



Initiatives for the Improvement of the South American Market of Roaming Services Analysis and Recommendations

Technical Document in Support of
IIRSA's Activities

IIRSA - ALL RIGHTS RESERVED



I . I . R . S . A

INICIATIVA PARA LA INTEGRACION DE LA INFRAESTRUCTURA
REGIONAL SURAMERICANA

www.iirsa.org

Initiatives for the Improvement of the South American Market of Roaming Services Analysis and Recommendations


This technical document was prepared by José María Díaz Batanero (UIT) and Ramiro Ruiz del Castillo (IDB/INTAL consultant) within the framework of IIRSA's activities.

The opinions expressed herein are those of the authors and do not necessarily reflect the position of IIRSA's CCT institutions.

February 2010
Buenos Aires, Argentina



FONPLATA



The authors wish to thank Ricardo Carciofi (IIRSA's CCT Secretariat and IDB/INTAL Director), Cristian Franz Thorud (IDB) and Mauro Marcondes-Rodrigues (IDB) for their contributions. Furthermore, the background material of the IIRSA Study prepared by consultants IMOBIX and Value Partners has been deemed highly valuable by the authors.

The following document is a translated version from the original paper in Spanish. For any discrepancies between both versions please refer to the original version.

TABLE OF CONTENTS

I.	INTRODUCTION	1
II.	BACKGROUND	3
	A. The Boom of Mobile Telephony in South America	3
	B. Roaming Services	5
	C. IIRSA's South American Roaming Agreement Project	6
III.	OPPORTUNITIES AND CHALLENGES IN THE SOUTH AMERICAN ROAMING MARKET	9
	A. Segments of Users of Roaming Services	9
	B. Characteristics of the South American Roaming Market	10
	C. Rates: The Impact of Market Structure and Taxation	12
	D. Lack of Transparency in Information to Users	15
	E. The Need to Implement Prepaid Roaming	16
	F. Quality of Service Limitations	17
	G. The Impact of Fraud on Roaming	19
IV.	INITIATIVES PROPOSED FOR THE SOUTH AMERICAN ROAMING MARKET	21
	A. The process to develop a Regional Action Plan	21
	B. Conclusions: Initiatives Proposed in IIRSA's Action Plan	23
	ANNEXES	27
	Acronyms	27
	Figures	28

I. INTRODUCTION

South America has experienced a remarkable boom in the mobile telephony business in recent years, which has made communication possible even for population sectors not covered until then by any other telecommunication service. In fact, at the end of 2007, only 19% of the people living in South America had a fixed telephone line, whereas mobile telephone services had a penetration rate of 71% in the region.

Worthy of note are three factors that account for the remarkable expansion of mobile telephony services at both the regional and international levels: the opening of the domestic telecommunication markets (which has contributed to enlarging supply and lowering prices), the technological standardization, and the introduction of prepaid subscription models. These elements combined have enabled new networks to expand (their geographic coverage) and users to benefit from lower prices in both the purchase of handsets and the subscription of services.

From the intra-regional travel perspective, one of the relevant services for mobile phone users is roaming in mobile telecommunication networks, i.e. the possibility to communicate beyond the area of coverage of the service operator to which the user is subscribed. Creating an efficient roaming market is a desirable aspect in the framework of integration processes, since it facilitates social, economic and business initiatives by communicating people and companies.

However, the high costs of roaming services (possibly due to the market structure and tax-related issues), the lack of information regarding the service conditions and the lack of availability of prepaid roaming services account for their underutilization, mainly by tourists and border zone residents, which in turn results in their small share in the mobile telephony companies' total revenues.

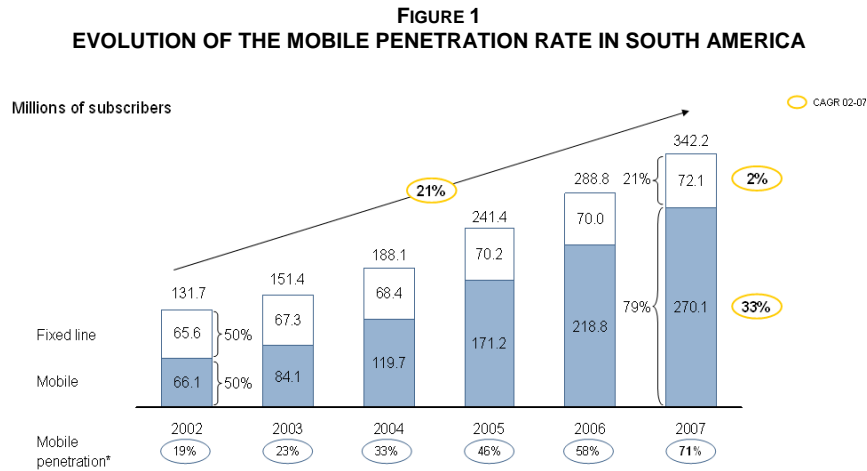
The importance of roaming services in integration processes, the obstacles identified, and the regional public good characteristics of the service in some dimensions of the roaming regional market have encouraged IIRSA to engage in this issue, as part of its integration sectoral processes. In particular, the Regional Study on the South American Roaming Services Market was conducted with the support of the Inter-American Development Bank (IDB) for the purpose of gaining insight into this market.

The purpose of this document is to present the characteristics of the roaming service market in the region (*section II*) as well as the most relevant conclusions drawn from the study (*section III*), including the main reactions caused by the study at the different technical forums where it was presented. Furthermore, the document presents by way of conclusion the main initiatives resulting from the dialogue and search for solutions maintained at IIRSA (*section IV*). Whether mobile services will become a key factor in the strengthening of the regional integration process and whether a South American space to promote intra-regional travels will emerge will largely depend on the follow-up on and implementation of these initiatives.

II. BACKGROUND

A. The Boom of Mobile Telephony in South America

South America is one of the best examples in the world of the high impact that mobile communications have on the social and economic progress of developing countries. Thus, from the connectivity point of view, the introduction of mobile telephony has made communication possible to sectors of the population not covered until then by any other telecommunication service, such as people living in sparsely populated and not easily accessed areas. In this regard, it should be stated that at the end of 2007 only 19% of the people living in South America had a fixed telephone line, whereas mobile telecommunication operators had managed to provide their service to 71% of the total population in the region, thanks to a network deployment process that took place in a period of less than 15 years and that has started to speed up since 2002 (see *Figure 1*).

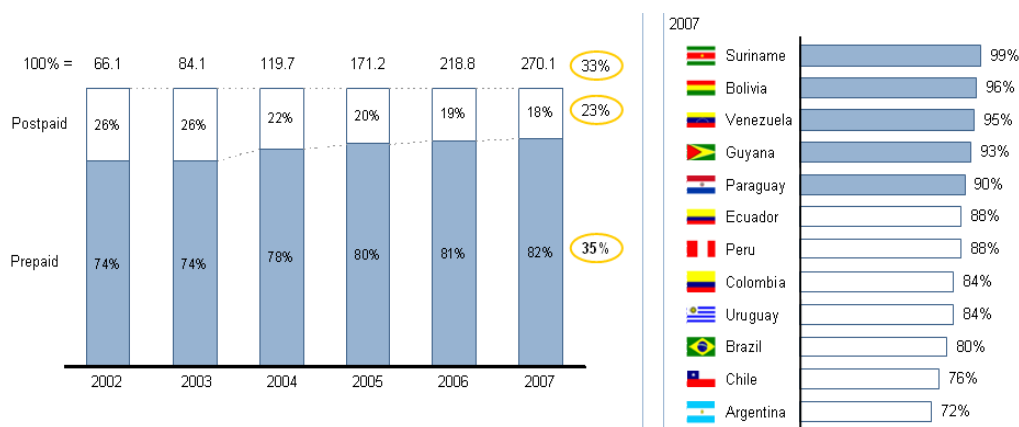


Connectivity improvement as offered by mobile telephone services is opening up new opportunities for economic development in South America, particularly for the lower-income population. Mobile services connect people, facilitate public service provision, empower micro- and small-sized enterprises and democratize information access. These benefits have a special impact on commodity-producing sectors, such as agriculture, livestock and fisheries, in which more than a 10% of the economically active population of the region works. Mobile telephony has become the largest platform for information and services distribution at the international level, contributes more than 1% of the South American gross domestic product (GDP), and has a proven positive impact on the economy growth rate.

Three factors have been key to the success of mobile services at the regional and international levels: the opening of the domestic telecommunication markets (which has contributed to enlarging supply and lowering prices), the technological standardization, and the introduction of prepaid subscription models. These elements combined have enabled operators to deploy new networks more efficiently and users to benefit from more affordable prices in both the purchase of handsets and the subscription of services.

By way of example, the average price of a not subsidized handset has fell from US\$250 to US\$20 between 1995 and 2007 —i.e. in 1995 its cost accounted for twice the average minimum monthly wage in the countries of the South American region, while in 2007 it accounted for only 10% of such wage. Likewise, in order to afford the maintenance costs of a fixed line some degree of economical soundness must be evidenced, whereas prepaid mobile services, for which users pay before making the calls, have enabled people without a regular income to afford their own mobile telephony subscription. The success of this formula is beyond dispute: at present, 82% of mobile lines in the region are prepaid. Worthy of note are the cases of Suriname, Bolivia, Venezuela, Guyana and Paraguay, where prepaid mobile services account for more than 90% of mobile lines (see *Figure 2*). These data turn the prepaid service into the driver of growth in terms of the number of mobile users in the region.

