver TdP's ADSL Internet access services. It will use its national IP network and will use also Telefonica's international network of cable submarine. Telefonica Data Peru is part of Telefonica Data of Spain, which also has operations in Argentina, Brazil, Chile, Colombia, Venezuela, Uruguay, Central America, U.S, Austria, Italia, and Morocco.

Box 1: Cultivating the ISPs
Principal factors in the rapid growth in the number of CPIs (ISPs) in Peru since 1996

The rapid growth in the number of ISPs since the second half of 1996 was based on at least four major factors:

First, TdP's active policy to enter the Internet market, both dedicated and dial-up. TdP encouraged the setting up of ISPs, known as "information provider centres" (CPIs), which could not only be pure Internet service providers catering for end users but also content providers in the InfoVía network.

Second, the TdP CPIs were able to provide their dial-up users with an Internet access service at a local-call tariff, irrespective of the point of access in the country, via the abbreviated dialling code 155, and this facilitated the emergence of CPIs in various places in the country. In addition, all the CPIs followed the same price scheme, fixed by TdP.

The third important element was the first significant reduction in leased circuit tariffs, which occurred in December 1996 on the initiative of OSIPTEL. The average reduction ranged from 19 to 35 per cent. For example, the monthly tariff for a 2 Mbit/s local digital circuit fell from US$ 1 950 to US$ 1 268. It was thus possible to reduce the high circuit tariffs prevalent until then.

The fourth factor was the growth in telephone penetration which accompanied the TdP tariff rebalancing programme. Established in the TdP licensing agreements, this made provision for specific rates for basic telephony services, including the installation tariff. In real values or in US dollars, the telephone network installation or connection tariff started at a high level, far above its actual cost, and gradually decreased towards the end of the fifth year of rebalancing. From the operator's viewpoint, it was more advantageous to add a new subscriber to the telephone network as early as possible since it would thus gain a greater revenue per connection, and this implied an additional incentive for TdP to expand telephone penetration rapidly at the start of the rebalancing programme.

Box 2: *Terra Networks*, Terra Nostra
International telephony strategy in the Internet markets

The strategy followed by Terra Networks Peru with regard to the Peruvian Internet market can be better understood by analysing the strategy devised by its parent company, Telefónica de España. The latter's Internet access services were launched at virtually the same time in all countries where the company has a major presence: Spain, Chile, Argentina, Peru. and recently Brazil.

Since 1998 Telefónica de España made fresh moves to boost its Internet presence in Latin America, using two complementary strategies: gaining an adequate Internet market share in each country by the purchase of other major ISPs; and consolidating international business in Latin America into a single new company: Terra Networks.

Hence, during 1998, Telefónica de España bought three major ISPs in Argentina and incorporated them into the main ISP business of Telefónica de Argentina. At around the same time, it purchased a major share in two leading ISPs in Brazil and a main gateway called Zaz. In July 1999, it bought the ISP Infosel in Mexico. In September 1999, Telefónica bought the Internet business of CTC in Chile, in addition to two ISPs in Argentina, and then purchased TdP's Internet business in Guatemala which converts them into InfoVía de Guatemala. All these acquisitions were to be used in the creation of a multinational company called Terra Networks, which would control all Telefónica de España Internet business in Latin America.

2.2 New providers since market liberalization in 1998 [12]

As previously stated, TdP licensing agreements gave it exclusive rights over basic services for a five-year period (1994-1999). However, an agreement between the State and TdP made it possible to conclude the exclusivity period a year before the planned expiration date. Hence the telecommunication sector became liberalized as regards the granting of licences for offering long-distance and fixed telephone services in 1998. As of November 2000, a total of 47 companies have been licensed to offer long-distance services, while in the case of fixed local telephony, two licences have been granted in addition to the rights held by TdP.

Competition in local services can generate the maximum positive impact for the further development of Internet services. The fact that users have to pay per-minute telephone charges, in addition to ISP charges, currently constitutes a significant barrier to Internet growth.[13] The local carrier service, through which circuit leasing is offered, was always open to competition, but it was only recently with the opening-up of the market in August 1998 that the market became more dynamic. At the time of liberalization, three companies in addition to TdP held licences to offer local carrier services, but only TdP was operating in the market. The opening up of the other services to competition had an indirect impact on the local carrier service market, as borne out by the fact that as of December 2000, 18 additional companies have applied for licences for this market. This is due to the fact that many firms, which have applied for a long-distance carrier service licence, have also requested a licence for local carrier services. Any increase in the number of companies holding the rights to offer leased circuits can only have a positive impact on the Internet providers, since competition should result in lower leased line prices, which will enable them to reduce operating costs.[14]

A number of operators have also emerged with a regional concentration in Latin America and in business markets such as ATT and BellSouth. Internet telephony and VoIP services are being offered by some of the country's leading telecommunication operators, ISPs and new commercial entities. A brief description of the main players is given below.

*ATT Latin America (*formerly *FirstCom):* FirstCom was a company with North American and Latin American (mainly Chilean) investors. It began commercial operations in Peru in 1999. It also has operations in other Latin American countries (Chile, Brazil, Colombia). It constitutes what is known in other countries as a competitive provider of basic telecommunication services and its target clientele is business users. In early 2000, it concluded a strategic merger with AT&T, creating the company AT&T Latin America. The new company plans to compete in the Peruvian telecommunication market for long-distance (national and international) services, fixed telephony, wireless services and Internet access.

Investments proposed by FirstCom in Peru total US$ 200 million, and to date US$ 70 million has been invested in the fibre optic network and in network support equipment. In June 1999, its infrastructure consisted of a 760 km fibre optic ring in Lima and Callao, 25 131 km of fibre installed, 22 ATM nodes, 140 buildings wired, one long-distance exchange and one international teleport.[15] Its basic transmission platform

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[12] This paper is concentrated in public Internet networks. However, it is important to mention that the development of private VoIP networks in Peru has basically been spearheaded by large private companies, such as banking institutions, industries or firms involved in natural resource extraction with multiple points of presence in the country, such as mining and oil companies, etc. The construction of private communication networks took place chiefly to reduce costs, the only other alternative being to use public networks, which were still under a monopoly until 1998. Currently many non-telecommunication companies such as Banco Continental, Banco Latino and Banco Interbank use voice over frame relay internally to supply voice and data services between their regional offices. The migration to an IP platform is said to be recent, largely because, at the time voice over frame relay was chosen, IP technology had not yet gained the full confidence of these companies.For example, the Banco Latino decided to integrate its voice and data networks into a single platform at the end of 1997. The platform used was frame relay because the IP platforms had still not been fully tested for this company. See the report of Pyramid Research, "Voice-over-packet services and technology in Latin America", *Database Qualitative Review*, 1st Quarter, 1999.

[13] As of December 2000, the local telephone rate was about US$ 0.027 per minute of use.

[14] Although there were four companies at the time of liberalization of the market with the capacity to offer the circuit-leasing service, there was no sign of any real competition between the firms, with TdP being the main one. The assessment of lack of competition in the market was supported by OSIPTEL's decision in November 1998 of keeping price regulation in the market. At that time OSIPTEL held the view that there was no "healthy competition" in this service, so it denied TdP's request for price deregulation of the service.

[15] FirstCom Corporation, Quarterly Report. See <http://biz.yahoo.com/e/990816/fclx.html.>

is ATM with IP overlaid. The company offers integrated services for the high-speed transmission of voice, data and video (including LAN interconnection, frame relay, access to remote terminals and dedicated Internet channels). It commenced long-distance operations in November 1999 and also supplies dedicated Internet access. In June 1999, it had 147 clients with dedicated Internet access. This year it plans to enter the local service segment, for which it already holds a licence.

The appearance of FirstCom as a provider of Internet services and of dedicated lines resulted in strong competition in this segment of the market. FirstCom's presence had a noticeably dynamic effect on competition in prices for Internet services. In the first few months of 1999, rates for dedicated Internet access fell by an average of 30 per cent, forcing TdP to reduce the Unired rates in order to compete and stay in the market (Table 3). Rates related to the installation of dedicated circuits also fell by as much as 50 per cent and discounts of between 5 and 15 per cent were applied, depending on the amounts of monthly bills. A few months after its arrival on the scene, FirstCom succeeded in capturing about 50 major firms in the country, many of which were drawn away from TdP or RCP.[16]

Table 2: The irresistible virtues of competition

Monthly rent for dedicated Internet access before and after the opening up of the telecommunication market in August 1998

Speed of circuit	TdP: Unired (1) Before ATT LA (ex- FirstCom)	TdP: Unired After ATT LA (ex-FirstCom) March 1999	Variation % (2)/(1)	ATT LA (ex-FirstCom) March 1999
64 Kbit/s	**650**	**455**	**-30%**	**450**
128 Kbit/s	**1040**	**728**	**-30%**	**720**
256 Kbit/s	**1665**	**1166**	**-30%**	**1150**
512 Kbit/s	**2665**	**1866**	**-30%**	**1840**
1024 Kbit/s	**4260**	**2982**	**-30%**	**2950**
2048 Kbit/s	**6815**	**4771**	**-30%**	**4720**

(1) Tariffs charged before the entry of FirstCom, equivalent to the maximum approved by OSIPTEL
Source: Telefónica del Perú and FirstCom

*BellSouth Perú, S.A. (*formerly *Tele2000):* This is the second mobile service operator in the country after TdP. In 1999, it also obtained licences for long-distance and local services. In 1998, BellSouth won the Band B license to provide services outside of Lima. In 1999 BellSouth also won a local bearer concession to operate in Lima, which allows it to provide local telephony and dedicated circuits to other firms. In December 2000 and January 2001, BellSouth launched its Internet access services: dedicated and dial-up.

BellSouth offers dedicated circuits, public payphones, and cellular telephony. BellSouth has acquired a majority shareholding in the cable and cellular company Tele2000, but it withdrew from the cable TV service that they offered, a service marketed as TeleCable. At present, TeleCable is still operating but BellSouth states that it has only withdrawn from the cable TV service provision, not from the optic fiber network, and only from the coaxial cable network covering part of Lima. Through this extended network it should be able to provide Internet access, telephony, data transmission and other services. This would explain the obtaining of licences for long-distance and local services in 1999 and it already offers a long-distance international service to its mobile phone customers.

At the end of 2000, BellSouth International made public its intention to create a holding company BellSouth Latin America, which would concentrate all its Latin America operations (Peru, Chile, Brazil, Colombia, Venezuela, Panama, El Salvador, Ecuador, and Argentina). It would follow a similar step taken by ATT when it created ATT Latin America after its merger with FirstCom.

[16] Before the arrival of FirstCom, the company Tele 2000 (now BellSouth Peru) was operating as a provider of dedicated and switched (dial-up) circuits. However, it was only recently, with the arrival of FirstCom, that real competition in the circuit-leasing service and in dedicated Internet access began to take shape.

*JN Atala & CIA S.A. (*formerly *Net2Phone):* Net2Phone is one of the world leaders in Internet telephony, its market being retail users. Net2Phone Perú has been operating in the country since September 1999. Gateways have been installed in Peru for connections with the public telephone network, making possible to originate and terminate telephone calls via the Internet.

Table below shows rates in February 2000 for long-distance international calls between Peru and the United States via two methods: from PC to telephone and from phone to phone. In the first case, the rate per minute for a call from Peru to the United States was US$ 0.15 via Net2Phone, which was quite attractive compared with the TdP rate of US$ 0.66. It should be emphasized that the settlement rate (which is the equivalent of half the international accounting rate) that TdP had to pay to the United States carriers was paid US$ 0.31 per minute at the beginning of 2000. This indicates that the settlement rate that Net2Phone Perú paid to Net2Phone USA must be much less than the rate paid by TdP, probably somewhat less than the peak rate. A call from the United States to Lima had a rate of US$ 0.21 per minute, while if the call was to a city outside the department of Lima, it had a significantly higher rate.

An interesting aspect to note is that with the Net2Phone rates, it was cheaper to call the USA from Peru than *vice versa*, unlike with traditional international telephony rates. Traditionally rates for calls from theU.S. to Peru have always been lower than from Peru to the USA.

Net2Phone's phone-to-phone method is only available for calls from the USA to Peru and rates were between 50 and 60 per cent greater than those for the computer-to-phone method.

During 1999, Net2Phone experienced some operational problems to deliver its services to final users. It was argued that the Net2Phone equipment was at fault, unable to cope with such high levels of demand. However, in a counter claim, RCP published a complaint claiming that TdP had been blocking access to IP numbers identifying the Net2Phone servers, so that Internet users could not route calls via the Internet and were obliged to use TdP services. RCP argued that, according to its tests, access to Net2Phone was possible when the Internet was accessed other than through TdP. But it should be borne in mind that TdP (via Unired) is the dominant Internet service operator, providing even RCP with access. This was the reason why RCP lodged an official complaint against this situation, since many of its users were unable to make use of Net2Phone when the route to the Internet was via Unired. Nevertheless, Net2Phone was not the only case where allegations arose of apparent blockages by TdP to prevent long-distance communications using this method. [17] Despite these complaints, the existence of blockages in access to the services of Net2Phone could not be proven, owing to the fact that such blockages subsequently began gradually to disappear without any pattern being found, nor was it possible to prove that they were caused by anyone in particular. At present, no further complaints have come to light regarding the alleged blockages in the use of Net2Phone.

