I.I.R.S.A

BID

Regional Study of the South American Roaming Services Market

Stage I: Diagnosis and Analysis of the Roaming Market in South America

Final Report

Buenos Aires, April 2009

www.iirsa.org/roaming.asp

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Index – Table of contents

Index – Table of contents (cont.)

Introduction

- The **initiative** for the **Integration of the South American Regional Infrastructure (IIRSA)** was **created** in **September 2000** during a meeting of Presidents from the 12 official South American countries (Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Suriname, Uruguay and Venezuela)

- With an initial mandate of ten years (2000-2010), the main premise of the initiative is the **integration of the physical infrastructure** in **South America** to promote **economic growth** throughout the region

- In **November 2004**, the **Implementation Agenda based on Consensus** (AIC) was defined by the IIRSA Executive Committee (CDE), which included **31 priority projects** to be implemented before 2010, among them the **"South American Roaming Agreement"** project, based on the successful experience of the **Brazilian Roaming Association** (ABR)

- The **objectives** of the **IIRSA project** for the **"South American Roaming Agreement"** are**:**
    - Promote the **creation of competitive roaming markets** in the South American region, and identify **opportunities and challenges** to improving costs, quality and coverage
    - Take the first steps towards **regional coordination for its implementation by the regulators** from participating countries, defining a **viable action-plan** and discussing it with interested stakeholders

- In **March 2008**, the **IIRSA-CITEL workshop** on "International Roaming Services for Mobile Telecommunications" was conducted with participation by the representatives from the regulators, operators and telecommunications associations of 18 countries

- For these reasons, IMOBIX / Value Partners were commissioned to conduct a **study on the international roaming services market in South America**, with the objective of:
    - Producing an **in-depth market analysis** report
    - **Comparing** this scenario to the developed **best practices in other regions** of the world
    - Assisting with **decision-making** to contribute to the implementation of the **IIRSA project**

Introduction (cont.)

- Stage I of this report consists of an **investigation of the current roaming market in South America**, analyzing the socioeconomic context, the supply and demand of roaming services, the mobile operators in the region, and roaming agreements, in order to **estimate the potential market**; results from a recent **opinion survey of the relevant stakeholders** (regulators, operators, consumer protection agencies) was also conducted to discuss opportunities and challenges for regional roaming initiatives

The study is divided into four sections:

- **South American socioeconomic context**
  - The main macroeconomic, social and demographic variables will be analyzed, as well as travel (business, vacation, cross-border), to better understand the social and economic reality of the potential roaming service users: people from different levels of purchasing power that travel (for vacation or business) or inhabit border zones
- **South American mobile telecommunications market**
  - The current state of the South American mobile market will be studied by analyzing the critical variables from an economic perspective, for instance the number of subscribers, and levels of service, ARPU, and technologies; and also from a regulatory perspective, with the objective of understanding how it has evolved and predicting how the market will develop in the coming years
- **South American roaming market**
  - The current roaming services market in the region will be determined by analyzing the general characteristics, the technical, tax, and economic aspects, while at the same time keeping in mind the industry initiatives, in order to comprehend the future perspectives of the market and its potential for growth
- **Analysis of feedback from the relevant stakeholders**
  - The opinions, perspectives and recommendations of the different stakeholders that make up the South American roaming market, such as the operators, regulatory organizations and consumer protection agencies, will be studied to identify opportunities and challenges from the internal viewpoint of the market

Executive summary

South American socioeconomic context

In economic terms, South America has made many positive developments over the past five years: GDP and private consumption have grown at a rate of more than 4% annually, incomes by inhabitants were stably maintained, unemployment rates have improved, and regional currencies have appreciated by almost 8% annually. It is particularly notable that, in recent years, the South American countries have managed to control and reduce inflation, which currently at 6% annually is an important advancement considering that inflation was once one of the region's greatest structural problems.

South America is a heterogeneous region, with large differences in the socioeconomic context of its members. In particular, as a group the four main countries in the region (Brazil, Argentina, Colombia and Venezuela) make up 79% of the population and 84% of the total GDP of the region. Large disparities in terms of poverty level, wealth distribution and the degree of urbanization also exist, making them prominent issues that must be considered when looking at the development of roaming initiatives.

To measure the potential of roaming services in the region, the behavior of South American international travelers and the population characteristics of the most relevant border zones were analyzed.

In terms of the volume of international travel, South America is still underdeveloped in comparison to other regions, since intra-regional trips are made by only 6% of the population, vs. 42% in Europe, 14% in North America and 14% worldwide. Nevertheless, there is evidence of a strong proportion of intra-regional trips to overall number of trips taken in South America, where more than half of the trips in the region (~10 million annually) are made by South Americans. The most important flows of intra-regional travel occur within Argentina, Chile, Uruguay and Brazil, routes that concentrate 54% of total traffic.

In South America there are ~16 million people living in border zones, representing a relatively low percentage of the population (around 4% of the total). Nevertheless, the population in these areas is concentrated in a small number of cities, generally dedicated to trade, generating opportunities for the development of roaming border roaming in the most prominent border zones.

Executive summary (cont.)

South American mobile telecommunications market

The South American mobile market has experienced major growth in recent years, reaching a penetration rate of 71% in 2007. The majority of this growth has come from prepaid services, which currently represent 82% of total lines. With respect to technological standards, GSM continues to be the leading technology in the region, used by 82% of total handsets in 2007.

In regards to service revenue, the ARPU (average revenue per user) in South America is relatively low, at approximately USD 14 monthly, which is significantly lower than in Europe (USD 27), although it is in line with the ARPU in Africa (USD 13) and the Asia-Pacific region (USD 15). In recent years, the ARPU, measured in USD, has been relatively stable in the region (though slightly lower in terms of local currency), which, in addition to strong growth in the subscriber base, has helped to maintain sustained growth in total revenue. Consequently, in 2007 revenue for mobile services reached USD 41.4 billion. Regarding the operators, the mobile market in the region is highly concentrated by three large business groups that make up 77% of total subscribers and 70% of the total revenue: Telefónica (Spain), América Móvil (Mexico), and Telecom Italia, highlighting the importance of including the support of at least one of these groups to be able to carry out roaming initiatives on a large scale.

There have been important advances in relation to telecommunications regulation. This has been due to the definition of consolidated legal frameworks and the creation of established regulatory organizations. The region is still in an early stage, however, when in regards to international roaming regulation.