FIGURE 2
SOUTH AMERICAN MOBILE SUBSCRIPTIONS PER SERVICE TYPE



With respect to technological standardization, the GSM technology¹ has managed to concentrate 82% of subscribers and is available in the 12 South American countries² with second- or third-generation networks. This popular technology, with more than 450 million subscribers in Latin America and the Caribbean and 4 billion subscribers in the world,³ has promoted the development of new services, such as payment platforms, which can be extended to the whole region, past the borders of the countries for which such tools were originally developed.

¹ Acronym for Global System for Mobile Communications, a standard technology for wireless mobile telephone systems.

² However, there are differences regarding the frequencies used in the GSM networks of each country of the region, which hinders the interoperability of handsets.

³ According to estimates by the GSM Association.

B. Roaming Services

The present mobile cellular telephone systems simplify users' movement far beyond the network of the specific operator hired (*home network*). This mobility service is known as *roaming service for mobile telecommunication networks* or simply as *roaming*. When the user travels abroad, past the borders of the country in which he/she has hired the service, it is known as *international roaming service*.

For this roaming service to be provided, the operator of the home network must have entered into a commercial agreement with another operator having a network that is compatible in terms of both technology and frequencies in the area where the subscriber is for a limited period of time (*visited network*). Under this *roaming agreement*, subscribers can make and receive calls using their own handsets and mobile phone numbers, and the operators involved establish the way in which they are to bill subscribers for the use of the service, while subscribers pay to the home network operator.

The experience gathered in other regions of the world shows that international roaming agreements are technically and economically viable, creating competitive markets in which additional revenue sources for operators emerge and the coverage, quality and costs of the service provided to customers are improved. An efficient roaming service market facilitates people's movement, reinforcing regional integration processes through telecommunications and the promotion of new business initiatives. This trend is best exemplified by the European Union (EU), where in 2007 roaming services yielded revenues estimated at almost US\$15 billion per year, i.e. 5% of the regional mobile telecommunication market.

These data differ from those in the South American region, where roaming services yielded US\$343 million in the same year, i.e. less than 1% of the regional mobile telecommunication market. Even though there are substantial differences between both regions, particularly in terms of economic development indicators, telecommunication service penetration, people's movement and population density, some factors indicate that the South American roaming market has a potential that is not being exploited, not only as a driver for social and economic development but also as a tool for strengthening the regional integration process.

To illustrate this phenomenon, it should be stressed that at present no special tax treatment applies to the billing of roaming services provided to users traveling in the South American region, thus giving rise to cases of double taxation, despite regional integration initiatives such as the Andean Community of Nations (CAN) or the MERCOSUR. Furthermore, even though there are three multinational business groups⁴ concentrating 77% of South American subscribers, very few special roaming rates are offered when the home and the visited networks belong to the same business group.

⁴ Telefónica Internacional, América Móvil and Telecom Italia.

C. IIRSA's South American Roaming Agreement Project

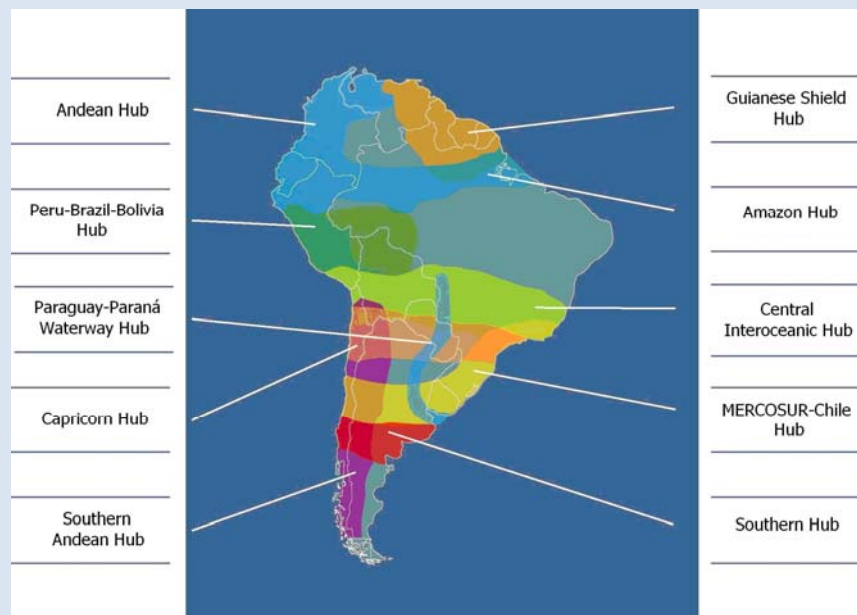
In the context described above, there is only one experience in the entire South American region concerning the development of programs to improve roaming service markets, namely the *Brazilian Roaming Association*⁵ (ABR), an association of operators founded in 1998 in Brazil to facilitate subscribers' movements across the country. The success of this initiative and the fact that it improved roaming services within the Brazilian territory have motivated the Brazilian Government to propose the inclusion of the *South American Roaming Agreement project* into the *Implementation Agenda based on Consensus (AIC)*, IIRSA's 31 strategic project portfolio approved in December 2004.

Box 1 IIRSA INITIATIVE

Founded in September 2000 at the First Summit Meeting of South American Presidents,^a the Initiative for the Integration of Regional Infrastructure in South America (IIRSA)^b is a continental approach to infrastructure intended to: (i) establish a transport, energy and communication infrastructure project portfolio serving as a catalyst for regional integration and economic and social development in South America; (ii) develop a forum for regional dialogue among infrastructure planning and regulatory authorities; and (iii) create new tools to improve the selection and implementation of infrastructure projects aimed at promoting regional integration.

With an initial 10-year mandate (2000-2010), the Initiative's action plan is built on two basic pillars: the definition of IIRSA's Project Portfolio based on an indicative territorial planning process and of project groups within the Integration and Development Hubs (EIDs, in Spanish), and the development of regulatory harmonization actions to foster the coordination of the rules and regulations applied to integration infrastructure. The South American Roaming Agreement project falls within the latter pillar.

FIGURE 3
IIRSA'S INTEGRATION AND DEVELOPMENT HUBS (EIDs)



Source: IIRSA

⁵ <http://www.abrtelecom.com.br>

IIRSA's Project Portfolio is made up of 510 transport, energy and communications projects, organized in 47 project groups and 10 EIDs, accounting for a total estimated investment of US\$74,541 million. Of this portfolio, 184 projects (36%), for a total of US\$37,370 million, are underway; 143 projects (28%), amounting to US\$24,595 million, are in the preparation stage, while the remaining 52 projects (10%), with an investment of US\$6,179 million, have already been completed.^c

^a Held in August 2000 in the city of Brasilia (Brazil).

^b For further information, see www.iirsa.org.

^c Data updated as of August 2009.

The *Regional Study on the South American Roaming Services Market* was conducted within the framework of this project. This study, which analyzed all the technical, economic, legal and tax barriers to a more efficient roaming service provision in South America, was published in December 2008.⁶ The cross-border nature of roaming makes it necessary for all stakeholders involved to work jointly and coordinately to introduce the necessary improvements in this service market. Therefore, this study, which involved the participation of the 12 South American countries and a series of technical meetings, has helped improve coordination among stakeholders, fostering discussions and the search for solutions to define a regional action plan that should enable the introduction of substantial improvements into the regional provision of roaming services in a reasonable time frame.

Box 2
DIMENSIONS OF ROAMING AS A REGIONAL PUBLIC GOOD

Harmonizing different regulations and coordinating actions among all relevant stakeholders in a regional roaming market is a clear example of a "regional public good." For goods of this kind, it is possible to verify that the level of the investments that countries (or in this case, operators) make on an individual basis is far from optimum. This is due to, for example, information asymmetries among the parties concerned, the lack of an equitable distribution of costs and benefits, or economic restrictions in some places that make it almost impossible for investors to bear the costs of the necessary infrastructure since they do not receive all possible gains from it.

The IIRSA Study reveals that the South American roaming market has some features of a regional public good and that the current under-provision of roaming services in the region is the result of some market failures. Although in other regions such failures were bridged via regulations, the peculiarities of the South American region make it necessary to open up the path to cooperation among stakeholders if the desired goals are to be attained. To this end, it is vital that participating agents be willing to pay some of the costs of undertaking collective actions. When *regional public goods* are involved, it is often highly positive to rely on a "third party" or outsider in the supply-demand interplay to promote the provision of the good or service involved. In the case of the South American roaming market, IIRSA has played this role of a facilitator among operators and regulators by encouraging the search for consensus as well as decision-making to solve the problems and obstacles identified.

As suggested by the theory of *club goods*, any collective undertaking must be self-sustainable and provide sufficiently large net benefits for each of the club members to attain a better position. The success of a club will depend on the extent to which the benefits from collective action are larger than the costs of such action. To this end, the challenge will be to reduce the costs of collective action and find ways of sharing the costs of providing club goods. In line with this, if the stakeholders involved (operators, regulators and manufacturers of handsets, inputs and software) are regarded as a "club" concerned with the coordination and solution of differences, the role of IIRSA as a facilitator helps its "members" reduce the costs of their participation in solving the South American roaming market constraints that are allocated less resources and a lower priority as they require the collective action from all stakeholders at the regional level. This is the case, for example, of border roamers —probably the segment of users that is least served by operators and that, however, may create externalities beyond the political and jurisdictional frontiers of the regions and countries where the necessary investments are made.