In April 2000, Net2Phone requested a long-distance concession before the Ministry of Transport and Communications. On September 2000, the firm JN ATALA & Cia S.A., the name of the Net2Phone subsidiary in Peru, got a concession to provide long-distance bearer services. The services to be provided are bearer dedicated (i.e. not switched) services. It seems that the local Net2Phone subsidiary decided to operate long-distance services under a long-distance concession in order to avoid problems with the Peruvian authorities. JN Atala & Cia S.A.'s long-distance network will consist of point-to-point and point-to-multipoint Intelsat satellite links.

[17] The last section of the report describes in detail some disputes between TdP and ISPs or telecommunications carriers.

Table 3: Other voice routes

Net2Phone rates for calls between Peru and the United States of America, February 2000, in US$ cents per minute.

Origin of call	Destination of call	Net2Phone rate	Time of day
a. PC-to-phone			
Peru	USA	15 (*)	Peak (7am-7pm)
		10 (*)	Off-peak (7pm-7am)
USA	Peru (Lima)	21 (**)	Any time
	Peru (outside Lima)	30 (**)	Any time
b. Phone-to-phone			
USA	Peru (Lima)	31 (**)	Any time
	Peru (outside Lima)	49 (**)	Any time

(*) Minimum prepayment of US$ 25. (**) Minimum purchase US$ 5.95

Source: Washington Post, February 11th.

*IBM***:** Like Cosapidata, IBM not only acts as an ISP but also creates internal networks to interconnect various subsidiaries of companies, whether at the national or international level. The networks created allow the transmission of voice and data, mainly using IP.

2.3 New players in 2000

The year 2000 has signalled the beginning of operations of more providers of Internet services. There are also some long-distance telephony providers that use IP technology.

Digital Way. A subsidiary of World Wide Wireless of U.S.A., Digital Way started operations in 2000. The initial investment has been US$ 5.8 million, and it is expected to invest US$ 50 million in the next 5 years. It offers access to Internet through the use of wireless broadband dedicated lines based on MMDS. In contrast to its competitors, which have deployed fibre optic rings around commercial districts in Lima, Digital Way will employ a wireless network and its clients will use the fixed bi-directional wireless technology to access the Internet. It offers wireless asymmetric dedicated access to Internet: the user may have a downstream speed up to 1 to 4 Mbit/s, while the upstream speed may go from 126 Kbit/s to more than 1 Mbit/s. Currently, Digital Way serves only the Lima market, but it plans to extend its services to some key provinces in the future, for which it holds also a long-distance licence. The planned market to attend is mainly the corporate business segment, focusing on small and medium enterprises. In the short term Digital Way will offer dedicated access to Internet thought wireless dedicated circuits. In the medium term, it plans to offer dedicated circuits to be used by corporate users.

Diveo Telecomunicaciones del Peru. Diveo started operations in the second half of 2000. It is a subsidiary of Diveo Broadband Networks Inc, a U.S. Washington based company, which also operates in other countries of the Latin America region (Argentina, Colombia, Brazil, Mexico, Panama, and Uruguay). It offers broadband telecommunication services (data, voice, video, Internet, among others). The Diveo network in Peru consists of a fixed wireless backbone which offers access to Internet through the use of wireless broadband dedicated lines. The Diveo strategic technology providers are Lucent technologies and Ericsson. The network is composed of HUBs interconnected with SHD radios and ATM switches with capacity of 155 Mbit/s. The planned market is mainly the corporate business segment in Lima. Diveo plans to provide value-added or integral services to corporate clients: voice, video, data, corporate solutions, etc.

Justice Telecom Peru. A subsidiary of Justice Telecom International, which is an integrated voice and data company that builds Internet (IP) technology based networks in Latin America and Africa/Middle-East, Justice Telecom Peru has a concession to provide long-distance services. Prior to becoming an IP international telephone provider, Justice Telecom International was in the business of call-back and reselling of international traffic. In addition to fully integrated voice and data products, Justice Telecom offers a portfolio of wholesale and retail products including international termination, wholesale data services, partitions, carrier co-location, dedicated Internet access, international long-distance, call-back, operator

services and calling cards. Justice Telecom International operates in several countries and sells its services directly through offices in Los Angeles, New York, Santiago (Chile), Lima (Peru) and Buenos Aires (Argentina).

Comsat. Comsat Peru is a recent company born of the strategic partnership between Lockheed Martin Co. and COMSAT Corporation. COMSAT operates internationally in several countries: Argentina, Brazil, China, Colombia, Guatemala, India, Mexico, Russia, Turkey, Venezuela, and the United States. It employs important ground and satellite systems, as well as advanced technologies developed by COMSAT Laboratories, including ATM, Frame Relay, IP, ISDN, SS7 protocols, for multiple applications. It has started long-distance operations in Lima but holds a licence to operate in any region of the country.

The Peruvian NAP. During 2000, TdP, BellSouth, ATT Latin America, COMSAT, and RCP agreed to deploy the first Neutral Access Point (NAP) in Lima, in order to interconnect the Internet traffic at a local level. The NAP will avoid the need to send the local Internet traffic to the U.S. before returning it to Peru. This is an important step, reducing unnecessary costs of transiting Internet traffic. Government involvement in the creation of the NAP amounted to acting as coordinator and facilitator in the implementation of the project. The administration of the NAP will rotate between the signatories of the agreement. The first administrator of the NAP will be TdP.

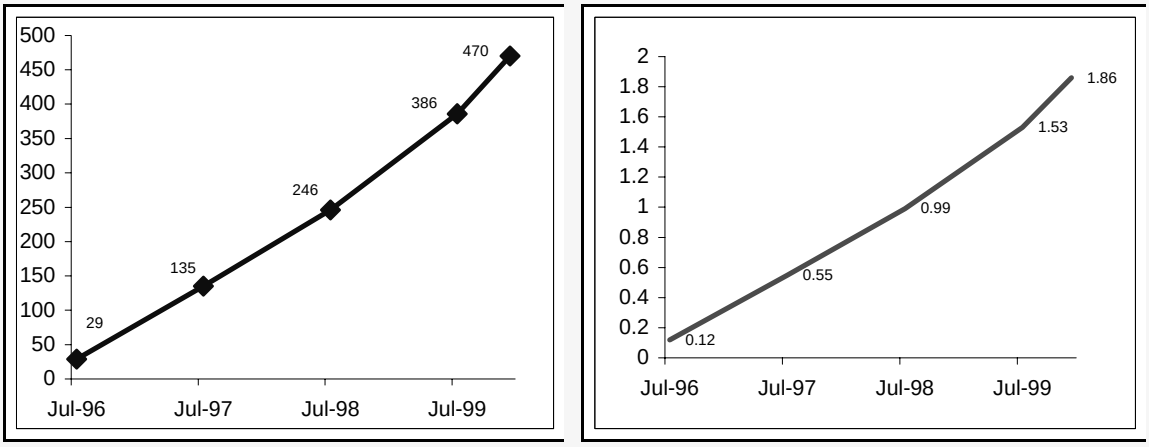
3 Market profile

3.1 Size of the Internet

The estimated number of internet users in mid-1996, (dial-up and dedicated) has been put at around 30 000, while by the end of 1999, this figure was around 500 000, close to a 15 fold increase in less than three-and-a-half years. Internet user penetration grew from 0.1 per cent to 1.9 per cent during the same period (Figure 2).[18]

Figure 2: The growth explosion

Evolution in the estimated number of users in thousands (left-hand chart) and proportion of Internet users relative to population July 1996-December 1999



Source: Telefónica del Perú, OSIPTEL

Table 4: A market showing constant growth

Indicators for Peruvian market in telephone access to the Internet, at March 2000

		InfoVía traffic ('000 minutes)	Variation	Dial-up users	Dedicated users	Total	Variation	Number of ISPs
1998	I	68'528		48'200	160'000	208'200		54
	II	91'280	33%	66'500	180'000	246'500	18%	54
	III	120'288	32%	83'400	201'700	285'100	16%	42
	IV	139'804	16%	83'600	218'000	301'600	6%	37
1999	I	144'998	4%	92'000	255'200	347'200	15%	42
	II	175'850	21%	99'000	287'000	386'000	11%	42
	III	203'469	16%	108'000	317'000	425'000	10%	46
	IV	225'463	11%	120'000	380'000	500'000	18%	56
2000	I	231'461	3%	130'000	390'000	520'000	4%	58

Source: OSIPTEL

As regards the number of companies in the Internet market, it is interesting to observe that owing to favourable market conditions, the situation has changed from that of a duopoly, in July 1996, to one with as many as 54 ISPs in 1998 (Table 4 and Box 1).

According to the Ministry of Transport and Communications, as of October 2000, there were 160 value-added service providers registered, of which 45 were ISPs. The number of value-added firms has shown an explosive growth in recent years: 70 in 1997, 113 in 1998, 140 in 1999, and 160 in 2000. The number of public Internet centres (see section 5) is estimated to be more than 500, while the total number of Internet users is calculated to be over 520 000, which include dial-up and dedicated users. [19]

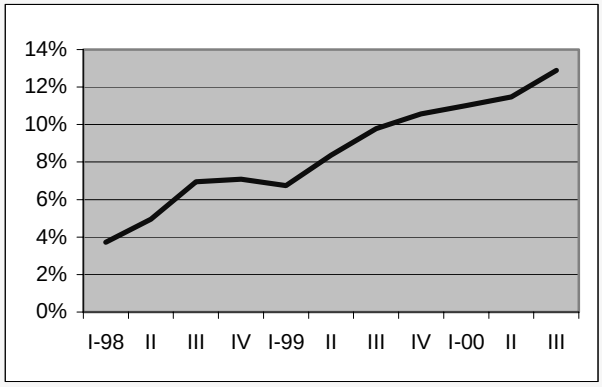
There are about 130'000 dial-up subscribers who access Internet through conventional residential or small office accounts. According to official estimates, i.e. Ministry and OSIPTEL, there would be around 390'000 users under the dedicated and public centre modalities, both labelled " dedicated users".

The services provided by these ISPs have generated a rapid expansion in Internet traffic. According to TdP's figures, Internet traffic of InfoVia has grown at a pace of 16.4 per cent quarterly, or 5.2 per cent monthly from 1998 to 2000. The share of the InfoVia traffic over the total local telephone traffic has increased steadily during this period, from 4 per cent in the first quarter of 1998 to an estimated 13 per cent in the third quarter of 2000. If current trends continue, Internet usage might have overtaken traditional voice telephony as the dominant type of local call traffic by the middle of 2003.

[18] The figures for dial-up users correspond to information supplied by the leading firms involved in the business. In the case of dedicated users, the number of users corresponds to estimates supplied by the same firms. It should be emphasized that it is very difficult to estimate the number of users who have access to public Internet centres since there is no need to be registered to use the latter. No official estimates of Internet market share are available. However, RCP is still considered to be a major presence with almost half the market. In October 1999, the general manager of RCP told a leading American business magazine that "RCP controls 56% of the market. The rest is shared between TdP and IBM" (in *Business Week*, 25 October 1999). More recently, it is strongly believed that RCP's market share is much lower.

[19] Valdez, Carlos. (2000). " El Internet en el Peru: Perspectivas." Presentation at the CITEL conference, October 9-10, 2000.

Figure 3: Share of Internet "Infovia" traffic on local telephone traffic



Source: *TdP*

From Table 4, it can be estimated that the average dial-up Internet subscriber would use approximately 600 minutes or 10 hours per month. This subscriber use is low in comparison to developed countries. For instance, according to a prominent investment bank, American On Line's average subscriber in the U.S. use 1,920 minutes or 32 hours per-month during the same first quarter of 2000.[20]

3.2 Peru's Digital Divide

Peru is one of the countries with the most uneven income and wealth distribution in Latin America. These structural characteristics are reflected also in the uneven access to telecommunication services, including the Internet, and the means used to access to information technologies, such as personal computers, TV, etc, and by different income groups. The dimensions of the domestic digital divide can be also found between rural and urban communities, ethnic groups, etc. Table 5 shows some socio-economic characteristics of households in Lima and their degree of use of telecommunication services and assets to access information technologies.