In other regions the majority of advances in roaming regulations are on the supranational level, given that the service is international in nature (local users only utilize it when they are outside their country of origin), permitting the coordination of distinct national regulators. Within South America, the regulatory coordination of telecommunications is carried out by two regulatory agencies, Regulatel and CITEL, and regional economic integration initiatives by MERCOSUR, CAN, and IIRSA.

Executive summary (cont.)

Though these organizations were able to generate some initiatives on roaming, they were never able to completely reach the desired objectives. For example, in MERCOSUR a resolution was passed for international roaming, aiming to achieve better transparency regarding the information provided to users, as well as to increase the technical coordination of the operators. However, in practice this resolution did not apply in full form to the coordination of frequencies in border zones and the arbitration of inter-operator tariffs. During this study, it was concluded that differential rates for roaming do not exist within regional integration groups (eg. MERCOSUR, CAN), given that the prices are set according to flow of transmitted data, associated costs and other dynamics related to the demand for roaming.

Regardless of these considerations, it is expected that roaming regulation initiatives will be supported by the previously mentioned regional agencies.

In summary, the South American mobile market presents potential for the development of international roaming services, given the mobile service penetration of more than 70% of the population and the consolidation of the GSM technological standard, which facilitates the inter-operation of the networks in the region. It should be taken into account, however, that South American users have lower levels of consumption and ARPU and that the market has a high proportion of prepaid subscriptions. For this reason, which will be further discussed in the next section, the South American roaming market has developed primarily among business travelers. In this context it is not surprising that the focus of national regulators is geared towards other issues with greater general impact on mobile users, such as the universalization of services or number portability.

Executive summary (cont.)

South American roaming market

The South American roaming market, USD ~343 million, represents less than 1% of the total operator revenue in the region. Business travelers are the main roaming users, representing 80-90% of the total, with an ARPU of 154 USD/trip. Leisure travelers represent the remaining 10-20%, with a significantly lower ARPU, approximately 61 USD/trip. Currently roaming services in South America are centered on voice and messaging for postpaid services, with little or nonexistent penetration in prepaid service. There are also opportunities to improve the service via additional features for the user, such as welcome messages, customer service special access code, voice mail, and caller ID.

It is estimated that, for the next few years, South America's intra-regional roaming service will become increasingly more relevant for operators in the region. Intra-regional roaming trips (South Americans traveling within South America) are expected to reach 6.6 million annually by 2012, which will prompt a greater utilization of roaming services, as much for the corporate segment as for individuals on vacation. The main driving force of this growth will come from individuals in the currently almost non-existent prepaid roaming segment, as they will represent 18% of the total South American intra-regional trips made that same year. Revenue from this segment is expected to reach USD ~1 billion in 2012, equivalent to 1.6% of total mobile revenue, which almost doubles the levels expected for 2008 (0.9%).

Retail roaming rates in South America are high and also present significant price variations for the same concept (eg. for outgoing voice). These prices can vary as much as 75% within the same country. Local outgoing calls are usually cheaper (1.66 USD/min including taxes), while calls to the country of origin are the most expensive (3.23 USD/min including taxes)*. Text messaging (SMS) in roaming represents a cheaper alternative to voice calls, given that incoming messages are free in general, and outgoing messages cost on average 0.56 USD/message. Data services are still in the developmental phase, and in 3 of the 12 participating South American countries, these services still do not exist. In the other 9 countries there is high variation in data roaming rates, averaging ~18 USD/Megabyte (MB).

* Excluding outgoing calls to third-party countries which are not very frequent

Executive summary (cont.)

One of the most important components of retail rates are the Inter-operator Tariffs (IOT), that in general are applied to outgoing calls and messages but not to incoming calls and messages. These IOTs are defined in private roaming agreements between operators, and according to industry standards they should be impartial regarding the operator that is using wholesale roaming services. In practice, however, there are discounts for large volumes or for member operators of roaming alliances, of which are estimated to enjoy discounts of 30 – 35% off regular IOTs.

These reductions in IOTs are strong incentives for the creation of regional alliances among national operators, but there are other incentives to motivate operators, such as the marketing leverage of a common brand, the possibility to redirect visitor roaming traffic onto their networks (steering techniques), and the potential to achieve a higher quality of service.

Presently in South America there are three alliances: two by large business groups (Telefónica (Spain), America Móvil (Mexico)) 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%, though the communication of these discounts is not very clear and is not applied in a uniform manner.

Finally, another very important component of retail roaming rates is the tax burden, which for the effect of the dual application of the VAT and other similar indirect taxes, generates a surcharge of between 35 and 60% above the rate without 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). Double taxation affects most roaming services in South America, and the dual application of the VAT (the most relevant indirect tax) is applied to 72% of the possible combinations of roaming scenarios among the countries in the region.

Executive summary (cont.)

Due to the high cost of roaming, South American travelers utilize more economical services, such as long distance calling cards, local prepaid services available in the visited country and voice over IP (VoIP). Considering the total fixed costs for the utilization of long distance calls and prepaid services (e.g. purchase of calling card at fixed price or purchase of a local prepaid mobile phone chip), these alternatives to roaming still generate savings for the user after the first 6 minutes of a local call or after the first 3 minutes of a call to the home country. In the case of VoIP (e.g. Skype) the costs are always cheaper than the roaming rate, though this calling experience is distinct for the user. In spite of the economic benefits, these alternative services present various obstacles for the user, such as the need for a fixed line phone to use prepaid calling cards, a computer/PDA with internet access to make VoIP calls, or the need to purchase credits (for prepaid services or calling cards). As a consequence of these limitations, roaming continues to be attractive to users despite its high prices, although at a limited frequency of use.

In terms of initiatives, the operators are reinforcing transparency in rates and services offered through better communication via their web sites and contact centers as well as the standardization of rates for different roaming destinations. Clients, however, still do not have a good understanding of the rates and the general dynamics of roaming services. There is still room for improvement through educating clients about prices and service quality.

Operators in the region are working to improve the availability of prepaid roaming, prioritizing heavy travel zones. The development of prepaid roaming coverage throughout all zones is advancing slowly, due to the complexity of implementing the system adopted in the region (the most popular system used globally), where service should be implemented on a one-on-one basis among the operators that have roaming agreements.

Operators are also developing distinct initiatives in matters regarding fraud, coordinated by industry groups such as the GSMA. Roaming fraud causes significant losses for various operators, and can decrease roaming revenue by 3-5%. The risk of fraud arises, in large part, from the delay in the exchange of information between operators regarding roaming consumption for specific lines. For that reason, the GSMA developed the Near Real Time Roaming Data Exchange (NRTRDE) initiative, in order to reduce the time for information exchange between operators. In the implementation of this initiative, South America is relatively advanced, where more than 80% of operators have already implemented NRTRDE or have plans to do so by October 1, 2008.