All of the above accounts for the important role played by IIRSA in the search for agreements and actions intended to improve access to roaming services, given the significance of communications for the development of economic and social exchanges, trade facilitation and support to border integration, all of them key objectives of the Initiative.

⁶ Financed by the Inter-American Development Bank (IDB) and developed by consultants IMOBIX and Value Partners. Last version published in May 2009. Hereinafter called "IIRSA Study."

As a prelude to the contents of the following section, it may be anticipated that a major conclusion from the IIRSA Study is that the roaming service is costly, due to the effects of its market structure that prevents efficiency gains from translating into lower subscription prices, on the one hand, and to double taxation, which also causes prices to be higher, on the other.

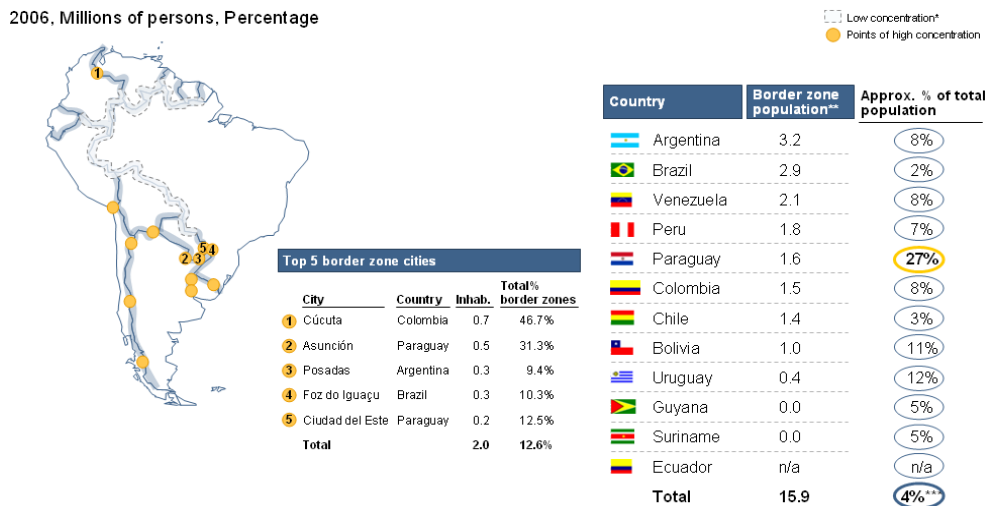
III. OPPORTUNITIES AND CHALLENGES IN THE SOUTH AMERICAN ROAMING MARKET

A. Segments of Users of Roaming Services

If the main segments that travel within the region are taken into account, more than 30 million people living in South America could be regular roaming users. These users, who make up 8% of the population, fall into three main categories: *business travelers*, *tourists* and *border zone residents*. The evolution of the South American roaming market will depend on the actions that may be taken to facilitate the use of roaming services by these segments of users when traveling.

In terms of number, border zone residents make up the main group of users, amounting to a total of 16 million people. This population segment can in turn be divided into those living in low-density locations, usually scattered in rural areas with no easy access, and those living in densely-populated cities located in border areas. The latter group is the one that receives the greatest benefits from international roaming services, given the intense cross-border mobility and the high penetration rate of mobile phones in these areas. To illustrate this, attention should be drawn to the fact that at the end of 2006 five South American cities concentrated more than 12% of the people living in border zones (see *Figure 4*) and more than US\$3 billion trade flow. The characteristics of these urban areas, i.e. great social and economic activity on both sides of the border, encourage the development of travel-related initiatives between neighboring countries promoting the use of roaming services as a tool for local development and for the strengthening of regional integration.

FIGURE 4
DISTRIBUTION OF BORDER ZONE POPULATION IN SOUTH AMERICA



Even though business travelers make up the smallest segment, their rate of roaming utilization is the highest, followed by tourists. Taking both segments of users together, intra-regional trips involve an estimated total of 10.1 million people per year, accounting for less than 3% of the population. This percentage contrasts strongly with intra-regional trips in Europe and North America, 42% and 14%, respectively. In spite of the fact that there is a growth trend in the number of intra-regional trips, these data confirm that, in order to increase the base of traveling

roaming users, it is necessary to undertake actions intended to encourage intra-regional trips. Improvements in regional integration infrastructure networks as well as the adoption of measures aimed at simplifying formalities would contribute to a significant reduction in transportation costs, which would have a positive impact on the movement of people and on the exchange of goods and services and, hence, on the roaming market potential, particularly for the segments of those who travel for business and for pleasure. These measures are in line with the planning process initiated by IIRSA. The starting point could be the countries that concentrate the largest flow of travelers (see *Figure 5*), i.e. Argentina, Chile, Uruguay and Brazil, which account for 54% of the total intra-regional traffic.

**FIGURE 5
MAIN FLOWS OF INTRA-REGIONAL TRAVELERS**



B. Characteristics of the South American Roaming Market

The South American roaming market amounted to US\$343 million in 2007, representing less than 1% of the mobile operators' total revenue in the region. This figure serves to measure the importance of this business line. Total roaming calls amounted to 174 million minutes, of which incoming calls⁷ were the largest component of traffic, accounting for 64% of total calls. As for revenues, incoming and outgoing calls generate a similar percentage of revenue, 49% and 48%, respectively. The remaining 3% of revenue results from the short message service (SMS).

Business travelers are the main users of roaming services, accounting for 80-90% of the total market. According to estimations, more than 60% of business travelers utilize roaming services in their trips, creating an average revenue per user (ARPU) of US\$154 per trip.

The fact that these users, 70% of whom are postpaid subscribers, are almost not price-sensitive, since their professional activities largely depend on telecommunication services, has led mobile operators in the region to focus their roaming strategy on this segment, which yields high profits with low network use. These data differ from those of other regions of the world, where business travelers have a much lower weight in the total use of roaming services (*ranging between 67% in Europe and 33%*

⁷ Calls received by roamers. Outgoing calls, instead, are those made by roamers.

in Africa and the Middle East) and where the ARPU per trip is much lower (between US\$95 in Africa and the Middle East and US\$58 in the Asia-Pacific region).⁸

Box 3 ARPU AND THE SOUTH AMERICAN ECONOMIC CONTEXT

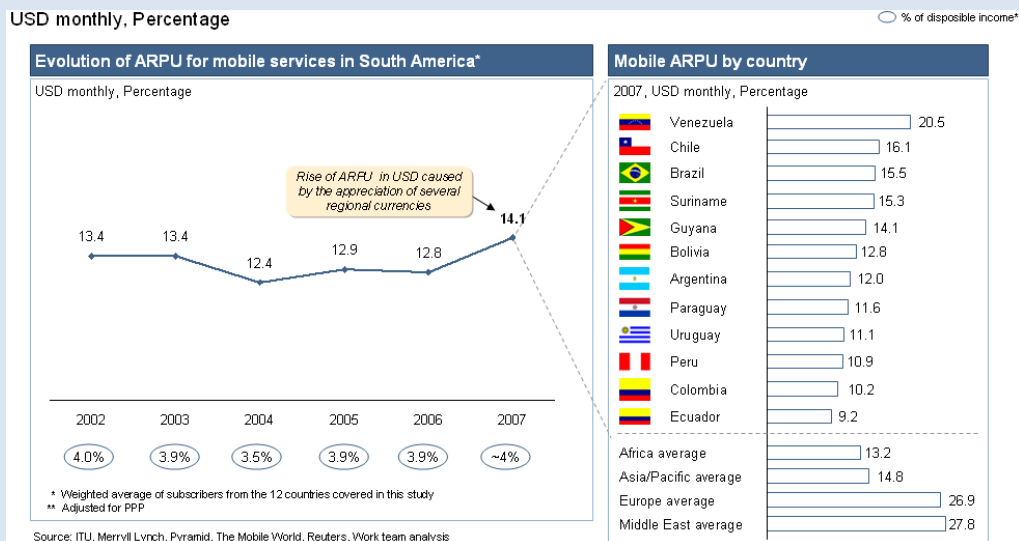
Between 2002 and the end of 2008, when the current economic crisis spread to the world, the South American region maintained a positive pace of economic and social development. In particular, four aspects are to be noted: (i) GDP and private consumption grew at a rate of more than 4% annually; (ii) incomes by inhabitants were stably maintained; (iii) unemployment rates were reduced by 5%; (iv) governments have managed to control and reduce inflation to about 6% annually, which is an important advancement considering that inflation was once one of the region's greatest structural problems.

Despite its recent good performance, however, South America is a heterogeneous region, with large differences in the socioeconomic context of its members. Four countries^d make up 79% of the population and 84% of the total GDP of the region. Nevertheless, there are large disparities in terms of other indicators, such as the poverty level—from 18% in Chile to 70% in Suriname—and the degree of urbanization—from 38% in Guyana to 93% in Venezuela. Such disparities among countries call for the need to make the relevant adjustments when adapting a regional analysis to the characteristics of each country within the region.