Table 5. Socio-economic characteristics of income groups and penetration of services and durable goods in Metropolitan Lima, as of July 2000

	Highest incomeGroups	Medium incomeGroup	Lowest incomeGroups	Weighted
	A,B	C	D,E	Average
Households	18%	33%	49%	100%
Monthly income	$1,317	$885	$173	$615
Penetration of: Internet	28%	0%	0%	5%
Fixed Telephone	96%	62%	18%	47%
Personal computers	55%	8%	5%	15%
Television	100%	99%	2%	52%
Cable TV	74%	23%	4%	23%

Source: Apoyo Opinion y Mercados S.A. Extracted from the presentation of P. Phumpiu, " Retos del Estado Frente a la Masificacion de Internet." September 2000.

[20] Meeker, Mary. (2000). "The Global Internet Primer". Presentation of the Morgan Stanley Dean Witter. Page 16. <www.msdw.com>

In July 2000, the average monthly income of a household in Lima was US$ 615. The highest income groups A and B, which represent 18 per cent of the total households in Lima, had an average household income of US$ 1'317. However, the poorest groups, D and E, which represent half of the total households, had an average income of just US$ 173 per month.

Internet penetration by household in Lima is just 5 per cent and it is concentrated entirely in the richest income groups A and B. This is in contrast with the relative high penetration in telecommunication services such as telephone (47 per cent) and cable TV (23 per cent).

Only 15 per cent of the overall households in Lima have access to a personal computer. Among the reasons explaining the low computer penetration are the low-income levels of the different groups and the lack of credit opportunities for households. Thus, the price of a computer of US$ 1'000 represents 76 per cent of the monthly income for groups A and B, 113 per cent of the income of group C, and 580 per cent of the average income of groups D and F!

The levels of telephone prices help also to explain, at least in part, the low Internet penetration in Peru. Thus, as of December 2000, telephone prices that an average Internet user had to face were: [21]

- monthly telephone rental: US$ 14 before the 18 per cent value-added tax, plus
- usage charges of US$ 14 per month before taxes, equivalent to a monthly Internet consumption of 10 hours.

A sub-total of US$ 28 per month for just these two telephone services, without taking into account costs such as a computer etc. If US$ 28 represents just 2 per cent of the high-income households in Lima, it amounts to 28 per cent of the monthly income for poorest households.

This may explain, at least in part, the high preference for public Internet centres among low-income people.

This situation is also reflected at national level. Dial-up Internet access requires a computer, a telephone line and software. However, in Peru, the number of people having the first two items is very small. At the end of 2000, the penetration of the basic fixed telephone service was less than 8 lines per 100 inhabitants. And in 1997, only 1/5 of urban households had a computer. Consequently, the potential number of dial-up Internet users remains very low. As it can be seen in Table 6, the domestic digital divide has been reduced somewhat during the last few years (1993-99) since there has been an improvement in the penetration levels of telecommunication services and higher access to assets used to access information technologies. But this change is still not enough to overcome the domestic digital divide.

Table 6: Partially Isolated

Percentage of households with various communication services, Peru 1997, and percentage of households in metropolitan Lima with various communication services, 1993-1999

Service	Percentage of households
Telephone	67.40 %
PC	20.10%
Fax	8.60%
Cable TV	8.30%
Cellular telephone	6.5%
Internet	3.30%

Service	1993	1999
Television	89%	95%
Radio	90%	90%
Telephone	17%	51%
Cable TV	2%	18%
PC	5%	11%
Internet	0%	4%

Source: INEI, National household survey, 2nd quarter 1997 and market support and opinion, socio-economic levels in metropolitan Lima, July 1999

[21] Per minute rate was around US$ 0.023 per minute. In addition, there was a per-call set up rate of US$ 0.023. On top of these rates, it has to be added the monthly Internet access paid to an ISP.

Per capita annual GDP in Peru for 1999 was US$ 2 676, or US$ 223 per month.[22] However in 1999, prices for the various items required for Internet access (numbered 1 to 5 below) were far above the average income of the vast majority of the population.

1. Computer (US$ 1,000-2,000: single payment)
2. Telephone line (US$ 150: single payment)
3. Internet provider (US$ 5 per month)
4. Monthly telephone rental (irrespective of use) (US$ 14 per month)
5. Telephone calls (US$ 0.027 per minute). Ten hours per month would mean US$ 16 per month.

4 Public Internet centres

The first public centre was opened by RCP in 1994 in Lima, and they have since become extremely popular. Currently, there are between 540 to 840 public Internet centres in Peru, some of them belonging to RCP, and the rest to new entrants to this market, such as Terra Networks Peru, and ATT Latin America.

RCP was a pioneer in installing public Internet centres in Peru. Its main purpose, at least initially, was to remove some of the limitations of infrastructure and costs. The public Internet centres offer cheap Internet access, for which users do not have to own a computer, an Internet connection or a telephone line. Internet centres allow the public to use Internet as a commodity, whereby the user buys the service on the spot and does not have to own any service or equipment (Box 3).

The government aims to promote Internet access, and the installation of public centres is an efficient way to do it, at least for low-income groups and poor rural communities. The 1998 government guidelines for liberalization laid down a substantial increase in Internet access as an objective for 2003. Through Telecommunication Investment Fund (FITEL) projects, the government expects to continue to implement projects that include an Internet component. During 2000-2001, FITEL is expected to be able to finance private projects to serve over 2'000 rural sites.[23]

The difference in the cost of Internet access from a public centre compared with that of individual dial-up access explains the great boom in the use of these centres. It is estimated that 70 per cent of the total number Internet users gain access via public centres while the remaining 30 per cent log on using dial-up lines or from their place of work. Most of the latter have leased circuits.

A recent survey on the characteristic of the users of public centres showed the following trends:[24]

- In terms of socio-economic characteristics, the survey showed that a high proportion of users are male (55 per cent of the total); most of users are between 15 to 25 years old (57 per cent of the total), and another important proportion is between 26 to 35 years old (20 per cent). The majority of the users have some level of education either primary, secondary, university or technical.
- The key motives for Internet connection are information searching and surfing (52 per cent); and entertainment, games, music (28 per cent). A very important application also widely used by Internet centre users is Internet telephony by using computer-to-phone or computer-to-computer modes to place national and international long-distance calls.

[22] Since privatisation, price reductions have occurred in relation to telephone installation, metered local telephone, and Internet monthly rental, while monthly telephone rental has seen significant increases. Thus, the main obstacle to access is the cost of the computer, while users still consider that telephone costs are too high, since Internet use necessitates prolonged use of a telephone line.

[23] All public telecommunication service companies but cable and value-added must contribute 1 per cent of their gross revenue to FITEL. The aim is to bring those telecommunication services to rural areas, where it would not be economically viable for the private sector to make the corresponding investments.

[24] Instituto Peruano de Comercio Electronico." Estudio de Internautas Peruanos en Cabinas Publicas." 2000. <www.ipce.com.pe>

- Around 60 per cent of centre users use centres 2 or 3 times a week. Nearly 56 per cent of users connect for an average of 2 to 3 hours, and 36 per cent connect for just 1 hour at a time.
- Around two out of three users have a computer at home. But only 28 per cent have an Internet connection at home. The main reason that centre users gave for not having Internet at home was because of the high cost of telephone usage and Internet connection.

Box 3: Public and cheap
General outlines of the RCP public Internet centres initiative

There are various estimates for the number of public Internet centres operating in Peru. Official estimates indicate some 540, but private estimates go from 840 to 1,000. Most of the Internet centres are located in Lima. RCP directly runs about 30 and has helped other companies to set up another 470, each with a small number of computers, between 10 and 20 per centre. The centres are generally connected to the Internet through a dedicated line of a fixed bandwidth, which is shared by the computers.

The tariff for use of a public centre depends on its location, the quality of services on offer and the distance from other centres, but the average cost is around US$ 1 per hour, whereas a dial-up subscriber to an ISP pays around US$ 1.65 per hour for telephone use alone. This does not include Internet access charges. Users of Internet centres use the service, among other things, to e-mail, surf the Internet as well as place long-distance national and international calls.

In 1999, RCP became the first company in Peru to export the public Internet centre model. This multinational expansion occurred after the World Bank declared the public Internet centre model to be "the most viable for developing countries". In 1999, RCP initiated the project for the installation and management of 100 public centres nationwide in El Salvador, and other countries including, Colombia, Uruguay, Togo and Mauritania have shown an interest.

As regards universal access, a telecommunication investment fund (FITEL) is evaluating pilot projects to bring Internet access to places of preferential social interest. RCP has submitted a project to FITEL in which it would provide the IP voice service via public centres, in addition to access to the Internet.

OSIPTEL has elaborated guidelines for funding these projects. They have been submitted to the Ministry of Transport and Communications for its approval. Some of the issues under consideration include the following:

- The obligation to train potential users of the service;
- The obligation to create and maintain content of interest to inhabitants of the area;
- The obligation to provide institutions and authorities in the area with e-mail accounts.

With the aim of meeting these requirements, some companies interested in the pilot projects have announced that their centres could offer features such as touch screen, voice-activated software, and be equipped with software for translation from Quechua into Spanish, and *vice versa.*

5 Developments: More innovative services

After the full liberalization of the telecommunication sector in August 1998, the market has witnessed the introduction on new Internet services, especially broadband access services, such as Cable modems and Digital Subscriber Line access to the Internet.

Asymmetric Digital Subscriber Line (ADSL). TdP introduced this service in September 2000. OSIPTEL, who approved price caps for ADSL services on August 31th, 2000, considers ADSL as the first step towards the implementation of a flat rate for Internet services. An asymmetric version of Digital Subscriber Lines offers a higher rate of upstream than downstream, ideal for residential users who receive, but do not send, a lot of data. As ADLS does not interfere with the basic voice service, the subscriber can simultaneously send or download data and use the voice service. The speeds offered range from 64 Kbit/s to 2.0 Mbit/s for residential subscribers and up to 155 Mbit/s for commercial firms or resellers of ADSL services.

Web TV. TdP offers Internet service via the cable TV network (Web TV – WorldGate) at a flat rate of US$ 35 per month. This service allows the subscriber to surf the Internet but not to send of receive data. The WorldGate service may be a good alternative for users without computers to access the Internet, since only a TV set is required. Even though it is not possible to access all Internet services using a TV, it may be an alternative for avoiding the initial cost of gaining access to the network. Regrettably, this service, costing

US$ 35 per month, is only available in conjunction with the US$ 35 monthly rental for cable TV service. Thus, users have to pay US$ 70 per month for both, which may mean that many users decide against it, especially if they are only interested in the Internet access and not in the cable TV service.

Cable modem. In August 2000, TdP launched a cable modem service over its Cable TV network at a monthly flat-rate of US$ 40 (128 Kbit/s). The TdP cable modem service is offered nationally through the TdP cable network. TdP's cable modem service is offered to TdP Cable TV subscribers only, and is paid in addition to the Cable TV service.

Dedicated access. The supply of Internet access though dedicated circuits has increased during 1999-2000. There are new companies providing these services with lower prices and higher speeds than in the past. Companies such as AT&T, Diveo, Justice Telecom, and Digital Way are offering more and better options for consumers. The following Table shows some recent rates for dedicated access to the Internet.

Table 7. Monthly rates for dedicated access to Internet, as of December 2000 (in US$)

Company		Speed 64 Kbit/s	Speed 512 Kbit/s	Speed 2048 Kbit/s	Included Dedicated circuit
AT&T LA	(1)	490	2'195	6'540	Yes
	(2)	NA	3'973	11'837	Yes
TdP	(3)	585	2'186	6'039	Yes
Diveo	(4)	550	2'100	NA	Yes
Justice Telecom	(5)	590 (=460+130)	2'380 (=2'060+320)	7'547 (=6'279+1268)	No
Digital Way	(6)	NA	1'097	2'691	Yes
RCP	(7)	440 (=310+130)	NA	NA	No

NA: not available. Note 1: With overbooking 5:1. Note 2: With overbooking 1:1. Note 3: rates already included a promotional discount of 25%. Note 4: Diveo offers circuits only from 64 to 512 Kbit/s. Note 5: rates already include a promotional discount of 41%, 27%, and 28% respectively, for the period 10/18/2000 to 12/31/2000. We have added the cost of dedicated circuits from TdP (US$ 130, US$ 320, and US$ 1268, respectively), to the Internet access rate to make them comparable with the other figures. Note 6: the figures correspond to asymmetric circuits of 256 / 512 Kbit/s, and 128 Kbit/s/2 Mbit/s, respectively. They include renting of router. Note 7: rate for one-year contract. A dedicated circuit from TdP would cost US$ 130 per month, which has been added to the Internet access rate of US$ 310 to make it comparable with the others. *Source*: Companies' market information. The rates do not include value-added tax of 18 per cent.