Executive summary (cont.)

Perspective of relevant stakeholders

During this study, key figures within the South American roaming market were interviewed (operators, regulators, consumer protection agencies), with face-to-face interviews in four countries and supplementary opinion survey questionnaires to the remaining stakeholders. In general they are optimistic about the development of roaming, proposing an increase in the relative importance of the total revenue for this service (from 1-5% in 2008 to 5-12% in 2011). In terms of opportunity, the relevant stakeholders agree on some key points to promote roaming in the region:

- Leverage the universalization of the service to increase the number of potential roamers (price is indicated as the main barrier to roaming usage)
- Improve education and communication to the consumers
- Leverage GSM technology for improved inter-operability between countries
- Advance the anti-fraud initiatives in the industry

At the same time they indicated that the main challenges for the development of the services are:

- Creating an attractive business case for investment in the improvement of prepaid roaming service availability
- Criminalizing acts of fraud at a governmental level
- Creating a differentiated plan for roaming services in the border zones
- Lowering the levels of double taxation in order to achieve better rates for users

Figure 1 - IIRSA initiative and implementation project for the “South American Roaming Agreement”

The implementation project for the South American Roaming Agreement was generated by an IIRSA initiative

IIRSA Initiative (Integration of Regional Infrastructure in South America)

- **September 2000: Creation of the IIRSA initiative** During this meeting of the 12 South American Presidents:
  - Its main premise was the **integration of the physical infrastructure** in South America, which is viewed as critical in the promotion of economic growth in the region
  - 10 year initial mandate (2000-2010)
- **November 2004: Definition of the Implementation Agenda based on Consensus** (AIC) by the Executive Committee of the IIRSA (CDE) with:
  - **31 priority projects** to be implemented by 2010…
  - … **among them** the implementation project for the **South American Roaming Agreement**

Implementation project for the “South American Roaming Agreement”

- **Included in the AIC based on the successful experience of the Brazilian Roaming Association** (ABR)
- **Motivations** of the project:
  - **Creation of competitive roaming markets** in the South American region to improve:
    - Costs
    - Quality
    - Coverage
  - **Necessity of regional coordination between regulators** of the countries involved in its implementation
- **BID proposes the Regional Technical Cooperation (CTR) RG-1302** within the Technical Coordination Committee of the IIRSA (CCT)
- **March 2008: IIRSA-CITELworkshop** regarding “International roaming services for mobile telecommunication”

Figure 2 – IIRSA-CITEL workshop

The IIRSA-CITEL workshop on March 2008 defined the main aspects for a South American roaming agreement

IIRSA-CITEL Workshop
(March 2008)

- Participation of regulators, operators and telecommunications associations from 18 countries
- Open panel discussion to brainstorm new initiatives

Need to confirm during the project the proposals that were made in the workshop

Most important aspects highlighted by participants**

Economic

- **Demand: lack of knowledge** by the operators of the **potential roaming market** and its drivers:
  - Elasticity of demand and opportunities for price reductions
  - Impact of travel
  - **Behavior and perception of the "roamer"**
- **Offer: maintaining prices despite the cost reductions** due to:
  - Tariff reductions for international long-distance
  - Concentration of operators at the regional level, with respective reduction of IOTs*
  - Use of technological alternatives (ex. VoIP, callback)

Taxes

- **High tax burden** on roaming services, comprises a **high proportion of the costs** to provide the service
- **Difficulty** in South America **of applying**:
  - **Agreements to avoid double taxation**
  - The tax clause from the Melbourne agreement, which discusses regulation of international telecommunications

Legal/ Regulatory

- **Lack of effective legislation** against **fraud** in these countries
- **Regulator coordination required for:**
  - Implementing common roaming regulation
  - **Leveraging integration and free trade initiatives**

Technical

- **Gap in capacities for the technical development of anti-fraud measures:**
  - Technical and organizational training of operators
  - Coordination among operators (e.g. alarms, blacklists, registration of stolen equipment, field research programs)
  - Elaboration of fraud prevention processes with support from CITEL and the GSMA
- **Need for greater interoperability and quality, which requires strengthening the coordination and cooperation on interconnection guidelines** among the operators

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* Inter-operator Tariff

Figure 3 – Methodological focus of the project

Methodological focus of the project

Framework stage	**Stage I: Diagnosis and initial analysis**	**Stage II: Analysis of International Experience**	**Stage III: Initiatives for South America and plan of action**
Activities	• **Investigation of the roaming market,** analyzing: - Socioeconomic context - Supply and demand - Regional mobile operators - Roaming agreements - Estimation of potential market • **Opinion survey** of relevant stakeholders (regulators, operators, …)	• **Survey of** initiatives and experiences at the **international** level including: - Socioeconomic context - Mobile market environment - Factors of successful and failed roaming initiatives • Analysis of the importance and **viability of the implementation** of these initiatives in the South American market	• Selection and prioritization of **improvement initiatives** to be implemented • Identifying **incentive mechanisms and required resources** for implementation • Design of a **communication strategy** by the various interested parties

Document contents

Document contents

South American socioeconomic context: Introduction

This section will study the South American **socioeconomic context to better understand the social and economic reality** of the **potential roaming service users** (people of different purchasing power levels that travel, for business or leisure, or live in border zones)

South American socioeconomic context: Executive summary

Economic

- South America presents a **very positive macroeconomic context:**
  - The region has been **growing significantly,** at a **rate of 4.2% from 2002-07**
  - Most of the countries have **maintained stable per capita income, with an average growth in private consumption of ~4.5%**
  - **Local currencies have appreciated 7.7% against the dollar, and unemployment has fallen**
  - **Inflation in the region has dropped significantly** in recent years

Social

- Nevertheless, **high social contrasts** in the region exist:
  - **Four countries** (Brazil, Argentina, Colombia and Venezuela) out **of twelve in the region,** comprise **79% of the population** and **84% of the GDP**
  - There is a **great disparity** in **poverty levels,** from 18% in Chile to up to 70% in Suriname
  - The population **distribution by social class also varies significantly** on an intra-regional level
  - The urban population represents 82% of the total, but there also exist predominantly rural countries, such as Guyana (38% urbanized)