This context accounts for the relative stability of ARPU,^e a major indicator used to evaluate the economic performance of mobile operators. Thus, in recent years, the South American ARPU, measured in US dollars, has been kept at approximately US\$14. This figure shows that the South American market is in line with the ARPU in Africa (US\$13.2) and the Asia-Pacific region (US\$14.8) (see Figure 6).

The stability of the ARPU in South America, combined with a strong growth in the subscriber base, has led to a sustained growth in total revenue for operators. Consequently, in 2007 revenue for mobile services reached US\$41.4 billion. As with other socioeconomic indicators, huge disparities and high concentration are observed in the regional ARPU, as shown by the ARPU in Venezuela vis-à-vis in Ecuador (US\$20.5 and US\$9.5, respectively), or by the fact that 74% of operator revenues concentrates in Brazil, Argentina and Venezuela.

FIGURE 6
EVOLUTION OF ARPU AT THE REGIONAL LEVEL



^d Brazil, Argentina, Colombia and Venezuela.

^e Average revenue per user. ARPU is an indicator used to estimate and compare the overall profits obtained from a group of users or from the total number of users. Despite some disagreements over the ways of estimating ARPU (which would devalue it as a tool for comparative purposes), it is the most common tool used by the mobile industry to analyze trends, markets, customer segments, and to measure improvements in efficiency by the operators.

⁸ See IIRSA Study, Report Stage II, pp. 202 and 203.

The business strategy of South American operators is limiting the potential for growth of the regional roaming market, since the greater penetration of mobile phones in the region as well as technological standardization are not used to promote a more widespread use of roaming services by the other two segments of users, which would have a positive redistribution impact, particularly for border zone residents. As for tourists, only 9% of postpaid and 1% of prepaid subscribers make use of roaming services when traveling in the region, generating an ARPU per trip of US\$61 and US\$18, respectively. The high rates charged for roaming calls made and received, the lack of information regarding the conditions of the service and the lack of roaming availability for prepaid users, who represent 82% of the mobile lines in the region, are some of the reasons that explain why these two segments of users are not very significant for the regional roaming market. The use of roaming services as a tool for development and regional integration will depend on the actions taken to correct these factors that now inhibit the growth of the number of users and of the roaming service market, as explained below.

Box 4
EXPECTED PROSPECTS FOR THE ROAMING MARKET

Given the increase in people's movement across South America and in the penetration rate of mobile phones in the region, the roaming market is expected to continue growing in the next years. According to estimates from the IIRSA Study, roaming services may amount to a one billion dollar market by the end of 2012, which would represent 1.6% of operators' revenues and a 23% of market growth in a 5-year term. Since this analysis was made based on an optimistic scenario and in the context of economic growth prior to the present worldwide recession, these estimates are more likely to come true in a period longer than the one anticipated by the experts who conducted the study.

In line with this, by the end of 2008, the GSM Association (GSMA) published an estimate different from the one developed in the IIRSA Study, taking into account a different economic context. Based on the information shared by operators, the GSMA estimated that the South American roaming market would grow only 5% in the same period, reaching almost US\$350 million in 2012.^f Although both scenarios coincide in that the South American roaming market will continue growing in the coming years, the huge discrepancy between both analyses proves that there is an important asymmetry in the information available regarding the size of the South American roaming market, the ARPU per user, and growth estimations.^g

Taking into account this context of information asymmetries, it would be a mistake to discuss the IIRSA Study focusing on the differences in the market estimates made by each party. The main contribution by IIRSA has not been its market estimates, but the fact that it has identified the causes limiting a greater demand for roaming services. As both analyses were made on the basis of the current operation of the South American roaming market, should all stakeholders involved in roaming service provision cooperate in correcting market failures and harmonizing their operations at the regional level, the growth of this market is likely to be considerably higher than the one estimated in both analyses.

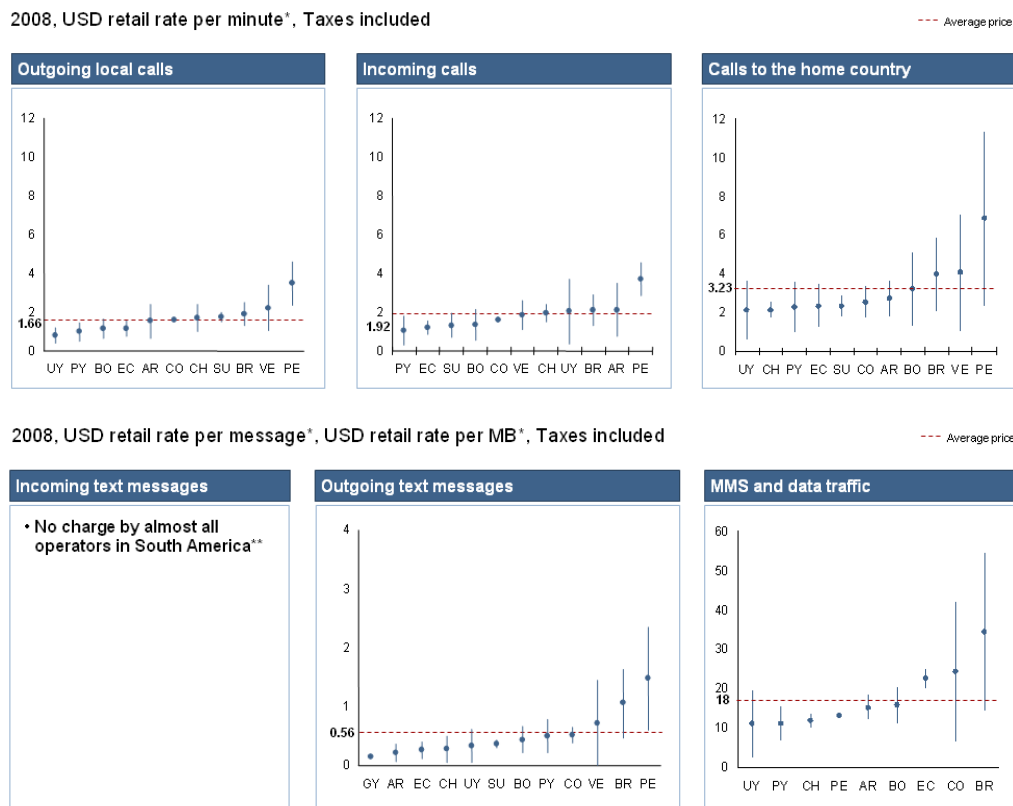
^f This estimate was made assuming a US\$250 million roaming market by the end of 2008.

^g See IIRSA Study, Report Stage I, pp. 103 to 111.

C. Rates: The Impact of Market Structure and Taxation

Rates are a major obstacle to a greater utilization of roaming services at the regional level. As opposed to the average per capita income, retail roaming rates in South America are high and also present significant price variations for the same concept (e.g. for outgoing voice). These prices can vary as much as 75% within the same country, depending on the type of subscription (see *Figure 7*). In general terms, local outgoing calls are usually cheaper (US\$1.66 per minute including taxes) than calls to the subscriber's country of origin (US\$3.23 per minute including taxes). With these rates, the median South American mobile ARPU (US\$14) only lasts for 7 minutes of incoming roaming calls. Reduction of rates should be at the core of all efforts to find solutions for and encourage improvements in the South American roaming market.

FIGURE 7
RETAIL RATES FOR INCOMING AND OUTGOING CALLS AND SMS MESSAGES



High roaming costs encourage travelers to utilize more economical alternatives, limiting the chances for the base of roamers to grow. The most commonly used alternatives are SMS text messaging, the purchase of prepaid SIM cards in the visited country or voice over IP (VoIP), although these alternative services present various important obstacles for the user, such as traveling restrictions, the need of Internet access or the impossibility of receiving calls to the same phone number used in the country of origin.

If roaming rates are not substantially reduced, users are likely to adopt these alternatives for good, especially as smartphones—which facilitate the use of VoIP through Wi-Fi or even 3G networks—become cheaper. Should this trend stick, mobile operators would be wasting a great opportunity for receiving a return on the investments made in their networks. Likewise, there would be a regressive impact in terms of the expansion of mobile coverage, because these service combinations are not available to most users in the region, particularly to lower-income users.

Due to the different interests of the stakeholders involved in the South American roaming market, there is not a common view as to the causes of the current roaming rates. Despite such disagreements, it is possible to identify two factors that might help understand the cause of such high rates, which are associated with *i*) the market structure; and *ii*) the impact of taxation.

The Market Structure

Telecommunication regulators and public agencies have stated that high roaming rates result from the fact that this market is an oligopoly and that the absence of competition discourages any reduction in retail and wholesale rates (see *Box 5*). As already mentioned, more than 75% of South American users are subscribers of three business groups, and it has been found that there are very few special roaming offers. In addition, important discounts are offered within some operator alliances, revealing that such discounts are not being transferred to the final users of the service.