There are some innovative offers for dedicated access to the Internet. For instance ATT LA offers a two-tier rate system for dedicated circuits: one involves some sharing of the circuit by other users (in about 5:1 proportion), and the other guarantees user exclusivity in the use of the dedicated circuit (called "overbooking 1:1"). There are also wireless dedicated access services to the Internet offered by firms such as Digital Way.

Long-distance prepaid cards. Some long-distance concession holders have started offering prepaid cards for long-distance telephony using IP technologies. This is the case of the firm RCP which offers long-distance IP calls by using its 'Roja y Blanca' ('Red and White') card.[25] The RCP peak-prices are 30 per cent lower than those offered by TdP for calls from Peru to the U.S.

Table 8. Price of a call from Peru to U.S., as of December 2000 (US$ per minute)*

	Using TdP	Using RCP's "Roja y Blanca"	Difference
Peak	0.66	0.46	-30%
Off-peak	0.52	0.44	-15%

*Rates do not include taxes.
Source: TdP and RCP

[25] Other firms offering long-distance call using pre-paid cards are TdP, Nortek, and Perusat.

Any holder of a 'Red and White' pre-paid card can use it from any TdP fixed telephone or payphone. The user dials a seven-digit telephone number 211-05-20 and waits for the prompt which asks for the user identification code and pin number. Then the user dials the national or international telephone number to which they want to connect.

Free Internet. In March 2000, *El Comercio*, a leading daily newspaper in Peru, launched its free Internet dial-up access. Subscribers of the service have to sign an agreement that permits *El Comercio* to send them advertising by e-mail. As of April 2000, *El Comercio* reported around 20,000 subscribers. Portals such as Yahoo.com also offer free Internet access services to Peruvian residents.

Dial-up discounts. TdP has introduced volume discounts for the Internet traffic generated by InfoVia users, called "Cyberbonos". The discounts are applied to the measured rate of local telephone service, currently at US$ 0.023 per minute during the day and US$ 0.011 per minute at night. There are three plans (A, B, and C) and the discounts are shown in Table 9.

Table 9. TdP's discounts for Infovia's dial-up users

Cyberbono	Monthly minutes	Discount	
		Day	Night
Plan A	600	10%	15%
Plan B	1500	15%	20%
Plan C	3000	20%	30%

Source: TdP.

However, the traffic thresholds of these plans could be very high since the average InfoVia Internet subscriber would use around 600 minutes per month. This would mean that the Cyberbonos plans as established, are beyond the reach of many InfoVia subscribers, i.e. at least half of their subscribers. In other words, the Cyberbonos would be targeted mainly to subscribers with very high consumption patterns.

6 Internet for rural areas

The OSIPTEL Telecommunications Investment Fund (FITEL) is going to launch a set of Internet related projects to increase Internet access in rural communities in Peru.

Program of Telecommunication Rural Projects (Programa de Proyectos de Telecomunicaciones Rurales (PRR)). The goal of the PRR is to reduce the distance of rural communities from access to basic telecommunication services. Between 1999-2002 the PRRs will implement a rural telecommunications network to 5,000 rural towns, directly benefiting about 1.7 million rural inhabitants and 2.2 million indirectly. Each PRR aims to install at least one public communal payphone in each town, with transmission capacity of voice, fax, and low speed data. The PRR projects starting this year will consider also the implementation of Internet public centres in 494 rural district capitals. Each centre will be capable of speeds of up to 19,200 bps, and access terminals in such a way that Internet users can access the World Wide Web with a minimum quality and speed.

Rural Public centres (Cabinas de Acceso Publico a Internet, CABINET). This project seeks to deploy Internet centres to those rural towns that already have access to basic telecommunication services (i.e. public payphones). During 2000-2002, more than 1,100 public centres for rural towns are planned, which will directly benefit around 1.8 million people. In addition to the dedicated links running at 19,200, and access terminals, the public centres will be equipped with access to a portal called *Portal Rural*, and a Spanish web page for each of the districts, in which information on local businesses, tourism, education, etc. will be displayed. In addition, each locality will have with e-mail accounts assigned to schools, health clinics, municipalities, and the public.

Pilot Projects of Telecommunications. FITEL, also finances public or private initiatives to develop telecommunications pilot projects. Two recent examples of these initiatives financed through FITEL aimed to reduce the digital divide between poor rural areas and urban cities:

(i) The project was granted to Intermediate Technology Development Group, a NGO, with funding of the U.K government. The project is localized in Cajamarca (North-West part of the Peruvian highlands). The goal is to install public payphones and Internet access to six rural communities, and provide training to local people in matters of information technology tools.

(ii) The project was granted to Enlace Hispano Americano de Salud, a NGO, with funding from the Spanish government. The project is based in the Amazonas (Northern jungle of Peru). The goal is to install public payphones and Internet access to seven communities, in order to have virtual access to a medical information system developed by Universidad Cayetano Heredia, in Lima.

7 The business of arbitrage of incoming international long-distance calls

Since the full liberalization of the market in August 1998, several telecommunications operators both established and new market entrants started to develop a new business: terminating international incoming traffic to Peru, specially from the U.S. Most of the operators were new long-distance firms that had just been granted concessions to deliver long-distance services after liberalization of the market in Peru. As it will be explained in this section, there was a set of factors that strengthened the development of this new lucrative business, such as the transitory interconnection rule approved by OSIPTEL in July 1999. OSIPTEL's intention to accelerate the interconnection negotiations through the use of transitory interconnection arrangements brought about some perverse incentives for new entrants, since they were only concerned with arbitrage profits out of the international rates and existing accounting rates. Furthermore, many of the new long-distance firms concentrated on just incoming traffic, not outgoing traffic, and did not even try to comply with the minimum set of requirements established in their concession contracts to deliver services in at least five cities out of Lima, with the consequence of delaying investments.

The arbitrage of incoming international traffic is not an economic issue unless seen as a source of: (i) inefficient entry, and (ii) because TdP's international revenues were an important source to cover access deficit, or in other words, TdP's rates were not fully rebalanced. In the first case, inefficient entry would imply that new entrants may have costs above TdP's costs, so less efficient from an economic point of view, by allowing entry to inefficient competitors. It seems that, *ceteris paribus*, IP networks are more cost effective than circuit-switched networks, so the concern of inefficient entry would not be justified. On the other hand, if TdP has not completed its rebalancing process in the sense that the current local rates do not cover long-run incremental costs, there would a serious threat to the continued development of the local network if the major source for financing the local deficit were dependent on international revenues.

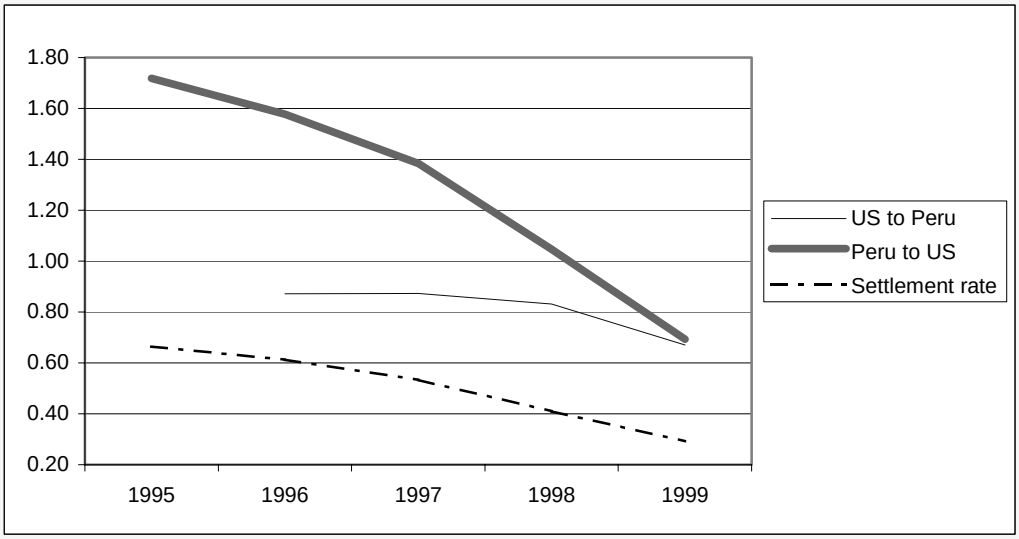
7.1 The arbitrage of incoming international traffic

It is a well accepted fact that almost everywhere international telephone rates and accounting rates are set above cost. In Peru, in spite of the declining trend in these prices in recent years, they are still considered to be well above cost. The traffic with the U.S. is very important for Peru's international telephone market. The graph in Figure 4 shows the evolution of PSTN's rates for the U.S.-Peru route between 1995-99. There are some important developments to be mentioned:

- The price of a call from Peru to the U.S. has been declining at greater pace than the price of a call from U.S. to Peru. Thus, from 1997 to 1999 the collection rate from Peru to the U.S. has been reduced by more than 50 per cent, and further reductions are expected. The decline was accentuated from 1998 onwards, when it was announced that competition might be introduced ahead of the established date of 1999. TdP cut its international collection rates in order to deter competition. In fact, the first long-distance competitor, ATT LA, started effective operations in November 1999.
- PSTN's collection rates in both countries converged in 1999 at about US$ 0.70 per minute.
- Settlement rate (equivalent to half the accounting rate) has declined steadily. As of December 2000, the rate was US$ 0.25 per minute, which represents half of the rate observed in 1997.

- Lastly, and most importantly, even when there has been an important decline in PSTN prices, these prices still remain well above cost. Some estimates suggest that the PSTN incremental cost of originating or terminating international traffic in Peru is at most US$ 0.07 per minute.[26] Even today, a PSTN price/cost ratio of 10:1 is still very significant, so there is still room for arbitrage opportunities for this traffic.

Figure 4: PSTN Tariffs for the U.S.- Peru route (US$ per minute)



Source: FCC and TdP.

The existence of PSTN prices well above costs has encouraged arbitrage opportunities since the market for long-distance was finally opened at the end of 1998. Since the barriers to entry and exit in the long-distance market were substantially reduced, and the costs of providing origination and termination services using IP international traffic were substantially lower than the PSTN, many of the new long-distance licence-holders and even established telecommunication operators decided to make profits in the still lucrative business of incoming international long-distance calls. The core of the business is simple: since current settlement rates are still well above cost, international traffic resellers, many of them located in the Florida area, offer call termination fees below settlement rates to local Peruvian carriers. Then the primary motivation for sending traffic outside the accounting rate system is to reduce the level of settlements that are due to partner countries.[27]

For instance, as the settlement rate that TdP pays or receives from generating or receiving international traffic with the United States was US$ 0.25 per minute as of December 2000, most of the new entrant long-distance or established companies have established commercial agreements for the termination or origination of international traffic at significantly lower rates. Operators that send more traffic to Peru than they receive in return have the incentive to circumvent the current international accounting system. The majority of this traffic is of course IP traffic, which is less expensive than PSTN traffic and can be terminated in Peru at lower rates than the settlement rates and instead pay interconnection fees at local rates or below.

At the beginning of 2000, commercial agreements existed whereby every international minute terminated in Peru received as low as US$ 0.06 per minute. The new long-distance licence-holders negotiated such termination agreements with external resellers. Almost two thirds of these companies were charged between US$ 0.06 and US$ 0.15 per minute for the termination of traffic, while 40 per cent of companies received a

[26] See for instance Rohlfs, J. and A. Briceño. (1998). "Rate Rebalancing and Competition in Peruvian Telecommunications". Paper presented at the 1998 International Telecommunications Society Conference, Stockholm, Sweden. It can be found at <www.spri.com>.

[27] Under the international settlements system, the operator in the country that originates a call has traditionally made a compensatory payment (call settlement rate, which has been usually half of the accounting rate in recent years) to the operator in the country that terminates the call. Payments are made when traffic in one direction is greater than traffic in the return direction.

rate of less than US$ 0.10 (Table 10). The termination rate is related to the costs involved in "bringing down" the international signal and terminating it in the TdP local fixed network. In other words, a low rate, for example, would probably imply that the licensee incurs a low cost, as might be involved in terminating calls routed via the Internet. This might suggest that at least 40 per cent of companies, which received a payment of less than US$ 0.10 per minute use IP Telephony. These were the rates mainly quoted in the United States spot markets for IP Telephony traffic to Peru, in which various international traffic resellers reach commercial agreements with the new entrant companies in Peru.[28] In addition to the cost represented by payment of the termination rate, a company established in Peru must add a margin to cover its other operating costs and its profit margin.[29]

Table 10: Diversification in termination charges as of January 2000

Rate variations for traffic termination in Peru (US$ per minute)	Proportion of new long-distance companies
Less than US$ 0.10	40%
Between US$ 0.10 and US$ 0.20	20%
More than US$ 0.20	40%

Sources: New long-distance licence-holders and OSIPTEL

There has also been a rapid and substantial decline of IP traffic prices. As any arbitrage activity, fierce competition continued among the new arbitragers throughout 2000. Thus as of December 2000, the average market termination charge for Internet telephony traffic from U.S. to Lima has been reduced to US$ 0.044 per minute, from US$ 0.095 in February 2000, i.e. a 54 per cent reduction in just 10 months. The charge to terminate traffic outside Lima has been reduced to US$ 0.13, i.e. 33 per cent less than the rate in February. The traffic to be terminated in cellular observed the most modest reduction during the period, only 12 per cent.