Demographic and travel

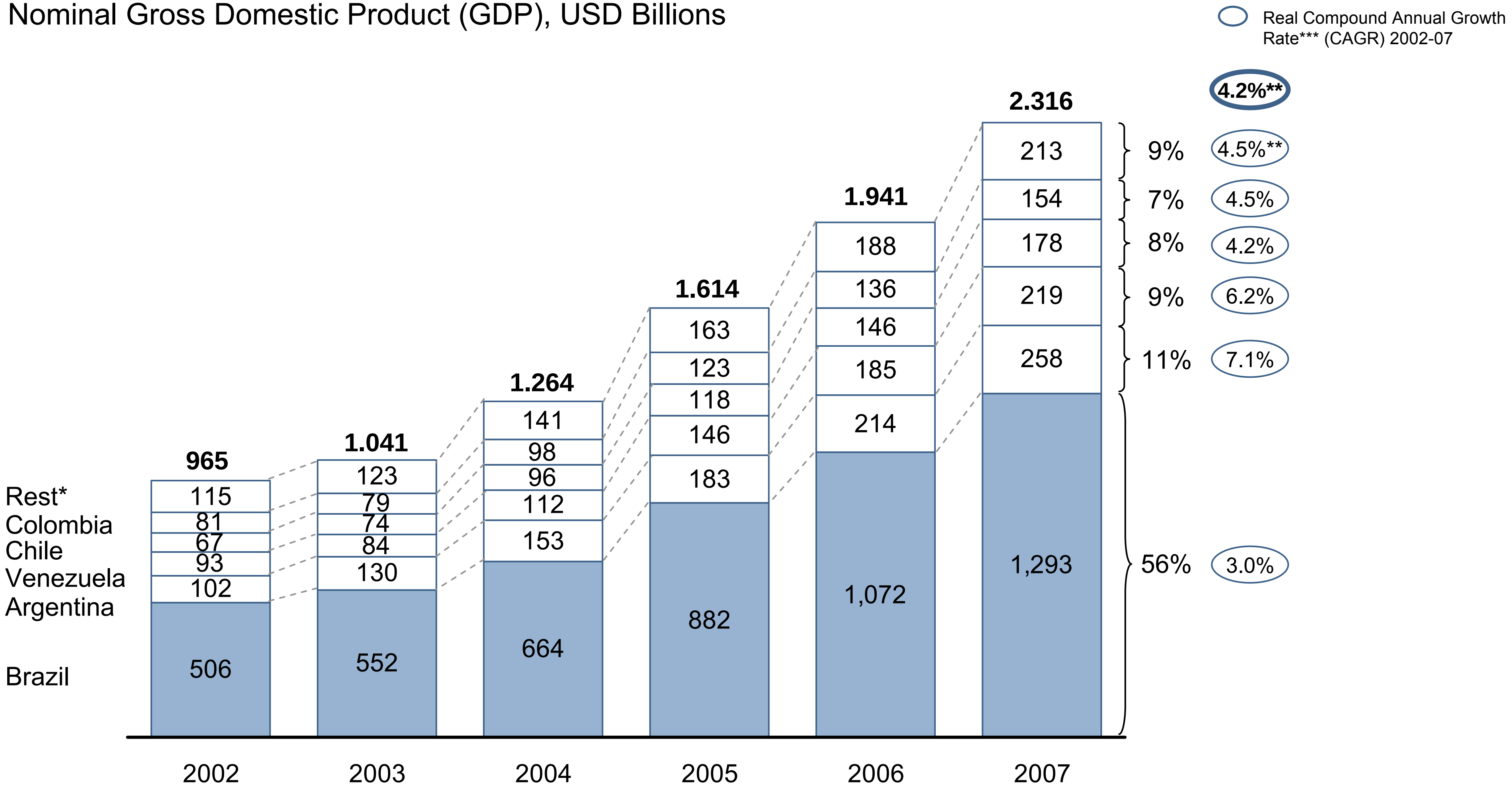
- **Travel in the region is** relatively **underdeveloped:**
  - On a global scale, South America is a region with relatively low levels of travel, both intra-regionally and internationally
  - **The population pyramid of South America is dominated by young individuals,** due to the large proportion of the population under 30
- **Intra-regional travel is relatively high**:
  - **More than half of all travel in South America is intra-regional**, reaching ~10,1 million travelers in 2006
  - **The most important flows of intra-regional travel occur within Argentina, Chile, Uruguay and Brazil**, routes that concentrate **~54% of total traffic**
- In South America there are **~16 million people living in border zones** (~4% of the total population), with **the more densely populated cities of these zones** predominantly dedicated to **trade**

Document contents

Figure 4 – Nominal GDP evolution, in South America

The region has been growing significantly, evidenced by a growth rate of 4.2%, from 2002-07

2007, Nominal Gross Domestic Product (GDP), USD Billions



* Suriname, Paraguay, Ecuador, Peru, Bolivia, Guyana, Uruguay

** Weighted average based on 2007 USD Purchasing Power Parity (PPP)

*** GDP at constant prices

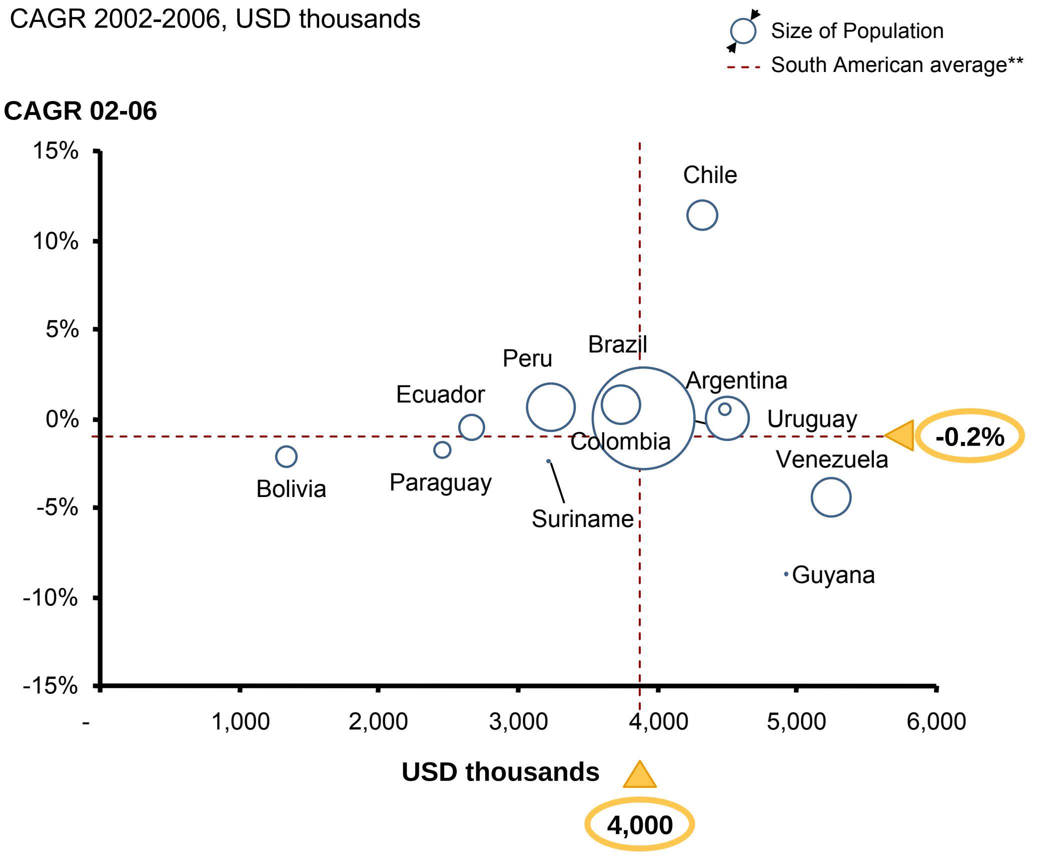
Source: IMF, World Economic Outlook Database, October 2007; Work team analysis