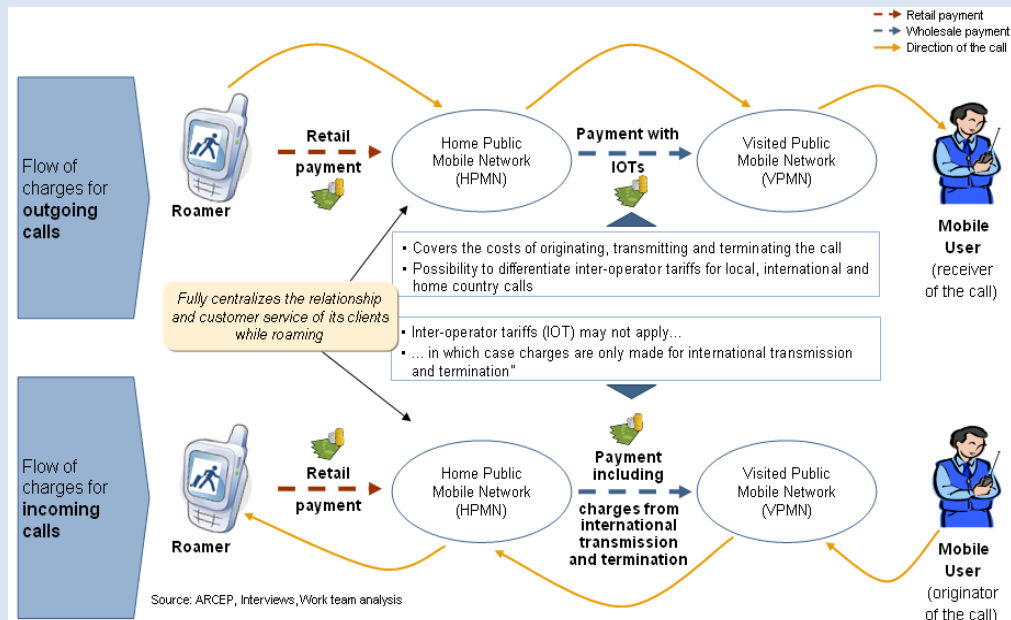
Box 5 WHOLESALE RATES AND REGIONAL ALLIANCES

One of the most important components of retail rates are Inter-operator Tariffs (IOTs), which in general are applied to outgoing calls and messages making a distinction between voice and data (see *Figure 8*). These IOTs are defined in *roaming agreements* between operators, establishing conditions such as the services to be provided or the volume discounts to be offered. According to industry standards, IOTs should be impartial regarding the operator that is using *wholesale* roaming services. In practice, however, there are discounts for large volumes and/or for member operators of roaming alliances, which in the South American region are estimated to amount to 30-35% of regular IOTs.

The reductions in wholesale rates and the marketing leverage of a common brand at the regional level are the two main incentives for the creation of alliances among operators. Presently, in South America there are three regional alliances: two by large business groups (*Claro, of América Móvil, and Movistar, of Telefónica Internacional*), and one by independent operators (*Roaming Alliance*). Roaming calls utilizing the network of a member operator of the alliance can result in discounts of up to 40% for customers, though the communication of these discounts is not very clear and is not applied in a uniform manner. The strengthening of these alliances can be a tool to improve the operational conditions of the South American roaming market, provided regulations ensure that operators that are not within a given alliance can continue providing roaming services to users under competitive conditions.

To foster these alliances, telecommunication authorities may introduce regulations obliging operators to inform their users of the benefits of these alliances in a transparent manner. The communication of such reduced rate structures, the growing base of mobile users in the region, and a strong need to set competitive advantages should be strong incentives to push operators into enhancing these types of alliances, which would result in a greater demand for roaming services.

FIGURE 8
INTER-OPERATOR TARIFFS (IOTs)



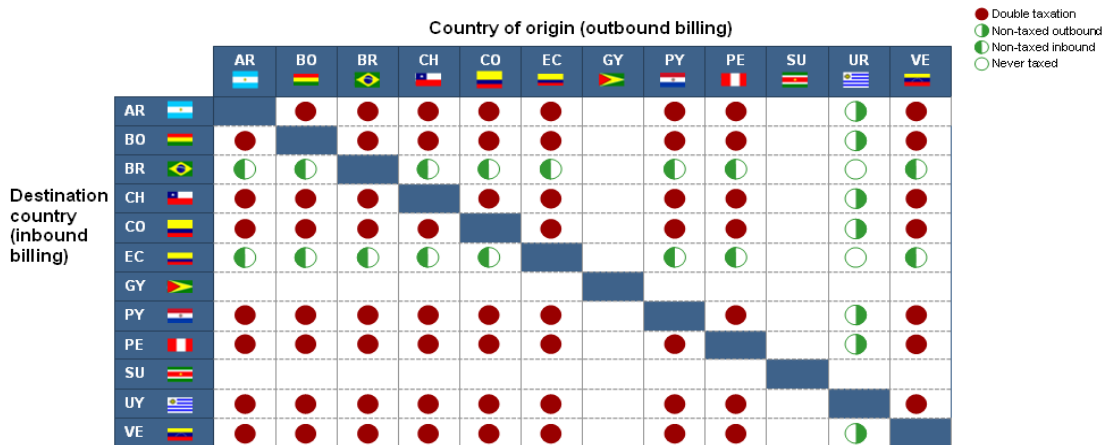
The Impact of Taxation

Operators, in turn, believe that taxation and the volatility of the exchange rate of local currencies vis-à-vis the US dollar inhibit any attempt to lower roaming rates, particularly in routes with less traffic. Regarding the impact of taxation on roaming rates, the tax burden generates an estimated surcharge of 35 to 60% above the rate without taxes, especially due to the dual application of VAT (or double taxation) and other indirect taxes.

The problem of double taxation exists because of the dual application of taxes on the value of the service in the country visited (justified by the concept of *locality*) and in the country of origin of the roamer (justified by the concept of *residency*). In the former case, taxes are paid in the country where the services were rendered and in the case of roaming it impacts on the wholesale tariffs that the visited network applies to the home network; in turn, the residency criterion applies if taxes are paid in the roamer's home country. When considering indirect taxes such as VAT, roaming is likely to be subject to double taxation if taxes are paid in the visited country (for locality reasons, over outgoing calls) and in the country of residence (because that is where the service was subscribed).

Despite the Melbourne Agreement (ITU, 1988), which establishes a *residency* criterion to avoid double taxation in telecommunication services, the lack of a specific definition of the international roaming service in the Agreement results in the fact that double taxation is a problem affecting 72% of roaming calls in the South American region (see *Figure 9*). The amendment of this Agreement to extend its application to roaming services at the regional level would help reduce final roaming rates considerably.

FIGURE 9
IMPACT OF DOUBLE TAXATION IN SOUTH AMERICA



D. Lack of Transparency in Information to Users

The analysis in the IIRSA Study revealed that there is great room for improvement concerning the information to users published by operators about the conditions of roaming service provision (see *Figure 10*). In most countries analyzed, operators publish incomplete, confusing and/or outdated pricing information to customers, thus reinforcing the users' ignorance on the pricing

structure applicable in each case, increasing their dissatisfaction, and limiting the growth of the demand for roaming services.

FIGURE 10
LACK OF INFORMATION REGARDING ROAMING SERVICES

Country	Web site				Customer service*	
	Researched operators with information on web site are:	Main problems with the inquiry			Unawareness of the service by front-end support	Lack of problem resolution
		Rates do not include VAT	Info. out of date	Confusing information about roaming	Incomplete rate info. for South America	
Argentina	3/3	✓		✓	✓	✓
Bolivia	2/3	✓	✓	✓	✓	
Brazil	3/4			✓	✓	✓
Chile	3/3			✓	✓	
Colombia	2/3			✓	✓	✓
Ecuador	2/3			✓	✓	✓
Guyana	2/2	✓	✓	✓	✓	
Paraguay	2/4	✓	✓	✓	✓	✓
Peru	2/2			✓	✓	
Suriname	2/2		✓	✓	✓	
Uruguay	3/3	✓	✓	✓	✓	
Venezuela	2/3	✓	✓	✓	✓	✓

Even though some operators are simplifying and standardizing their roaming rates, in many cases even lowering rates, the current context of lack of transparent information undermines the impact of such measures, since users are not informed about them. In order to modify this situation, operators should adopt a more transparent communication policy, by supplying every segment of users with simple, updated and accurate information on the conditions of service provision and the rates to be applied in each case. Although this action may be taken unilaterally by each operator, coordinating a more transparent policy at the regional level —for example, by defining a common standard of information— would create a more competitive environment, since this would facilitate the comparison of rates, and would harmonize to some extent the South American roaming market.

E. The Need to Implement Prepaid Roaming

Although prepaid subscriptions represent 82% of South American mobile lines, less than 1% of these subscribers utilize roaming services when traveling. This reveals that there is an important segment of potential roaming service users who are not being served by operators, limiting the growth of the market.

The main constraints for the use of prepaid roaming are the scarce demand for the service by prepaid mobile users, who are usually those of lower income and with fewer chances to travel abroad, as well as the lack of availability of the service, caused by the need of investments by operators. At the time of the IIRSA Study, only in three countries —Chile, Guyana and Venezuela— there were operators offering prepaid roaming services in the entire region. These are certainly exceptions to the

rule, since in Bolivia, Colombia, Ecuador or Peru no operator offers any prepaid roaming services, not even in the routes with the largest flow of travelers (see *Figure 11*).