Table 11. Termination fees for Internet telephony traffic from the U.S. to Peru (US$ per minute)

	February 2000	December 2000	Change
Lima	0.095	0.044	-54%
Rest of Peru	0.195	0.130	-33%
Cellular	0.190	0.168	-12%

Source: <www.arbinet.com> . The data correspond to traffic with the highest-qualification " AAA."

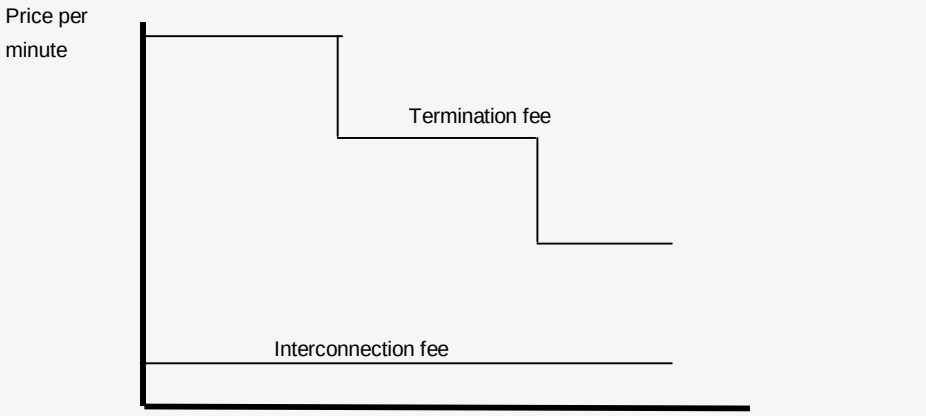
One important factor that facilitated the increase of arbitrage activity by new long-distance licensed carriers was the OSIPTEL ruling on transitory interconnection in July 1999. This made it easier for the carriers to terminate international traffic in Peru without the need to have a full interconnection agreement in place with TdP. The transitory interconnection allowed the new entrants to have line-side interconnection through conventional telephone lines to terminate traffic. This, too, had a perverse incentive for some new carriers to delay investments and to concentrate solely on the business of incoming traffic with a very low investment

[28] Resalers of IP telephony international traffic are growing. More and more companies are selling batches of international traffic in an increasingly spot-oriented market. For example, there are "middlemen" currently engaged in mediating between supply and demand for such traffic, such as Pulver, Arbinet, etc. See for example <http://www.pulver.com> and <http://www.arbinet.com>.

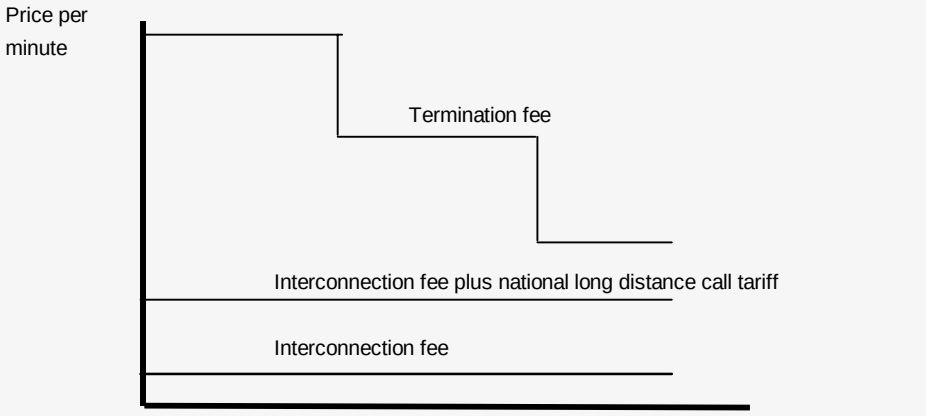
[29] For example, as of December 2000, if the local carrier is interconnected with TdP, it has to pay an interconnection charge equivalent to US$ 0.018 per minute.

and without trunk-side interconnection. In other words, most long-distance carriers behaved purely as service resellers.

Figure 5: Economic conditions for terminating incoming international traffic outside of the official settlement system



Case (a) Originating call: Foreign operator. Terminating call in Lima: Peru's established operator



Case (b) Originating call: Foreign operator. Terminating call outside Lima: Peru's established operator

Note: The originating foreign operator agrees with a Peru's established operator a multi-part per minute fee for traffic termination in Peru.Multi-part fees decline with volume of traffic. Case (a) corresponds to termination of traffic in Lima. Assuming that the local operator is already interconnected with the local incumbent's network, the local operator's profit is equal to the difference of the multi-part fee and the interconnection charge collected by the incumbent's local network. Case (b) corresponds to termination of traffic outside of Lima. The local operator's profit is equal to the difference of the multi-part fee and the sum of the local interconnection charge and the national long-distance call tariff.

7.2 Changes in the Peru's international long-distance traffic

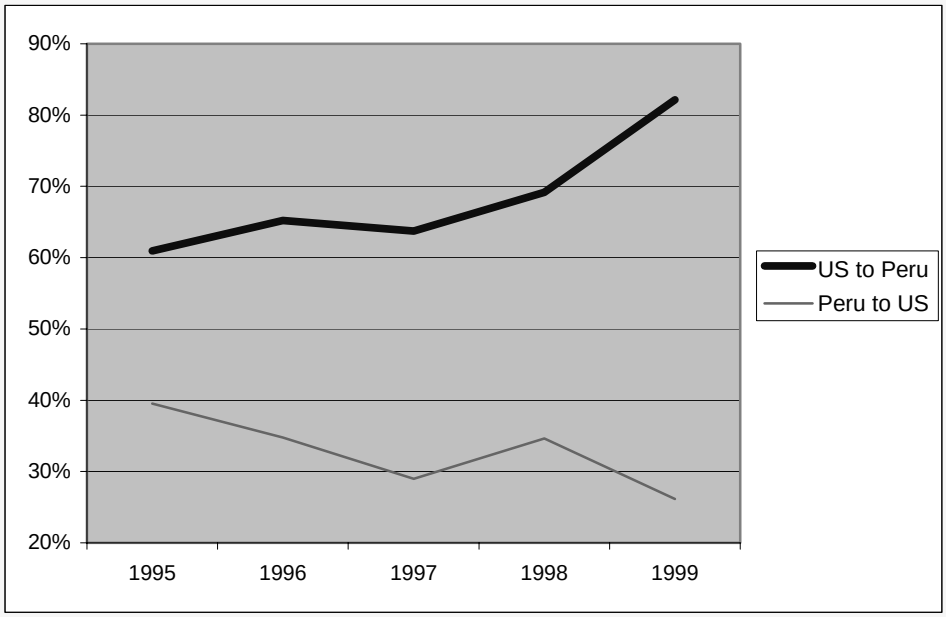
Both total TdP's incoming and outgoing volume of traffic have increased during 1995 to1999. The ratio of outgoing to incoming traffic has been fairly stable, at around 3:1, that is three-minutes of incoming traffic for each one-minute of outgoing traffic. However, TdP's collection revenues from international traffic have been reduced substantially: 20 per cent in 1998 and 22 per cent in 1999. It is also expected that TdP's net settlement revenues have declined in recent years. There are several factors that explain this decline:

- A steady reduction in the settlement rate.

- TdP's loss of incoming traffic in favour of new competitors mainly for incoming international U.S. traffic. Even when the first long-distance competitor, ATT LA started operations only since November 1999, it is known that before that date, many operators were already terminating IP traffic in Peru.
- TdP's lower collection revenues in spite of reductions of international collection rates.
- Severe recession of the economy since 1998, which reduced the purchasing power of Peruvian families.[30]

Most of the new long-distance providers concentrate their operations on the route from the U.S. to Peru. Figure 6 shows the share of the U.S. to Peru traffic and of the Peru to U.S. traffic during 1995 to 1999. Currently, more the 80 per cent of the incoming traffic to Peru comes from the U.S. In contrast, the share of traffic from Peru to the U.S. has been greatly reduced during the same period. A growing proportion of incoming international voice traffic is coming in over IP and then breaking out into the TdP's local network.

Figure 6: Peru's share of traffic with U.S.



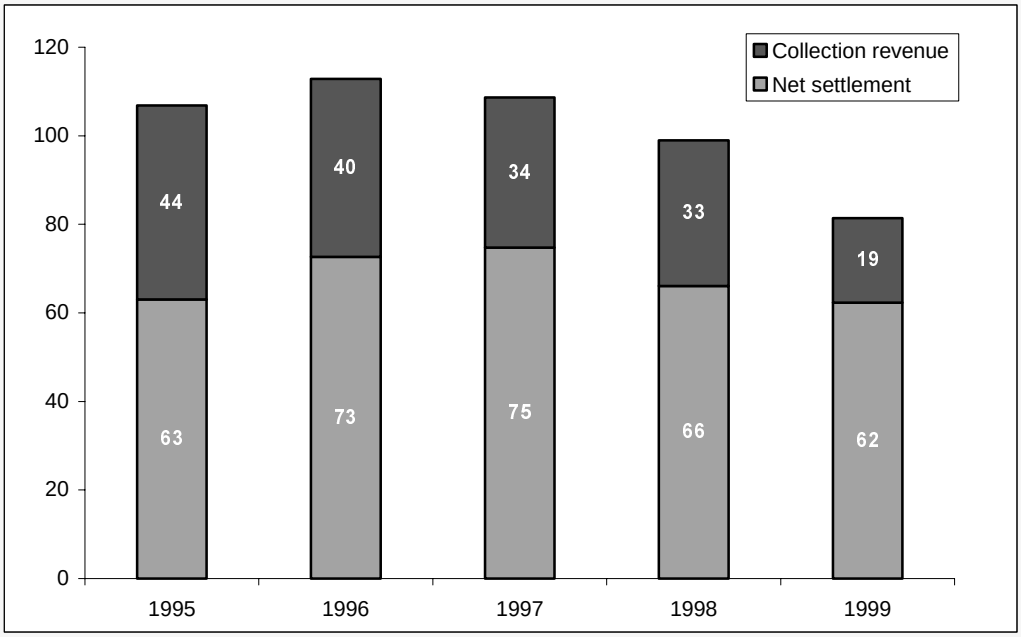
Source: FCC and TdP

These contrasting developments have resulted in an increase in the ratio of incoming to outgoing traffic between these two countries from 5:1 in 1995, to 9:1 in 1999. However, the net settlement payments for TdP have been reduced by 12 per cent in 1998 and 6 per cent in 1999, due basically to further reductions in the settlement rate for Peru to U.S. traffic.

The impact of these developments on revenues coming from the traffic flows between Peru and the U.S. is clear, the total revenues have declined from US$ 113 million in 1996 to US$ 81 million in 1999. This is mainly due to a reduction in the traffic billed in Peru.

[30] There are no official figures for market shares of Peru's international traffic. However, some industry sources mention that in 2000 the outgoing traffic in Peru was roughly divided as follows: TdP had 92 per cent of the market, with ATT LA having 5 per cent, and other competitors sharing the remaining 3 per cent. TdP have lost possibly 40 per cent of market share in the incoming international traffic due to the active presence of arbitrages.

Figure 7: Peru's Revenues from the Peru to U.S. PSTN traffic (US$ million)



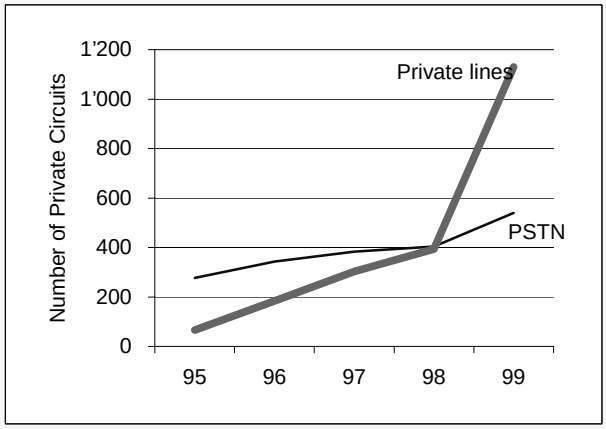
Source: FCC and TdP

7.3 International Private Circuits U.S. to Peru

There have been some interesting developments in the growth of international private circuits between the U.S. and Peru:

- The number of PSTN circuits increased from 1995 to 1999, but especially during 1999, 34 per cent, in concordance with the increase of PSTN traffic from the U.S. to Peru. The FCC reported that the total number of international PSTN circuits from the U.S. to Peru had risen to 540 in 1999.
- More surprisingly, private line circuits have shown an impressive growth, especially in 1999. The FCC reported that there were 1'130 private international circuits in 1999, jumping from 394 in 1998. The number of private circuits outnumbered the PSTN circuits in 1999. Most private circuits are used to transport Internet traffic (voice, fax, data, etc.)