Figure 5 - Analysis of per capita disposable income and private consumption, adjusted for PPP, by country

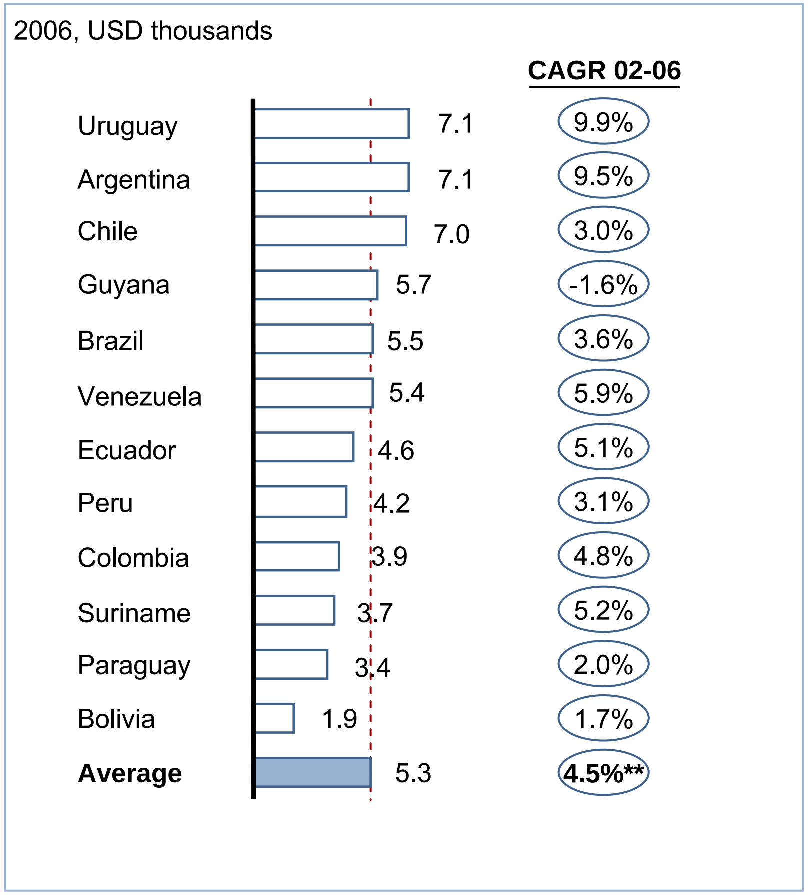
Most of the countries have maintained stable per capita income, with an average growth in private consumption of ~4.5%

2006

Per capita disposable income, adjusted for PPP*



Per capita private consumption, adjusted for PPP*



* Purchasing Power Parity

** Weighted average according to population of each country

Source: ECLAC, INDEC, CIA, Work team analysis

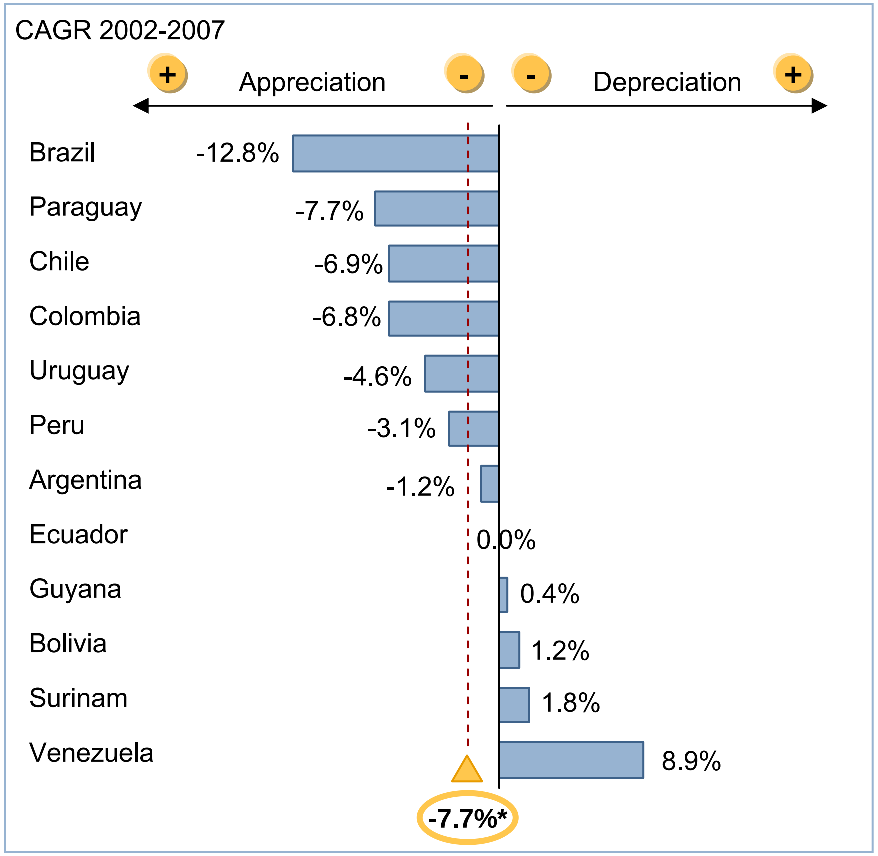
Figure 6 - Exchange rate evolution and unemployment rate, by country