FIGURE 11
AVAILABILITY OF PREPAID ROAMING IN SOUTH AMERICA

Number of operators in the country of origin that offer prepaid roaming service to the visited country

Country of origin	Visited countries											
	AR	BO	BR	CH	CO	EC	GY	PY	PE	SU	UY	VE
AR			1	1				1			2	
BO												
BR	2											
CH	3 or +	2	2		2	2		1	1		2	2
CO												
EC												
GY	3 or +	2	3 or +	2	2			2	2	2	2	1
PY	1										1	
PE												
SU			3 or +	1	1		1		1			
UY	1											
VE	3 or +	2	3 or +	2	2	1		2	1	1	2	

There are technical alternatives for the implementation of prepaid roaming, such as the use of CAMEL⁹ —a specification for intelligent network platforms— or USSD Callback, requiring investments in equipment and the allocation of resources to conduct interconnection tests. However, given the present context of economic recession, operators prefer to allocate their resources to the development of services with a higher return on investment, such as mobile Internet services for postpaid customers, currently a major driver of growth for the sector. In order to encourage the 40% of South American operators not yet offering prepaid roaming services to make the necessary investments, tax or regulatory incentives need to be introduced, especially until the demand for prepaid roaming grows to the point in which such incentives can be removed. Additionally, it is necessary to develop initiatives to facilitate and foster intra-regional travel, either by reducing travel costs or by simplifying entry formalities for South American travelers staying for short periods in any country of the region.

F. Quality of Service Limitations

From the user's viewpoint, some quality of service aspects hinder the growth of roaming service utilization. In the first place, some services are not available outside home networks. The lack of availability of the caller ID or CLI¹⁰ service prevents roamers from choosing to either accept or

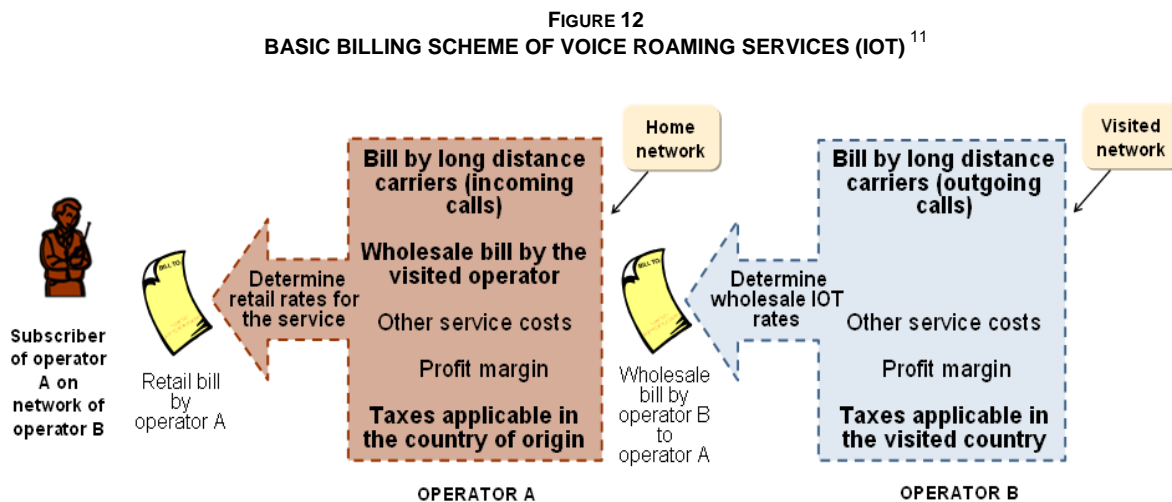
⁹ Acronym for Customized Applications for Mobile Enhanced Logic. This is a set of standards to extend intelligent network telephone services to 2G or 3G GSM networks. The functional capabilities of CAMEL platforms were added in phases. CAMEL Phase II or higher allows prepaid roaming on a GSM network.

¹⁰ Acronym for Calling Line Identification.

reject incoming calls, thus encouraging users to reject all incoming calls because, as they are received outside the home network, they are billed to the call recipients, usually at a high rate. Likewise, the fact that the credit recharge service is not available for prepaid mobile phones prevents prepaid roaming users (where this service is available) to continue making and receiving calls once they run out of balance. Other services not yet available for roaming are voice mail access and home network customer service.

Regarding the quality of outgoing or incoming calls in roaming situations, the IIRSA Study has revealed that most users perceive them to be of a quality remarkably lower than that of the calls made within the home network. This leads many travelers to choose alternative communication services, deemed of better quality.

As can be seen in the basic billing scheme of voice roaming services (see *Figure 12*), the situations described above are due to the fact that roaming calls involve a set of stakeholders different from those involved in calls within the home network. These stakeholders, such as visited network operators or *long-distance carriers* participating in the international connection, may have different quality of service standards from those in the home network, or network infrastructures not allowing the provision of some of the previously mentioned services, such as CLI.



Developing industry initiatives to define and enforce minimum quality of service standards to be respected and implemented at the regional level is key to promote improvements in the functioning of roaming services. Given the network effect of telecommunication infrastructures, these initiatives will not turn out to be effective unless all stakeholders in roaming service provision, from operators to other service providers, are involved. Otherwise, calls will be of the lowest quality available in the network. In line with this, regulators and other public agencies have an important role to play to ensure that all stakeholders make the necessary efforts to attain the quality of service agreed by consensus.

¹¹ Source: IMOBIX-Value Partners.

G The Impact of Fraud on Roaming¹²

Fraud causes significant losses for mobile telecommunication operators every year, from 3 to 5% of revenues, with an estimated 25% occurring in roaming situations. According to the last survey conducted by GSMA,¹³ roaming fraud gives rise to losses ranging from US\$100,000 to US\$740,000 per year (depending on the operator size), of a total of US\$21.2 billion.

Among the most common cases of fraud currently known,¹⁴ the process type is the easiest to carry out in roaming situations and the one that may cause the greatest loss. Even though this type of fraud is not specific to roaming services, to commit their illegal activities criminals take advantage of the long *detection and response times* usually required by home and visited network operators to exchange information on CDRs.¹⁵ In some cases, particularly during weekends, the visited network operator may take up to three days to notify the home network operator about a fraudulent behavior, a delay that may cause significant losses.

To combat this or other types of fraud, the immediate exchange of information between operators is key, since this would enable operators to detect each incident in time, analyze whether it is a real case of fraud or a *false positive* fraud, and respond in time to minimize any loss against operators. It is important to point out that, even though this type of fraud always originates in the visited network country, the one that suffers the economic consequences is always the home network operator. This discourages many operators from providing roaming services in the routes to countries that do not guarantee cooperation, a scenario that explains why roaming services are not available in some routes.

At present, there is an international GSMA initiative for the implementation of automated systems enabling operators to exchange information *almost on a real-time basis*. This initiative, known as Near-Real-Time Roaming Data Exchange (NRTRDE), would reduce information exchange to only four hours during high traffic. According to GSMA estimates, this initiative might reduce by 90% the losses caused by fraud. Although most South American operators are well advanced in the implementation of NRTRDE,¹⁶ there are still others that have not expressed their willingness to participate in the initiative, since current roaming agreements do not provide for the implementation of this solution. As already stated, operators who have already implemented NRTRDE may not offer roaming services to users associated with operators that have not yet implemented it, thus limiting roaming service availability in the South American region.

To avoid this situation, encourage each stakeholder to assume his/her role and make the applicable investments, and reduce the cases of fraud, it is necessary to update roaming agreements so that

¹² For further information about fraud on roaming, see Macía-Fernández *et al.* "Fraud in Roaming Scenarios: an Overview", IEEE Wireless Communications, 88-94. December 2009.

¹³ IRSF & Roaming Fraud Survey Results, FF Doc 36/16, January 2006.

¹⁴ See IIRSA Study, Report Stage I, pp. 97 to 101.

¹⁵ Acronym for Call Detail Records.

¹⁶ It is estimated that 83% of operators have implemented NRTRDE or are "on track."

they include the requirement of NRTRDE implementation, and to harmonize national legislations and regulations at the regional level in order to clearly define telecommunication service fraud and the actions that each stakeholder should take to reduce its occurrence. Unless this regional cooperation takes place, criminals will continue taking advantage of the weaknesses of the entire network for their own benefit.

IV. INITIATIVES PROPOSED FOR THE SOUTH AMERICAN ROAMING MARKET

A. The process to develop a Regional Action Plan

The lack of a regional regulatory framework applicable to the South American roaming market implies that the road to overcoming the obstacles identified in the IIRSA Study should require the cooperation of all the stakeholders involved.

In line with this and within the framework of IIRSA's South American Roaming Agreement project, the design of a regional *Action Plan* has been underway since mid-2008 with the purpose of overcoming the main obstacles identified (see *Figure 13*). This has involved an intense process of information exchange, discussion of scenarios, and analysis of possible initiatives to be included in IIRSA's Action Plan, with the active participation of telecommunication regulators, operators, public agencies and regional organizations. Worthy of note is the participation of the major sectoral associations and agencies, particularly CITEL, REGULATEL and GSMA, which have played a vital role in the search for consensus, with the facilitation and support of IIRSA's organizational levels.¹⁷

FIGURE 13
MAJOR MILESTONES IN IIRSA'S SOUTH AMERICAN ROAMING AGREEMENT PROJECT

Date	Milestone
December 2004	Inclusion of the project in IIRSA's Agenda of 31 Priority Projects (AIC)
March 2008	Regional IIRSA-CITEL Workshop to define the guidelines for the IIRSA Study
November 2008	First Meeting of the Executive Technical Group (GTE) for the project (Bogotá, Colombia)
April 2009	Publication of the IIRSA Study
May 2009	Second Meeting of the GTE for the project (Cusco, Peru), with the cooperation of CITEL CCP.I
December 2009	Adoption of the Action Plan for the project

To build upon the lessons learnt in other regions of the world, this *Action Plan* was designed taking into account the main initiatives undertaken in other regional roaming markets. One of the leading cases was that of the EU, where the participation of the European Commission led to the adoption of the *Eurotariff* after a tense discussion process among operators, regulators, users' associations and the Commission itself (see *Box 6*). Even though many lessons can be drawn from this experience, the differences in the socioeconomic context of both regions, the high level of conflict reached in this process, and the absence of institutions equivalent to the

¹⁷ National Coordinators (CNs), the Executive Steering Committee (CDE) and the Technical Coordination Committee (CCT).