Figure 8: Private circuits from U.S. to Peru



Source: *FCC*

8 Legal aspects of the VoIP service

Internet as value-added service. Peruvian legislation on telecommunications does not cover the Internet service specifically. To date, the Ministry of Transport and Communications has regarded it as a value-added service. A value-added service, by definition, involves the addition of some feature or facility to the basic service (carrier or final services). The apparent justification for classifying the Internet under this heading is that Internet uses carrier and final services (telephone lines and circuits) adding an additional feature (IP connectivity). As explicitly stated in the Telecommunication Act, all value-added services are covered by a regime of free competition, which means that OSIPTEL cannot, in principle, regulate rates for such services.

VoIP in real-time? The specific name used by many of the ISPs to denominate the services they deliver is "packet-switched data service" provider. A peculiarity of the Peruvian legislation is that it excludes real-time voice traffic from being classified as a value-added service. In other words, ISPs are prohibited from providing real-time voice. Apparently, at the time when the service classification was carried out, it was already known that value-added companies might be able to carry voice traffic, but to do so in real time it would be necessary to hold a licence. As a result, discussions on the subject of VoIP have focused on whether VoIP transmission is performed in real time or not. Regrettably, the legislation does not give a satisfactory definition of what "real time" means, giving rise to a variety of opinions on the matter. In the meantime, authorities consider unofficially that voice-over-IP is not delivered in real-time.

Regulation of services, not technologies. In Peru services are regulated not technologies. Accordingly, there are some long-distance concessions that have been granted recently, by which several carriers are providing services using IP switching and transmission technologies. This is, for instance, the case of Infoductos, a long-distance firm related to RCP.

9 Difficulties in introducing competition in the Internet market

9.1 Initial phase

The introduction of competition into the Peruvian Internet market has been accompanied by a series of administrative and judicial disputes between operators. For example, the entry of TdP into the Internet market in 1996 was marked by anti-competitive behaviour towards RCP. TdP controlled the "essential resources" of dedicated telephone lines and circuits for the provision of Internet services, thereby occupying a dominant position, which led to TdP being accused of acting in a discriminatory manner towards competitors.[31]

The first legal action involving operators was initiated by RCP in February 1996, and this was handled by the dispute settlement service of the regulatory body OSIPTEL. From this time on, a series of other administrative and judicial disputes arose between telecommunication operators and Internet service providers (Table 12).

[31] For a detailed analysis, see Briceño, Arturo, "Regulating anticompetitive behaviour in the Internet market: an applied imputation model for Peru", in Sharon Gillet and Ingo Vogelsang, eds., Competition, regulation and convergence: current trends in telecommunications policy research, (1999), Lawrence Erlbaum Assocs., Mahwah, NJ, USA.

Table 12: A network of disputes

Principal administrative and judicial proceedings relating to the Internet market in Peru, 1996-1999

Start date	Plaintiff	Defendant	Grounds	Outcome
February 1996	Red Científica Peruana	Telefónica del Perú	Various (alleged) abuses of dominant position in market and discriminatory treatment.[32]	The complaint was deemed well-founded, with TdP being required to (a) fulfil outstanding obligations and (b) cease the perceived discriminatory treatment. TdP was fined the maximum amount. It appealed against the ruling, which was upheld at second instance. TdP then appealed to the judicial authority. On June 2000, judicial authority upheld the administrative decission. TdP appealed to the second –and last- authority. The outcome is still pending.
August 1996	Telefónica del Perú	Red Científica Peruana	Alleged acts of unfair competition in form of public defamation campaign.	The complaint was deemed to be well-founded in part. RCP was fined US$ 25 000. It appealed against the first-instance ruling, which was upheld at second instance.
March 1998	P.C. Company S.A. (*)	Telefónica del Perú	Alleged abuses of dominant position	It was combined with the dispute opened in October 1998 and both were examined together.
October 1998	P.C. Company S.A.	Telefónica del Perú	Alleged non-compliance with standards of fair competition	In June 1999, P.C. Company abandoned the action, thereby terminating the dispute.
November 1998	P.C. Company S.A.	Telefónica del Perú	Alleged charges for services not supplied and at higher tariffs than the maximum approved by OSIPTEL	The complaint was declared unfounded, thereby terminating the dispute.
February 1999	P.C. Company S.A.	Telefónica del Perú	Alleged abuse of dominant position in the form of discriminatory treatment	The action was terminated owing to the fact that P.C. Company did not refute an exception claimed by TdP within the time limit.
March 1999	Telefónica del Perú	Red Científica Peruana	Alleged provision of long-distance services without licence using APLIO equipment.	Based on the finding that RCP activities did not require a licence, TdP's demand was overruled by the first instance. TdP appealed against the ruling but subsequently abandoned the action. TdP's action had a nullifying effect on the first instance decision.
September 1999	Red Científica Peruana	Telefónica del Perú	Seeking injunction to make TdP refrain from improperly interrupting the service involving circuits leased to RCP.	The dispute came to a head in December 1999 when RCP failed to present all the documents needed for imposing the injunction. RCP claimed to have abandoned the proceedings to avoid wrecking the negotiations for interconnection between TdP and RCP.

(*) P.C. Company S.A. is TdP's CPI.

Source: OSIPTEL

[32] Grounds for the legal action initiated by RCP include the following: (*) Alleged non-provision by TdP of a 2 Mbps dedicated line between RCP sites in Miraflores and Monterrico for more than a year, as well as constant and intermittent faults. (*) Alleged failure by TdP to meet RCP's request for connection to Venezuela with a 256 Kbps channel via Panamsat, the property of a Venezuelan entity, requested by letter dated 15 December 1995. (*) Alleged failure by TdP to meet RCP's request for connection to Chile with a 256 Kbps channel via Panamsat, the property of a Chilean entity. (*) Failure to meet request for increasing speed from 128 to 256 Kbps in the international circuit to the United States taken out with TdP. (*) Alleged failure to meet requests for connection to Lima from various institutions and universities throughout the country grouped in 14 provincial consortia. (*) It is alleged, in many cases, that TdP offers more favourable conditions to those consortia. (*) Alleged unnecessary withdrawal and non-provision of all capacity under equal conditions with services provided by TdP. (*) Apparent use by TdP of confidential information to confuse, misinform, mislead and misrepresent, in order to divert competitors' clients, i.e. RCP clients. (*) 30 dedicated lines allegedly awaiting installation, but agreements on this impossible owing to failure to meet RCP requests. (*) Prices allegedly bundled and/or distorted and/or involving dumping with the clear suspicion of cross-subsidization in some cases. (*) Alleged failure by TdP to perform fibre optic installation requested more than a year before complaint was lodged. (*) Alleged delaying tactics by TdP to obstruct installation of Internet access. (*) Alleged failure by TdP to install frame relay connection requested by RCP two months before complaint was lodged. (*) Alleged failure by TdP to solve problems of basic telephony and access hunting by users.

9.2 The controversial APLIO equipment

The first dispute over the provision of VoIP services in Peru arose in 1999 from legal action brought by TdP against RCP. In March 1999, TdP started proceedings against RCP for alleged "acts of unfair competition". (Table 11) According to TdP, RCP was supplying a long-distance national and international service, for which it did not hold a licence, using the so-called APLIO equipment (Box 5). The APLIO equipment is a small computer designed specifically for voice transmissions via the Internet. Accordingly, it removes the need for a PC to perform voice transmissions via the Internet.[33]

Box 5: APLIO – An innovation in equipment

APLIO is a new type of equipment with software and a modem for voice communication via the Internet. It contains a DSP (digital signal processor) which performs the following functions: (i) voice compression and decompression (according to ITU standard G.723.1 for 5.3 and 6.3 Kbit/s); (ii) coding and decoding into/from TCP/IP packets; and (iii) the process of Internet connection via an Internet access provider, having a modem chip for this purpose.

APLIO began to be sold in Peru for US$ 295 each, with discounts available for bulk purchases.

As in the case of voice communication using a PC, the user must have a telephone line and an Internet access account, which can be supplied by any ISP. APLIO makes the connection, makes the call to the ISP and sends the IP addresses of the parts which will be communicated to the so-called "global management centre" to establish the Internet link. There are various methods for making a voice communication over the Internet using APLIO:

- A first minute of long-distance international telephony and the rest via a voice communication using APLIO. Prior coordination must exist between both parties via a conventional long-distance international call. When the called party answers the call, both the caller and called party press a key on the APLIO equipment which disconnects them from the international call (as if both parties had hung up) and begins the connection to the Internet access provider (at both ends of the communication). Once they are in communication, both are connected automatically to the Internet via their ISPs, after which they are connected to the APLIO "IP-number-searching server", being able to locate via this server the IP number assigned to the number called for locating it on the Internet. When the connection of both IP numbers on the Internet is displayed, both APLIO terminals ring so that the respective users pick up their phones and continue the conversation via the Internet.
- A voice communication using APLIO mechanically (manually), the "100 per cent free mode", as the manufacturer calls it. This second alternative makes it possible to do without the prior coordination via an international telephone call, proposing a different method for prior coordination. Both the caller and called party must perform coordination from the moment they communicate. Hence, the called party will access the Internet at the agreed moment and will connect his APLIO, putting it in "standby" mode. Once the caller is connected to the Internet, he or she will dial the unique serial number of the APLIO terminal called.
- A voice communication using APLIO automatically, in "free mode without appointment", as the manufacturer puts it. This third alternative avoids the need for any kind of prior coordination, programming the called APLIO to connect with the Internet and go into "standby" mode only if it receives a predetermined number of ringing tones after which the calling attempt stops. The called APLIO will connect automatically to the Internet and will go into "standby" mode. After the called APLIO has connected, the calling APLIO will be able to locate it through its unique serial number after a reasonable time (approximately a couple of minutes). At present, APLIO only allows voice communication via Internet with another APLIO or from a PC to an APLIO. After the connection between the two users (called party and caller) is established, each user uses his or her APLIO for voice transmission, with voice being transformed into data since, as mentioned above, the APLIO equipment has the function of performing voice compression and IP packet coding. Packets of data are transmitted from the APLIO to the ISP, the same as for any other data packet to the ISP. The function of the ISP is to transmit the data packets to the specified IP address or number. The data packets are sent to the other end – the called party's end – and it is only via the APLIO of the called party that the IP packets are decoded and voice decompression or transformation occurs again.

[33] The functioning of APLIO requires that both users have access to the Internet through an ISP. Thus, the APLIO can be conveyed from one place to another and be used whenever the user has Internet access, irrespective of which ISP is involved.

TdP argued that offering the national and international long-distance service through the APLIO equipment without having a licence allowed RCP to obtain an illegal competitive edge over the companies which were legally authorized to provide that service.

Two things were certain: first, a licence was required to offer the long-distance service; and second, at the time of taking the legal action, RCP only had a licence to supply value-added services, including the Internet service.

In the middle of the dispute, some users who had acquired APLIO appliances also began to have problems with using them. Some CPIs (Internet providers which use only TdP services: Unired and InfoVía) had begun to sell APLIO equipment, just like RCP and other firms. Nevertheless, none of these CPIs were denounced by TdP for offering long-distance services as had been the case with RCP. After a time, the CPIs that had marketed APLIO equipment stopped promoting them and subsequently stopped selling them.

Some users complained publicly that they had acquired this equipment from a CPI but that it had stopped working. These users mentioned that when they complained to the CPI where they acquired the APLIO equipment, they were informed that the equipment only worked if an Internet service other than the Unired service was used.

The OSIPTEL's CCO ("ordinary collegiate body") charged with settling the dispute resolved that if RCP had been supplying the long-distance service without a licence, then the competent body to resolve the dispute would be the Ministry of Transport and Communication. However, the key conclusion of the CCO was that use of APLIO did not constitute a long-distance public service because no payment had to be made for the communication service.[34] According to the CCO, RCP did not require a licence for marketing the APLIO equipment since its authorization for offering Internet services was sufficient for the functions it was performing.[35]

TdP appealed against the CCO first instance ruling. According to OSIPTEL provisions regarding disputes between operators, a company has the right to appeal against the first instance ruling issued by a CCO nominated by OSIPTEL. The second administrative instance is the chairperson of OSIPTEL. However, at around the same time as the appeal, RCP received its licence for supplying long-distance services. [36] Before the second instance issued its ruling (upholding the first instance ruling or accepting TdP's accusation), TdP dropped the proceedings and thus, in line with the administrative framework for disputes, no precedent or ruling that the first instance had issued previously was recorded. In other words, TdP avoided a virtually certain ruling against it on the subject of Internet telephony being established as a legal precedent, thereby preventing unlicensed companies from using that ruling to provide VoIP services.[37]

9.3 Debating the legality of IP Telephony

The ruling on the APLIO dispute was the first and, so far, the only formal pronouncement from a Peruvian State body on the subject of voice over the Internet. Even though it was limited purely to resolving whether the marketing of APLIO constituted offering long-distance services, it clarified certain doubts on that subject.