Local currencies have appreciated at a rate of 7.7 % against the dollar, and unemployment has dropped

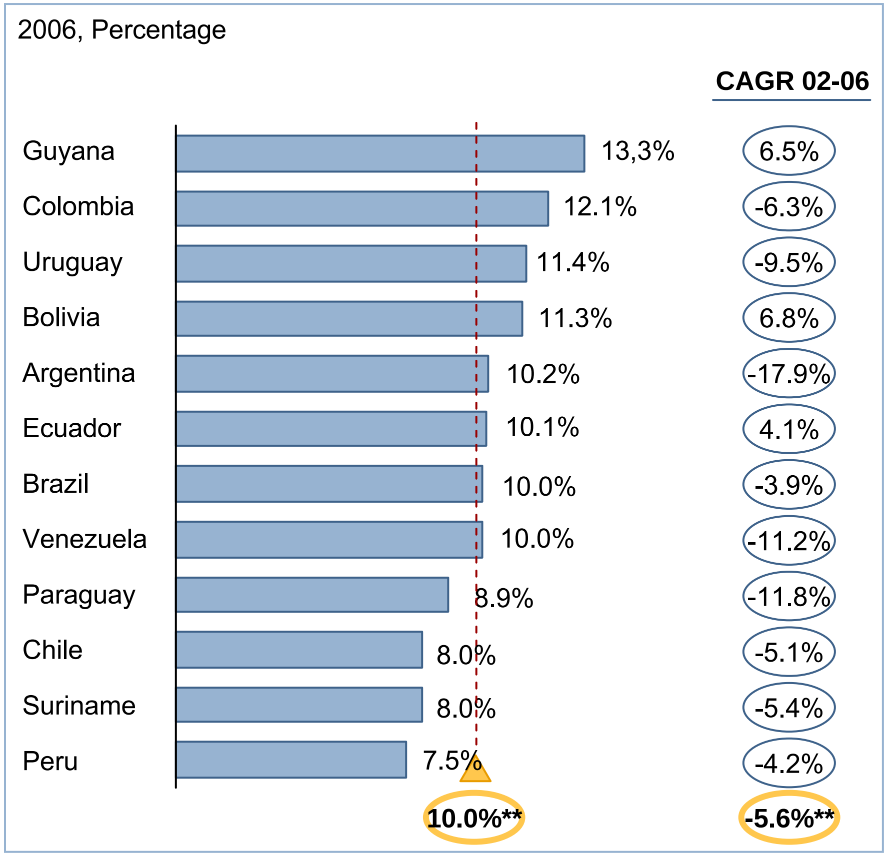
2007

Average

Exchange rate



Unemployment rate



* Weighted average according to population of each country

** Weighted average according to the economically active population of each country

Source: CEDLA, ECLAC, INDEC, CIA, Work team analysis

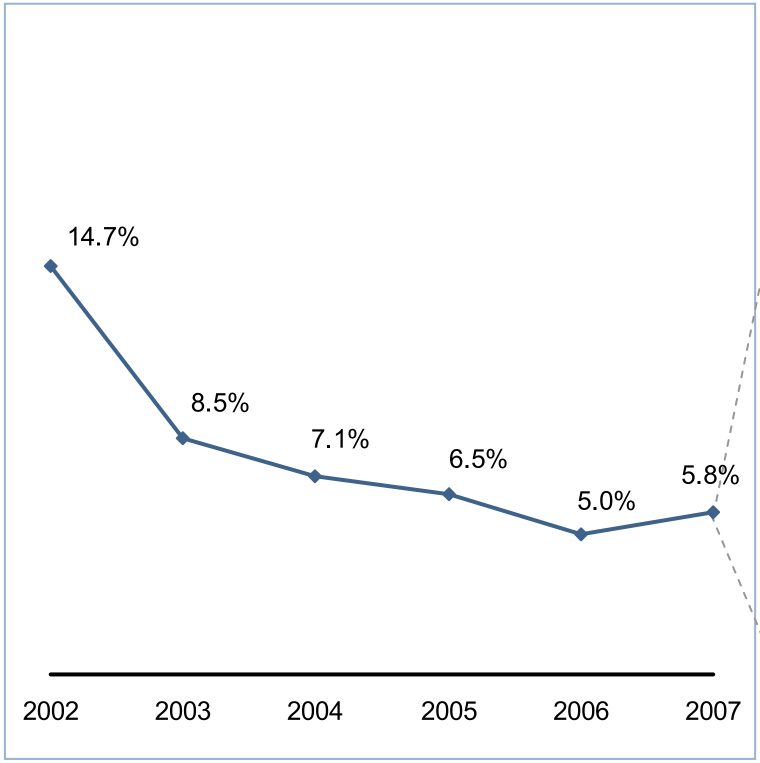
Figure 7 – Evaluation of the average regional inflation rate in 2007, broken down by country

Inflation throughout the region has been significantly reduced in recent years

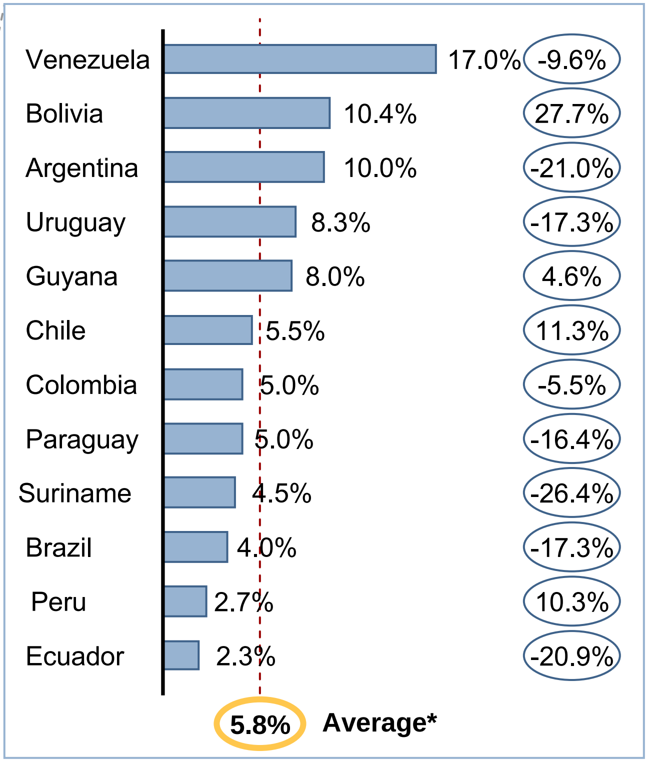
2007, Consumer price inflation, Annual percentage change, End of period