European Commission in the South American region make it unadvisable to develop initiatives similar to the *Eurotariff* in South America.

Other scenarios analyzed in developing this Action Plan were those of Africa and the Middle East, where highly positive initiatives were undertaken by operators, both in response to regulatory pressures and to obtain competitive advantages. Particular mention should be made of the regional alliance among operators of the Zain Group in Africa. Through the development of *One Network*, Zain connects more than 400 million people in 12 countries at local call rates, i.e. completely eliminating roaming charges. A major aspect of this program is that One Network offers prepaid roaming and the possibility of purchasing credit in the visited country. This alliance, created in the absence of regulatory pressures, has had a significant impact on the positioning of Zain in the region. The high business concentration of South American operators indicates that similar initiatives may be conducted in the South American roaming market.

Box 6
ROAMING REGULATION IN THE EUROPEAN UNION^h

The EU is characterized by a great amount of intra-regional travel and an intense economic, cultural and social exchange. Yearly, around 40% of Europeans are estimated to be intra-regional travelers; in addition, the mobile telephone penetration rate in the EU is higher than 100% of the population, all of which indicates how important roaming services are for the European integration process.

In spite of the fact that the European roaming market is very dynamic (roaming revenues are estimated to represent 5% of the regional mobile telecommunication market, i.e. almost US\$15 billion per year), the European Commission, through the direct intervention of Viviane Reding,ⁱ estimated in 2005 that the market had some competition problems that justified the Commission's intervention to define a rate scheme intended to reduce roaming rates and increase market demand.

The first stage of this initiative consisted in conducting a public consultation process to improve the information available about the provision of roaming services and their use by European travelers. According to the surveys and analyses performed, there were no reasons that explained the high rates charged for roaming calls made and received (sometimes four times the price of calls within home networks), and a high percentage of travelers did not use roaming services due to the lack of transparency about the conditions of use and rates.

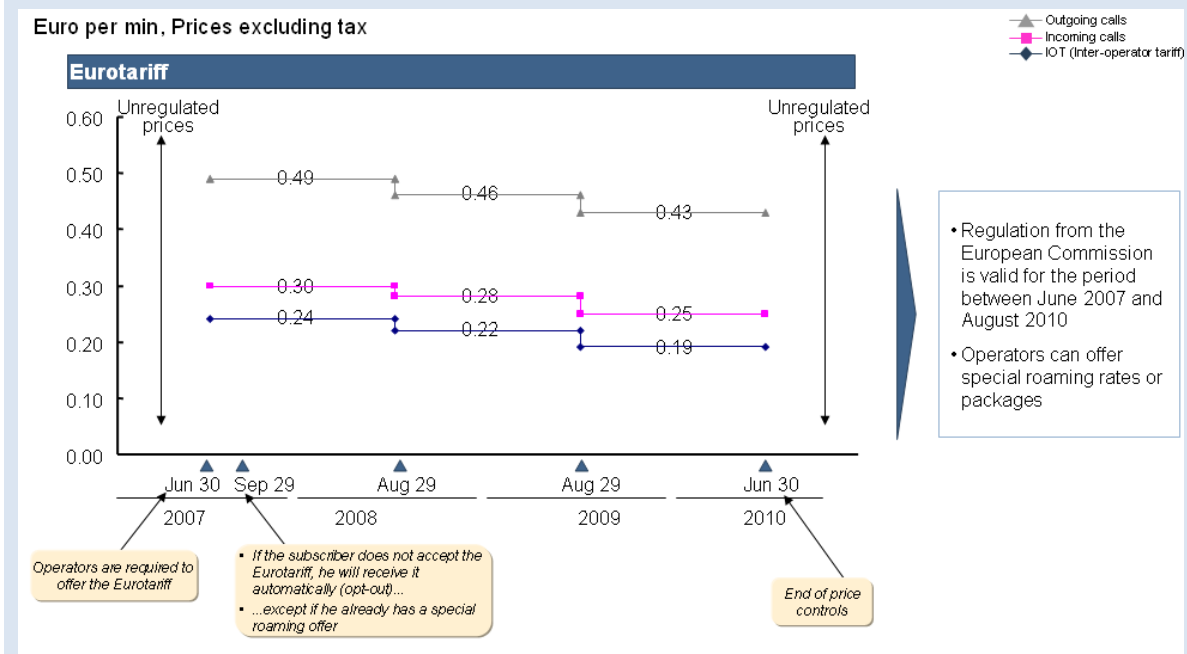
After a period of looking for solutions agreed upon by consensus, characterized by strained relations and disagreements among the Commission, mobile telecommunication operators and regulators, the Commission submitted to the European Parliament a unilateral proposal (leading to Regulation (EC) No 717/2007) for defining the *Eurotariff*, i.e. a maximum tariff structure applied to both wholesale and retail prices for calls made and received and for SMS messages. This proposal, exceptional in the sense that it included for the first time a direct regulation of retail prices in a service market, was finally adopted by the European Parliament, and became effective on June 30th, 2007 in the 27 EU member countries and in the 3 countries of the European Economic Area.

One of the most interesting aspects of this regulation is that it defines a progressive reduction of tariffs (see *Figure 14*), while it provides for different periods to review the effects of this regulation and the advisability of keeping it in force. Likewise, the regulation allows operators some freedom to offer alternative tariff schemes in other mobile service packages. Should the desired goals be attained, this regulation is likely not to be renewed once it expires in June 2012.

The impact that the Eurotariff has had on the European roaming market is still unclear. The results published by the European Regulators Group (ERG) point to an increase in the demand for roaming services, although lower than the one anticipated by the Commission. In addition, the change in the economic context has caused a decline in intra-European travels and movements, making it difficult to conduct an objective analysis as to whether this increase in the demand is due to the regulation introduced or to an upward market trend already in place at the time of the regulation.

According to the operators, the regulatory process sponsored by the European Commission was developed based on very optimistic estimates on the elasticity of market demand, for which reason, from the operators' viewpoint, the application of the Eurotariff may endanger the deployment of new mobile telephone services, such as roaming for data traffic via 3G networks, a service in growing demand that might require considerable investments from operators to increase the network capacity.

FIGURE 14
EVOLUTION OF MAXIMUM PRICES AS DEFINED BY THE EUROTARIFF



In 2009, the regulation establishing the Eurotariff was amended to include other measures, such as the improvement of communication channels between operators and users, the definition of maximum tariffs for data roaming^j and the establishment of mechanisms for service interruption to defend users from the so-called “bill shock,” i.e. receiving exorbitant bills for roaming service provision of which the user is not aware.^k

^h For further information, see http://ec.europa.eu/information_society/activities/roaming/index_en.htm

ⁱ Commissioner for Information Society and Media.

^j Set a maximum of EUR 1 per MB of data transmitted.

^k A ceiling of EUR 50 was set to discontinue the service. This limit may be increased upon the user’s request.

B. Conclusions: Initiatives Proposed in IIRSA’s Action Plan

The *Action Plan* developed under IIRSA’s facilitation includes 11 initiatives proposing concrete solutions to overcome the obstacles described in Section 2. These initiatives may be classified into three groups based on their characteristics: *technical aspects and fraud, rate setting and taxation, and regulation*. Since the nature and characteristics of each initiative is different as to their scope and the resources and time needed for their implementation, the Action Plan will be implemented in two stages (see *Figure 15*). Each initiative approved is presented below.

FIGURE 15
INITIATIVES OF THE ACTION PLAN FOR IIRSA'S SOUTH AMERICAN ROAMING AGREEMENT PROJECT

Stage	Initiatives
First Stage (2010)	<ol style="list-style-type: none"> 1. Information Standardization 2. Studies on Double Taxation 3. Regional Implementation of NRTRDE 4. Implementation of Global Roaming Quality (GRQ) 5. Creation of a Local Border Roaming Zone 6. Inadvertent Border Roaming
Second Stage (2011)	<ol style="list-style-type: none"> 1. Prepaid Roaming Platform 2. Calling Line Identification (CLI) Recognition 3. Development of an IMS Platform 4. Release of International Gateways 5. Bypass Fraud

The first stage of IIRSA's Action Plan provides for the improvement of information transparency to users. Thus, through the *Information Standardization* initiative, South American operators, with the support of GSMA, REGULATEL and CITEL, will define and adopt a standard format to communicate the rates applicable to each roaming case, creating a more competitive environment among operators by facilitating the comparison of the rates charged by different operators. With more transparency, users would have all the necessary information available to use roaming on a sounder and more reliable basis, which would increase market demand. This initiative provides for a definition of an information standard, its application by all South American operators, and communication to users of the improvements introduced.