The fact that it could not be known *a priori* which would be the competent body to resolve the dispute (the Ministry or OSIPTEL) compounded the lack of clarity on the matter. Here, there were three different

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[34] National legislation states that public communication services, unlike private ones, are those that are supplied in exchange for payment ("economic compensation").

[35] For the final first instance ruling and further material, see <http://ekeko.rcp.net.pe/rcp/controversia/EXP-9902/index.shtml.>

[36] During the dispute over APLIO, RCP accused TdP of using certain activities to drive it out from the market. This supposed hostility originated from the time when RCP acquired a licence to offer long-distance services. RCP denounced untimely failures in many of the circuits that it leases for periods of various hours. In addition, TdP had allegedly been suspending the PRI ISDN line service which RCP was using to terminate long-distance calls in the TdP network. RCP proved that from the time that RCP had a licence, it was authorized to terminate such calls but that TdP was blocking its services in order to avoid the entry of competitors into the market.

[37] In legal terms, the dropping of the proceedings by TdP implied that the first instance ruling on the APLIO dispute had no legal validity, and so, strictly speaking, no formal pronouncement would have yet been made by any authority on the subject of VoIP.

positions. The first held that the fact that Peruvian legislation made no mention of the subject of VoIP implied that there was no regulation on it and therefore that these services could be offered freely. A second position argued that the VoIP service only implied the transmission of data, not voice, therefore it could not be considered to be telephony, and so to offer that service, it was only necessary to have an authorization for providing value-added services. According to the third viewpoint, the VoIP service was regarded as the equivalent of telephony and therefore regulations covering the field already existed. In this last case, it would be necessary to have a State licence to offer this service.

These three possible scenarios for the provision of VoIP – free access without regulation, value-added service or licensed service – hold various implications regarding the obligations faced by a company offering that service (Table 13).

The global trend is to regulate services consistently, irrespective of the technology used to provide them. If this is applied to the case of Peru, it would be necessary to determine whether the VoIP service constitutes a telephone service, a value-added service or another, different service, in order to determine the appropriate extent of regulation. As can be seen from the table below, the existing regulation for value-added services is lighter than for the telephone service, which is subject to tight regulation.

Table 13: The advantages of being marginal

Differences in regulatory requirements for providers of long-distance and value-added basic services

Long-distance services	Value-added services
Obliged to hold a licence	Obliged to have an authorization only
Granting a licence takes 50 days, which may be extended up to a total of 70 days.	Registration takes approximately 5 days
Obliged to make a one-off payment of 0.25 per cent of forecast initial investment	No obligation
Presentation of a technical/economic profile	No obligation
Obliged to contribute 1 per cent of gross annual revenue to FITEL	No obligation
Regulatory supervision fee. Obliged to pay 0.5 per cent of gross annual revenue for regulatory supervision	Obliged to pay 0.5 per cent of gross annual revenue for inspection
Obliged to have own infrastructure, in 24 months, in at least 5 cities and have at least one switching centre	No obligation to expand. Does not have to own infrastructure
May be subject to rate regulation	No rate regulation
Obliged to meet quality parameters	No obligation
Obliged to interconnect networks with other public service operators	Interconnection is optional, depending on whether the regulatory body requires it
Obliged to contribute towards cost of pre-selection system	No obligation

Source: General regulations of Telecommunication Act. Guidelines for liberalization of telecommunication market

9.4 A new controversy: the interconnection between a telecommunications carrier (TdP) and an ISP (RCP/"Infoductos")

At the end of 1999, RCP was granted a long-distance concession to provide long-distance telephone services. RCP created a new business unit, called Infoductos, to provide these services. Under Peruvian law, a concession holder has the right to request and get interconnection from any other public concession holder. In mid 1999, RCP requested interconnection to TdP. However, after a period of time of failed negotiation between the parties, RCP requested OSIPTEL to step in to issue an Interconnection Mandate. According to the law, through an Interconnection Mandate, OSIPTEL replaces the parties and rule over those issues in

which the parties have not been able to agree on (see Box 6 for a chronology of events surrounding this interconnection process).

This new controversy is important because is the first dispute in Peru between a telecommunication operator and an ISP that provides Internet telephony. And again the actors are the same as in the past: TdP and RCP. This time the controversy is concentrated on the delivery of Internet telephony by RCP, now entitled as a long-distance (Internet) telephony carrier to request interconnection to TdP.

The total period of time from the initial date on which RCP requested interconnection to TdP up to the time that the Mandate of Interconnection was issued lasted over one year. The Mandate established the interconnection of the Infoductos long-distance network with the TdP local telephone network (fixed and public payphones) and the TdP mobile network. Telefonica Servicios Moviles SAC, a TdP subsidiary, was separated from TdP in October 1999. Both TdP and RCP have appealed the OSIPTEL Mandate, and in practice, only part of it has been fully implemented.

Box 6. Chronology of a new dispute, TdP-RCP (Infoductos*)

In June 1999, RCP requested for interconnection to TdP. But the RCP request was too general in the sense that it wanted to interconnect with "all TdP networks and services". According to the Interconnection Rule, the requested operator for interconnection, TdP, has the right to solicit information from the requesting party. TdP needed time to respond to the RCP request, and the whole process of request and response was then repeated several times.

In July, OSIPTEL issued complementary rules of interconnection for all operators in the market. Part of this document related to the right to have "transitory" interconnection under certain conditions. An operator could request transitory interconnection to another operator if more than 70 days of negotiation have elapsed and if the parties have not reached a definitive interconnection agreement. The temporary interconnection could be implemented through the use of common telephone lines (" line-side" interconnection instead of "trunk-side" interconnection), ISDN lines or leased dedicated circuits.38 Since the requested operator for interconnection was TdP in most cases, it was understood that TdP should provide the means of interconnection. Those requesting operators that were already connected to the TdP network could use these connections as interconnection links while the period of temporary interconnection lasted. OSIPTEL intended to prompt the entry of new operators that needed interconnection, providing a transitory scheme of interconnection. The scheme was supposed to remain in place for up to four months or until the interconnection agreement was finalized and approved by the regulator.

The negotiation process started officially in September. According to the Interconnection Rule, parties have 60 calendar days to reach an interconnection agreement. But the official day of the beginning of the counting was when TdP, the requested party, considered that all the information required have been adequately submitted by RCP.

In November, after 60 working days of fruitless negotiation, RCP asked OSIPTEL to intervene and issue a definitive Interconnection Mandate.

At the end of 1999, RCP informed OSIPTEL that it had transferred its long-distance concession to Infoductos.

In April 2000, OSIPTEL sent to both parties the Project of the Interconnection Mandate, who then sent their comments on the Project to OSIPTEL and then commented on each others comments.

OSIPTEL then allowed a four month extension for temporary interconnection, which included the case of RCP with TdP.39

In July, OSIPTEL issued the Interconnection Mandate for the RCP and TdP interconnection.

In August, OSIPTEL issued and interconnection Mandate related to the interconnection of the TdP and ATT LL (formerly Fisrt-Com) local networks. The reciprocal interconnection charge was lowered from US$ 0.029 per minute to US$ 0.00168 per minute. It also established a timetable for further reductions up to US$ 0.0096 per minute by June 2002. The lowering of the interconnection charge applicable to local-to-local interconnection came after a long period of negotiation between TdP and ATT LA as well as BellSouth. After negotiations failed, ATT LA requested OSIPTEL to step in to issue an Interconnection Mandate.

In August, both RCP and TdP appealed against the Interconnection Mandate issued by OSIPTEL. RCP for instance claimed that the new interconnection charge of US$ 0.00168 established in the TdP/ATT LA's Mandate should be made extensive to the interconnection charge that RCP should pay to TdP.

In November, RCP and TdP signed a complementary interconnection agreement on interconnection links and network modification costs for interconnection. This agreement has not been disclosed to the public.

In December, OSIPTEL approved the complementary interconnection agreement reached between RCP and TdP.

* At the end of 1999, RCP formed a partnership with a United States investment fund, Westphere, and created the company "Infoductos".

[38] Resolucion No 014-99-CD/OSIPTEL issued on 07/21/99. The resolution also regulated some other issues related to the interconnection. For instance, it was mandated that the interconnection traffic should be rounded to the second instead of the minute, among other things.

[39] Resolucion No 017-2000-CD/OSIPTEL.

9.5 Key issues surrounding TdP-RCP (Infoductos) dispute

Interconnection with TdP public payphones. One of the most controversial issues surrounding the interconnection negotiation process between the parties concerned and the OSIPTEL Interconnection Mandate has risen from the use of TdP public payphones by RCP.

RCP requested interconnection with the TdP local telephone network, which according to RCP should include the provision of both fixed telephony as well as public payphone interconnection. As it was mentioned before, RCP launched its prepaid long-distance card " Roja y Blanca" in 2000, and it started commercialising it with the objective that it could be used either from any TdP fixed telephone or public payphone. RCP decided not to provide its long-distance telephone service through the pre-selection mechanism established in the Liberalization Guidelines of 1998 for the first two-years of liberalization, since pre-selection was one of the ways by which telephone subscribers could choose their long-distance carrier. The other ways to access long-distance carriers, although not explicitly stated in the Guidelines, were through indirect dialling using the operator, 800 numbers, or prepaid cards.

TdP contested the interconnection with its public payphones arguing that they are not part of what should be understood as local telephony, and that their operating costs are much higher than the fixed-line telephone service. TdP also argued that the use of prepaid cards for long-distance telephone services using public payphones would unlawfully circumvent the current pre-selection system that fixed local subscribers have to use to route their long-distance calls. Since public payphones are not subject to pre-selection, the use of prepaid cards would make a user able to choose his long-distance carrier practically on a call-by-call basis. But the call-by-call access to long-distance carriers, according to the Liberalization Guidelines of 1998, will only be in place as a complement of the current pre-selection system after 2002.

According to TdP, RCP should reach a "commercial" agreement with TdP for the use of its public payphones, not an interconnection agreement. TdP would have requested RCP to agree to a commercial rate of US$ 0.33 per call (not per minute) for the use of its public payphones. But if the use of public payphones was going to be considered as part of the interconnection umbrella, TdP would have requested an interconnection charge of around US$ 0.23 per call.

The OSIPTEL Interconnection Mandate established that public payphones are part of the local telephony services, so TdP should allow RCP to use TdP public payphones but pay a higher interconnection charge. The Mandate established that the interconnection charge for public payphones would be US$ 0.0648 per minute, which results in an additional US$ 0.0358 per minute to the existing charge of US$ 0.029 per minute for national long-distance interconnection. When the RCP long-distance calls were routed through TdP fixed-lines, RCP should only pay the existing interconnection charge of US$ 0.029 per minute, applicable to national long-distance interconnection.

Since RCP considers that public payphones are part of the TdP local telephone network, and that the current legal framework establishes that there should be just one interconnection price, RCP has challenged the Mandate ruling that origination of calls from public payphones has a different and higher charge than the origination and/or termination charge established for local networks. Furthermore, RCP has also questioned the level of the established charge, US$ 0.029 per minute until August 2000, arguing that that rate is not based on costs as the Law, the Guidelines, and Interconnection Mandate dictate.

It is important to mention that TdP also provides long-distance telephone services through a pre-paid card, called "tarjeta (card) 147", which can be used either from its subscribers' fixed-line telephones or public payphones. So, in this sense, the RCP claim that TdP was acting anti-competitively by denying access to TdP public payphones was made on stronger grounds than the TdP argument that long-distance pre-paid cards violate the pre-selection rules.

The argument that the unit costs of running public payphones are higher than fixed-lines may be valid, especially in Peru where the maintenance costs (security, etc) are higher than international standards, and because there are rural payphones deployed in highly unprofitable areas. However, a similar argument is not fully applied when analysing the incremental costs for TdP for interconnecting its public payphones to a third operator. The costs for TdP for interconnection to its public payphones must be very similar to the costs TdP incurs for interconnection to its fixed-line telephones. In any case, if there were a cost differential arising from interconnecting to public payphones and fixed-line telephones, it may be difficult to justify the final interconnection charges as established by OSIPTEL solely on cost.