○ CAGR 02-07

Evolution of regional average inflation rate



Inflation rate by country



- **Inflationary pressures** at the regional level have **decreased** in recent years, resulting in a regional average inflation rate of 5.8% in 2007
- However, there is **a high disparity in inflation rates among the countries…**
- …with **Argentina**, **Bolivia** and **Venezuela** experiencing **double-digit inflation** in 2007

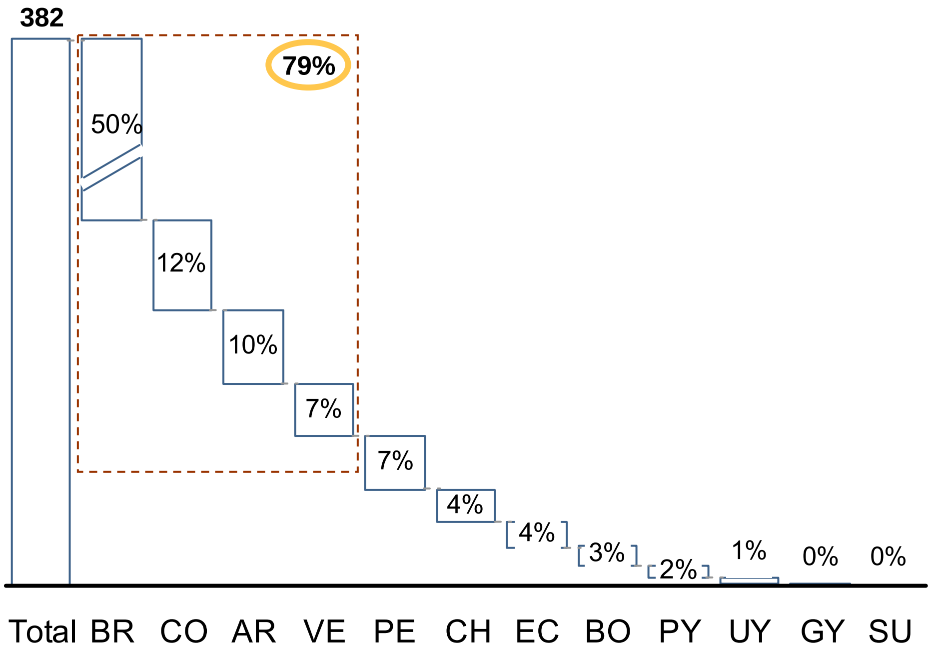
* Weighted average according to population of each country
Source: IMF, World Economic Outlook Database, October 2007

Figure 8 – Analysis of population and nominal GDP, by country

Four countries (Brazil, Argentina, Colombia and Venezuela) out of the twelve in the region, comprise 79% of the population and 84% of the GDP