The second objective of the first stage of IIRSA's Action Plan would be the search for solutions to solve double taxation at the regional level, by defining mechanisms to ensure that any reduction in the tax burden would directly reflect in the rates applied to users. For this purpose, REGULATEL, with the support of CITEL, will conduct a regional study to identify the modifications required at the regional level to eliminate double taxation and favor compliance with the Melbourne Agreement in the case of roaming services.

Regarding the fight against fraud, operators have defined as a priority for 2010 the implementation of NRTRDE (see *section III*) by all South American operators. This would significantly reduce the incidence of fraud by shortening the detection and response times in cases of fraud. This initiative, to be led by GSMA, has already been implemented by some operators and will be ready for its implementation at the regional level by the end of the year.

As regards quality of service, agreement was reached to implement during this first stage the *Global Roaming Quality (GRQ)* initiative, which establishes measuring methods and performance indicators common to all roaming stakeholders. Although GSMA has already defined some quality standards for all operators using GSM technology, the inclusion of the GRQ initiative in IIRSA's Action Plan would encourage an agreement between GSMA and REGULATEL, pursuant to which the use and monitoring of these quality indicators would be established for the entire region.

Box 7

LOCAL ROAMING BORDER ZONES AND INADVERTENT ROAMING ZONES

As explained before (see *section III*), in South America there are more than 16 million people living in border zones. This segment of the population makes up a group that, though small in number, has very specific needs, given the peculiarities in infrastructure availability that border regions usually present, since they are often better connected to their neighboring countries than to their own country, making it difficult for the State to take part and provide basic services, such as health, education and safety, among others.

To deal with this issue, the various institutions concerned with regional integration in South America are designing policies to promote development and integration in border zones by favoring a better operation of border crossings as well as the exchange of trade, services, culture and knowledge among people living on either side of the border, thus stimulating the economic and social development of these locations. In this context, roaming may be a facilitator of a process to promote border zone development.

Despite this potential, border zone residents receive roaming services at international call rates, forcing them to have several telephone lines or to pay excessive costs for the use of mobile telephones to keep their economic activities on the other side of the border. Sometimes, roaming even takes place accidentally due to the propagation of waves to the other side of the border when the user has not crossed the border (*inadvertent roaming*), making users disconnect their mobile phones to avoid unexpected expenses.

IIRSA's Action Plan included two initiatives to develop pilot alternatives to solve the problems associated with border roaming. The objective of these initiatives is to enable border zone residents to communicate on each side of the border at local call rates, thus fostering roaming service utilization in these areas and reducing the incidence of inadvertent roaming.

The proposal would be tested in a densely populated border zone yet to be defined, to be replicated later on in other similar zones. It includes the pilot project definition, the relevant studies, the implementation plan and its execution. Given its technical-regulatory nature, this initiative should be implemented jointly with CITEL, REGULATEL and the governmental agencies responsible for the telecommunication sector in the countries involved in the project. Furthermore, operators would participate with the support of GSMA.






The second stage of IIRSA's Action Plan, to be implemented as from 2011, also includes initiatives that jointly involve regulators, operators and regional agencies. With regard to its technical aspects, operators proposed developing additional services for users, such as the implementation of prepaid roaming platforms, thus enlarging the base of roamers, or the inclusion of calling line identification (CLI), thus substantially improving the users' experience by enabling them to select which roaming calls to accept and, hence, to control their expenses more efficiently.

With reference to the regulatory aspects of the second stage of Action Plan, different mid-term alternatives will be explored to facilitate roaming in the South American region, either by analyzing alternatives for the development of an IMS regional platform or by defining mechanisms to release international gateways (entrance and exit to/from the telephone communications network of each country) in order to reduce final prices for users and improve quality of service, as detailed in the proposals included in the IIRSA Study. Likewise, in the context of the project, joint actions will be studied in order to reduce bypass fraud cases (calls

between countries through unauthorized VoIP routes), either through the development of regulations applicable in South America or through the implementation of technical solutions to minimize the impact of this kind of fraud.

In the mid-term, the South American region must exert a closer regional coordination in the spectrum regulation field. The present context of frequency band allocation for mobile telecommunication services (see *Figure 16*) shows a fragmented picture, limiting the use of roaming in the region. In this regard, the ITU has recommended harmonizing mobile telecommunication services in the 700 MHz band, which is currently being released. This band, on account of its characteristics, is highly beneficial for rural areas, a factor that may improve connectivity at the regional level and boost border roaming. For this purpose, it might be necessary to revise the frequency bands presently allocated to each country and adjust regulatory frameworks.

FIGURE 16
FREQUENCY BANDS AND MOBILE TELECOMMUNICATION SERVICES IN SOUTH AMERICA

Country	800-850 MHz	900 MHz	850 -1500 MHz	1800 MHz	1900 MHz	2100 MHz
	AMPS/TDMA - GSM -UMTS	GSM	iDEN	GSM – Possible UMTS	CDMA – GSM - UMTX	UMTS
 Argentina	√		√		√	
 Bolivia	√					
 Brazil	√	√	√	√	√	√
 Chile	√		√		√	
 Colombia	√				√	
 Ecuador	√				√	
 Guyana	√	√				
 Paraguay	√				√	
 Peru	√		√		√	
 Suriname	√	√				
 Uruguay	√	√		√	√	√
 Venezuela	√	√			√	

The first months of 2010 will be key to start implementing these activities, especially to allocate resources for the activities planned, define the role of each stakeholder involved, and record the experiences gathered. According to the results obtained, the second stage of IIRSA's Action Plan might need to be adjusted at the end of 2010 to allow the continuity of the initiatives not completed in the first stage, modify the scope of the initiatives already designed, and include new initiatives identified by participants in IIRSA's project.

By way of a conclusion, it should be pointed out that any improvement in the South American roaming market will depend not only on the implementation of IIRSA's Action Plan but, above all, on the continuity of the cooperation and capacity for dialogue of all stakeholders within the mobile telecommunications sector. The strengthening of the South American integration process via the communication network deserves to maintain the effort as well as the strong technical, political and institutional commitment expressed so far.

ANNEXES

Acroyms

<i>Acrónimo</i>	<i>Correspondences</i>
ABR	Brazilian Roaming Association
AIC	Implementation Agenda based on Consensus
ARPU	Average revenue per user
IDB	Inter-American Development Bank
CAF	Andean Development Corporation
CAMEL	Customized Application of Mobile network Enhanced Logic
CAN	Andean Community of Nations
CCP.I	CITEL's Permanent Consultative Committee I (Telecommunications)
CCT	IIRSA's Technical Coordination Committee
CDE	IIRSA's Executive Steering Committee
CDR	Call detail records
CITEL	Inter-American Telecommunication Commission
CLI	Calling Line Identification
EID	IIRSA's Integration and Development Hubs
ERG	European Regulators Group
FONPLATA	Financial Fund for the Development of the River Plate Basin
GRQ	Global Roaming Quality
GSM	Global System for Mobile Communications
GSMA	GSM Association
GTE	IIRSA's Executive Technical Group
IIRSA	Initiative for the Integration of Regional Infrastructure in South America
IMS	IP Multimedia System
IOT	Inter-operator tariff (<i>wholesale rates among operators</i>)
MERCOSUR	Southern Common Market
NRTRDE	Near-Real-Time Roaming Data Exchange
GDP	Gross Domestic Product
REGULATEL	Latin American Forum of Telecommunications Regulators
SMS	Short Message Service
EU	European Union
UIT	International Telecommunication Union
USD	United States Dollars
VoIP	Voice over IP

Table of Figures

<i>Figures (Page.)</i>	<i>Información</i>	<i>Correspondence in the Study</i>
Fig. 1 (p.3)	Evolution of the Mobile Penetration Rate in South America	Inf. 1, Page 42
Fig. 2 (p.4)	South American Mobile Subscriptions per Service Type	Inf. 1, Page 45
Fig. 3 (p. 6)	IIRSA's Integration and Development Hubs (EIDs)	N/A
Fig. 4 (p. 9)	Distribution of Border Zone Population in South America	Inf. 1, Page 36
Fig. 5 (p. 10)	Main Flows of Intra-regional Travelers	Inf. 1, Page 33
Fig. 6 (p. 11)	Evolution of ARPU at the Regional Level	Inf. 1, Page 46
Fig. 7 (p. 13)	Retail Rates for Incoming and Outgoing Calls and SMS Messages	Inf. 1, Page 76 and 77
Fig. 8 (p. 15)	Inter-operator Tariffs (IOTs)	Inf. 1, Page 69
Fig. 9 (p. 16)	Impact of Double Taxation in South America	Inf. 1, Page 88
Fig. 10 (p. 16)	Lack of Information regarding Roaming Services	Inf. 1, Page 79
Fig. 11 (p. 17)	Availability of Prepaid Roaming in South America	Inf. 1, Page 81
Fig. 12 (p. 19)	Basic Billing Scheme of Voice Roaming Services (IOT)	N/A
Fig. 13 (p. 21)	Major Milestones in IIRSA's South American Roaming Agreement Project	N/A
Fig. 14 (p. 23)	Evolution of Maximum Prices As Defined By The Eurotariff	Inf. 2, Page 43
Fig. 15 (p. 24)	Initiatives of the Action Plan for IIRSA's South American Roaming AGREEMENT Project	N/A
Fig. 16 (p. 26)	Frequency Bands and Mobile Telecommunication Services in South America	N/A