Temporary becomes permanent. After its request for OSIPTEL to intervene at the end of 1999, RCP has used the temporary or "transitory" interconnection scheme to interconnect its long-distance network with the TdP local network. For that purpose, RCP rented 13 ISDN E1 circuits from TdP to offer services in Lima, and requested four additional ISDN circuits for the provinces. Furthermore, to function as an ISP, RCP has rented other TdP services such as telephone lines (commercial lines, hunting, ISDN lines) and dedicated lines. There have been successive extensions of the transitory interconnection agreement between RCP and TdP in order to allow RCP to continue providing its long-distance services through the "Red and White" pre-paid card. This agreement was to be revoked in December 2000, forcing RCP to establish a definitive interconnection (" trunk-side" interconnection) with TdP.

However, RCP has been reluctant to change the temporary interconnection status to a permanent interconnection. RCP has argued that the change of status implies unnecessary costs for RCP and that these higher costs would create effective barriers to a profitable entry of RCP in the long-distance market. The costs that RCP has been trying to avoid are:

- Interconnection trunks.
- TdP network modification costs to interconnect RCP at tandem level. Following the TdP request, OSIPTEL approved a set of costs that TdP has the right to charge to interconnecting operators. These costs stem from modification that TdP has to make to its network to accomplish interconnection.
- Signalling System 7 (SS7)[40].

RCP argues that the current 13 ISDN E1 circuits that they have rented from TdP are serving as interconnection links and therefore it says, there is no need to replace them by E1 interconnection trunks with SS7. According with RCP, the signalling of ISDN circuits is enough for RCP interconnection needs. RCP is renting the ISDN circuits and paying commercial retail prices to TdP, around US$ 7'000 a month for the 13 circuits in Lima. But if RCP were to change those circuits for interconnection trunks, it would have to pay around US$ 11'000, i.e. almost 60 per cent more. In addition, RCP argues that the one-time installation charge that RCP has already paid TdP would be charged to them again for installation of the "new" interconnection trunks. RCP wants to keep the ISDN signalling instead of SS7 signalling claiming that no operator should be able to impose a signalling technology on another; especially if that involves a higher cost for RCP.

An additional complication with the interconnection trunks is that TdP would rent them as STM-1 circuits, which are 155 Mbit/s. RCP needs are well below that minimum transport capacity (initially 13 E1 in Lima and 4 E1 in provinces). RCP has criticized the OSIPTEL Interconnection Mandate because it supports the TdP offer of just STM-1 interconnection trunks, instead of also considering more flexible alternatives such as circuit bundles of 8 Mbit/s, 16 Mbit/s, and 32 Mbit/s.

In December 30, 2000, OSIPTEL issued a resolution approving a complementary interconnection agreement that RCP and TdP would had reached in November 27, 2000, i.e. four months after OSIPTEL issued the Interconnection Mandate. The details of the complementary interconnection agreement have not been released publicly. The OSIPTEL resolution only mentioned that as the regulatory body in charge of approving any interconnection agreement in the market, it approved the terms and conditions that both parties had, which deals with: (i) interconnection trunks, and (ii) network conditioning costs that TdP would have incurred to interconnect to the RCP network.

[40] (Signaling System 7) The protocol used in the public switched telephone system for setting up calls and providing services. SS7 is a separate signaling network that is used in Class 4 and Class 5 voice switches. The SS7 network sets up and tears down the call, handles all the routing decisions and supports all modern telephony services such as 800 numbers, call forwarding, caller ID and local number portability (LNP).

10 Concluding remarks

IP Telephony in Peru is in its infancy. Major providers exist with the capacity to supply the service, such as TdP, FirstCom and RCP. With the last two of these, the platforms for the transmission of their services consist of integrated frame relay and IP networks.

An important feature of the development of telecommunications in Peru since 1994, and which undoubtedly affect the development of voice over IP in Peru, is the promotion of vertically integrated companies, as in the case of TdP, which enjoyed temporary monopoly conditions until 1998, or the case of ATT LA. This has often given rise to anti-competitive practices to the detriment of other more specialized, non-vertically-integrated competitors, such as RCP. A clear example of this can be seen from the events which took place after 1996, when TdP decided to enter the Internet access business; or in the alleged blocking by TdP of the use of IP Telephony enabling software (e.g. Net2Phone) or hardware (e.g. APLIO) in Peru; or in the recent controversy of interconnection between TdP as a local provider and RCP as long-distance carrier

Consequently, it is highly likely that the development of IP Telephony in Peru will continue to be closely tied to the market power of the leading telecommunication operator in the country, TdP. Hence, it is the regulatory aspects, in particular anti-trust aspects, more than technological or market aspects, that will continue to dictate the terms of the agenda for the development of IP Telephony in Peru.

The use of IP technology by firms entering the long-distance telephony market, specially incoming traffic, has resulted in a reduction in rates (collection, and settlement rates). Other localized, more appropriate work in the form of specific projects such as the FITEL projects to install public Internet access centres in rural areas, or further development of existing public centres, will doubtless help to increase the long term prospects of both the Internet and of IP Telephony penetration in Peru.

The commercial activities of the operators in the market and the one-off projects to promote the Internet and its associated technologies would, however, be given a real boost if the competent national authorities issued a clear pronouncement on the national policy to be adopted with regard to this new challenge of the communication era. The situation in Peru is not unique: the majority of countries all over the world are moving forward slowly and cautiously, trying to avoid any major mistakes in the handling of a technology which raises high hopes but also presents great challenges.

APPENDIX A
Telecommunications in Peru

The situation under the State monopoly

Until 1990, development of the telecommunication market in Peru was based on a State monopoly model. At that time, the government decided to transfer responsibility for the development of telecommunications to the private sector, maintaining only a regulatory function for itself. The planning then started for privatization of the sector, and this was put into practice in 1992.

Until 1994, the telecommunication market was practically stagnant; teledensity was 2.9 lines per 100 inhabitants; the average waiting time to obtain a telephone line was approximately nine years and connection costs were US$ 1500 (see Table A2 below).

The two State entities, *Compañia Peruana de Teléfonos* (CPT) and *Empresa Nacional de Telecomunicaciones* (Entel), had no investment capacity owing to chaotic business management, inappropriate rate policy and the economic crisis in the country.

The privatization process

From June 1992, a strategy started to take shape to privatize both State entities, CPT and Entel, and this was implemented in 1994. The main aspects of this privatization strategy were as follows:

- Approval of the merger of CPT and Entel;
- Minimum investment commitments of approximately US$ 1’000 million;
- Provision of fixed local and long-distance (national and international) telephone services under monopoly conditions for five years;
- Commitment to implement a pre-established rate rebalancing programme;
- Granting of 20-year licence, extendable for 5-year periods.

The base price of the sale by tender was fixed at US$ 546 million, and a significantly larger amount was actually obtained, as shown in the following table. The winning company was *Telefónica del Perú* (TdP), a subsidiary of *Telefónica de España*.

Development of the sector

The next five years showed a substantial improvement in the development of the telecommunication sector in Peru (see Table). In August 1998, through an agreement between TdP and the Peruvian State, it was agreed to speed up liberalization of the services which would be provided exclusively by TdP – in other words, liberalization took place a year earlier than forecast. Since then, 27 licences for supplying long-distance telephone services and three licences for the fixed telephony service have been granted. In the first part of 2000, the band corresponding to the PCS service has been awarded to STET (Italy) in a public tender, which will further develop competition in the mobile sector. Another source of competition in the mobile sector is the provision of trunking services by Nextel (US), whose services are competing at some degree with cellular services.

Table A1: Relative values
Bids for the acquisition of 35 per cent of CPT and Entel Perú

Bidding consortium	Bid (in million US$)
Telefónica del Perú	2 002
Peruvian Telecommunications Holding Limites	857
Telecomunicaciones Peruanas	803

Source: OSIPTEL

Table A2: Indicators for the telecommunication sector in Peru

	1993	*1999*
Average waiting time for a fixed telephone line	118 months	2 months
Fixed telephony one-time connection charge	US$ 1 500	US$ 150
Fixed telephone lines installed	670 400	2 007 000
Fixed telephony penetration rate (lines per 100 population)	2.70	6.50
Public telephones	8 000	55 002
Cable TV users	30 000	350 000
Internet users	-	470 000
Network digitisation	33%	92%
Fibre optic	200 km	6 652 km
Localities with telephone service	1 450	3 000
Urban centres with cellular telephony	7	117
Cellular telephony lines	36 000	850 000
Penetration rate for cellular telephony (lines per 100 population)	0.15	3.33
Licences granted	16	193
Authorizations for value-added services	-	129
Employment in sector (number of persons)	13 000	34 000

Source: OSIPTEL

The number of concessions for various telecommunication services has increase sharply since the opening-up of the sector in August 1998.

Table A3: Number of Concessions

	1994	*1998*	*2000 (October)*
Long-distance	1	1	44
Local bearer	1	4	20
Fixed telephony	1	1	6
Mobile telephony and PCS	3	3	4
Beeper	7	32	36
Trunking	0	12	8
Cable	4	51	102
MMDS (A digital wireless transmission system)	0	3	3
Mobile satellite	0	2	3
Data transmission	0	1	1
Public payphones	0	1	5

Source: Ministry of Transport and Communications. Presentations at CITEL conference October 9-10, 2000.

Public centres

Rates for the use of public centres vary greatly, ranging from US$ 0.45 to US$ 3 per hour. The differences in rates can be explained in various ways, but the principal factors affecting how they are fixed include the cost of dedicated lines, the location of the public centre, the services on offer, and the proximity of other centres. Each of these factors is considered below.

Cost of dedicated lines

Internet access via a dedicated line incurs a fixed monthly cost irrespective of the extent of use. Generally, it represents the highest operating cost incurred by the centres, so each centre has to evaluate the bandwidth required to meet traffic demand, as well as the number of computers needed to equip the centre.

This generates a trade-off in the pattern of the needs of each centre, since for a specified speed, average costs fall as the number of computers increases, which means that the centres can offer their users a lower price. However, surfing speed also falls for each additional computer which is connected to the dedicated line.

The quality of service offered by a public centre can be measured in terms of the ratio “speed per PC”, which measures the average surfing speed available to centre users if all the computers are being used at the same time. The following table shows the average values for this ratio for a sample of centres from various districts of Lima (sample of 20 public centres):

Table A4: Speed/PC ratio(Kbit/s)

Bellavista	10.67
Chorrillos	2.13
Jesús María	7.58
La Molina	4.77
La Victoria	3.20
Cercado de Lima	7.24

Source: FirstCom

As can be seen, as with the rates charged by the centres, the ratio varies greatly, ranging from 3.2 to 10.67 Kbit/s. It should be noted that this speed is the minimum available to centre users at any given time with all PCs being used simultaneously for Internet surfing. Since this situation is unlikely in practice, the surfing speed available to users is frequently greater.

Location of public centres

Another factor influencing prices charged by a public centre is location. In districts where average income of the population is low, profit margins are bound to be smaller. In other districts, rates are higher, mainly because users are frequently tourists who need the Internet as a means of communication. This is the case with the district of Miraflores or with centres located in commercial centres such as Jockey Plaza or Larco Mar, or the airport, where costs for using the centres are higher.

From a sample of 158 centres in Lima, Table 12 has been drawn up, showing each district's percentage share of the total number of centres covered by the sample.

An important aspect is that the highest concentration of centres is found in the districts of Miraflores and Cercado de Lima. This shows that use of the centres does not depend exclusively on the economic level of the population of the district, since the two districts show marked differences with respect to the average per capita income.

Services on offer

Many of the public centres not only offer Internet surfing but also additional services as a means of being different from other centres. Additional services on offer are photo scanning, printing, provision of personal e-mail accounts, resale of the voice service over Internet, cameras for videoconferencing, etc. Some of these services are free of charge, while others incur an additional charge.

Proximity of other centres

An important aspect for setting the rate to charge the user is the level of existing competition. When there are other centres fairly close by, prices tend to fall or extra services such as those mentioned in the paragraph above are offered.

This may be the case with the centres located in Cercado de Lima, where, along with Miraflores, there is a high concentration of centres, but it is noteworthy that many of them are located on a single road, the Avenida Wilson, it alone having around 18 public centres with an average of 8 computers in each centre.

Table A5: Location of public centres

(percentage of total number is shown for each district)

District	Category (*)	Percentage share
Miraflores	**A**	**13%**
Cercado de Lima	**B**	**13%**
Lince	**M**	**8%**
Surco	**A**	**8%**
La Molina	**A**	**7%**
Pueblo Libre	**M**	**6%**
Jesús María	**M**	**5%**
Rímac	**B**	**5%**
San Isidro	**A**	**5%**
Los Olivos	**B**	**4%**
San Borja	**A**	**4%**
San Martín de Porres	**B**	**4%**
San Miguel	**M**	**4%**
Ate Vitarte	**M**	**3%**
Others		**11%**

(*) A = High income, M = Medium income, B = Low income

Source: RCP