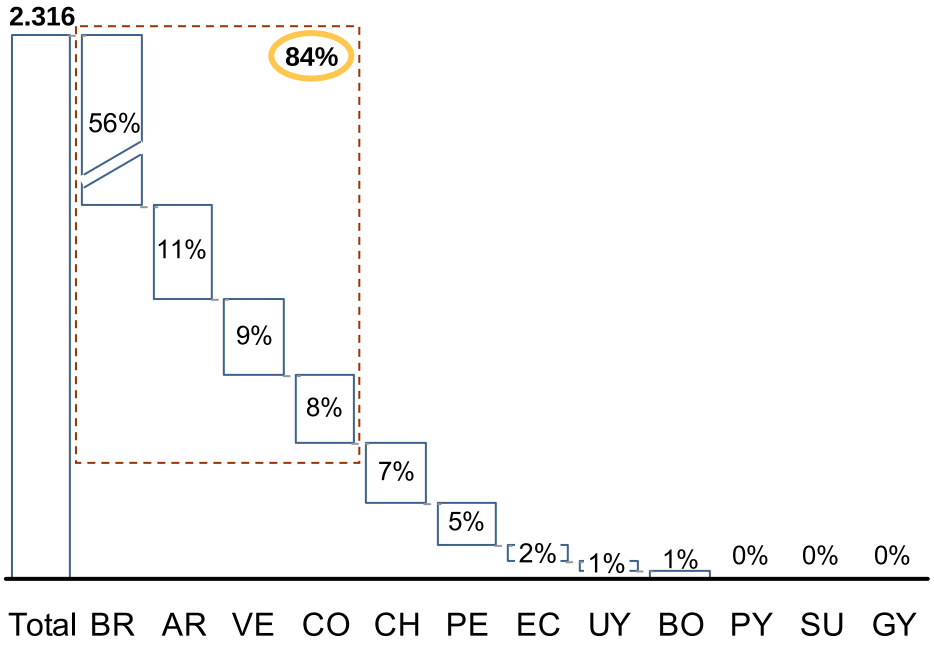
Population

2007, Millions of persons



Nominal GDP

2007, USD billions

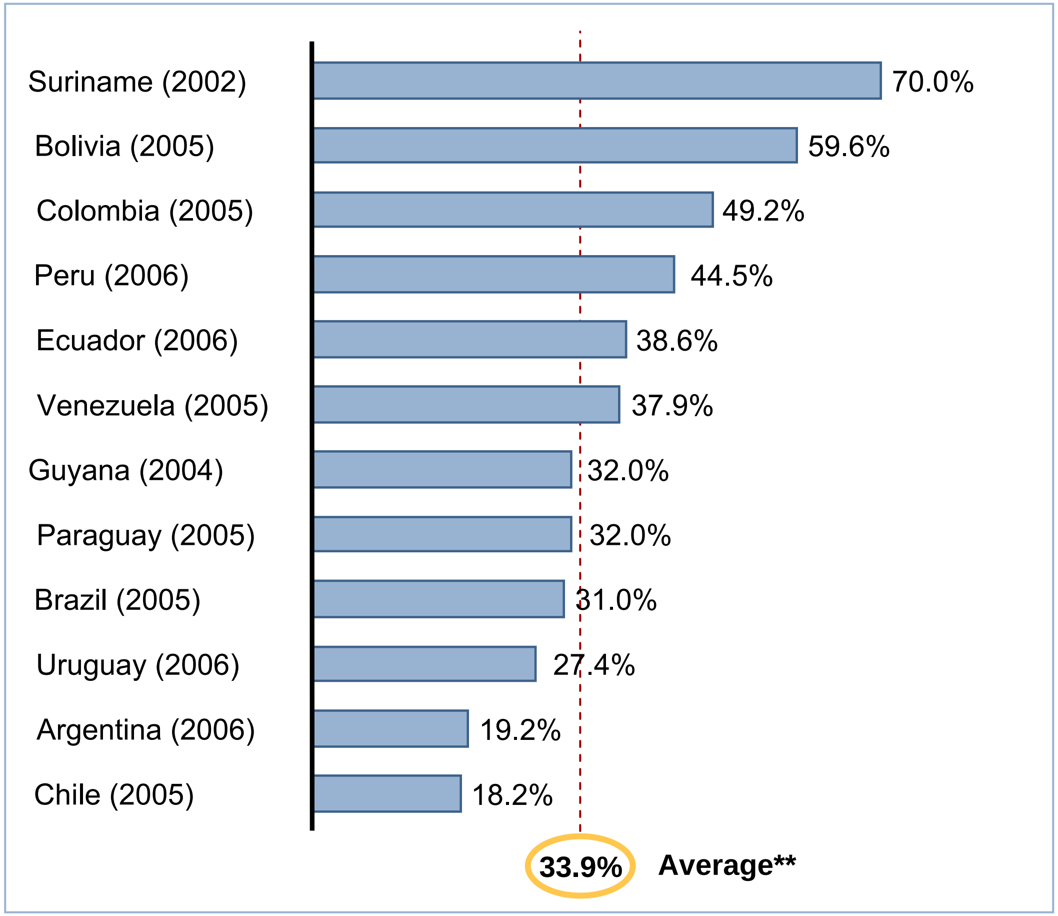


Source: IMF, World Economic Outlook Database, October 2007

Figure 9 – Poverty index, by country

There is a great disparity in poverty levels among the countries, from 18% in Chile to up to 70% in Suriname…

Poverty index* in South America



- The average **poverty rate** in the region is **33.9%...**
- … where **Chile and Argentina** have **the least percentage** of the population **living below the poverty line**…
- …**and Bolivia, Colombia and Suriname** have **more than 50%** of their population living in poverty

* Critical threshold, in terms of income, consumption, and access to goods and services, below which individuals are classified as poor

** Weighted average of population

Source: CIA – World Factbook; National Bureaus of Statistics, IMF, Work team analysis

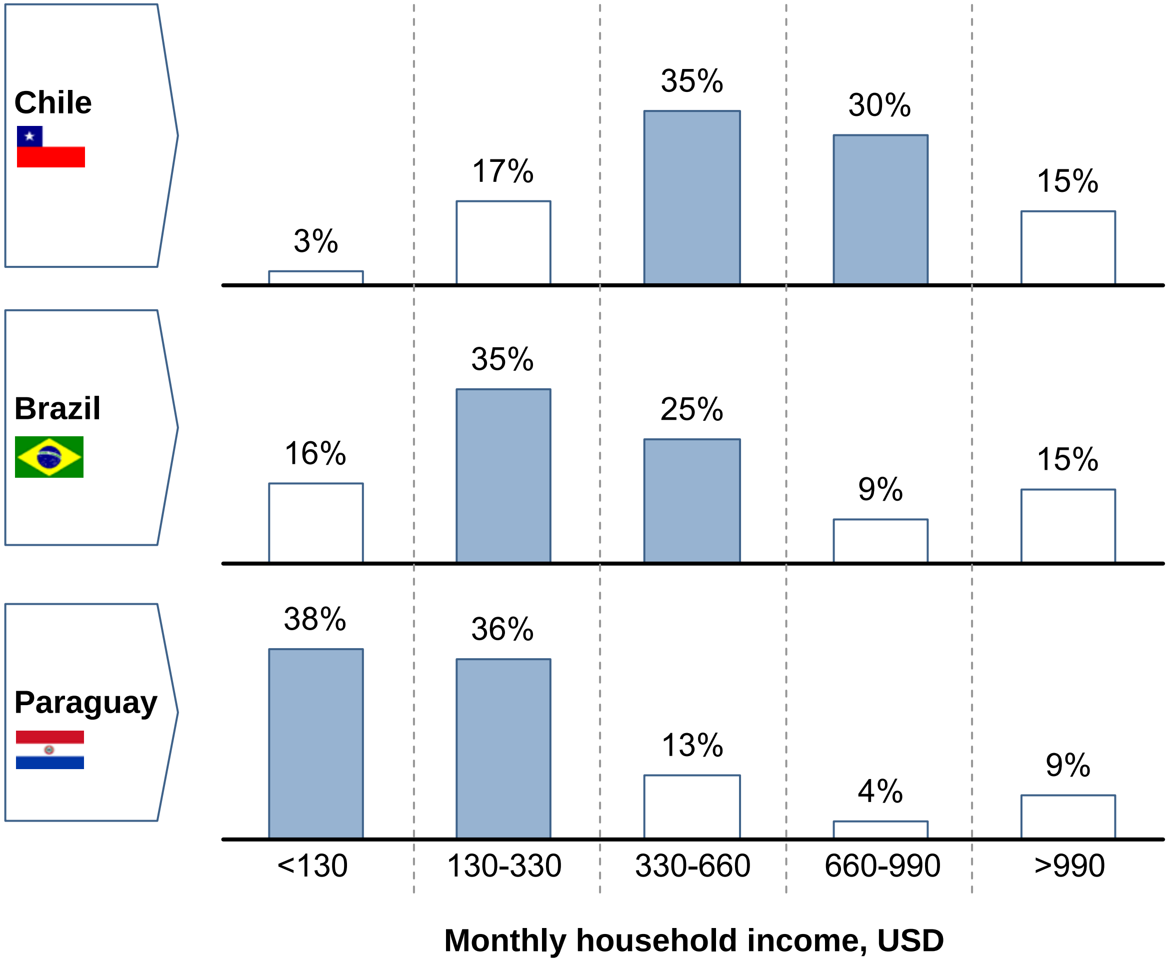
Figure 10 – Socioeconomic distribution of Chile, Brazil and Paraguay

… and the population distribution also varies significantly by social class at the intra-regional level

SELECTED COUNTRIES

2003, Percentage of families by monthly household income, USD

🟦 Predominance

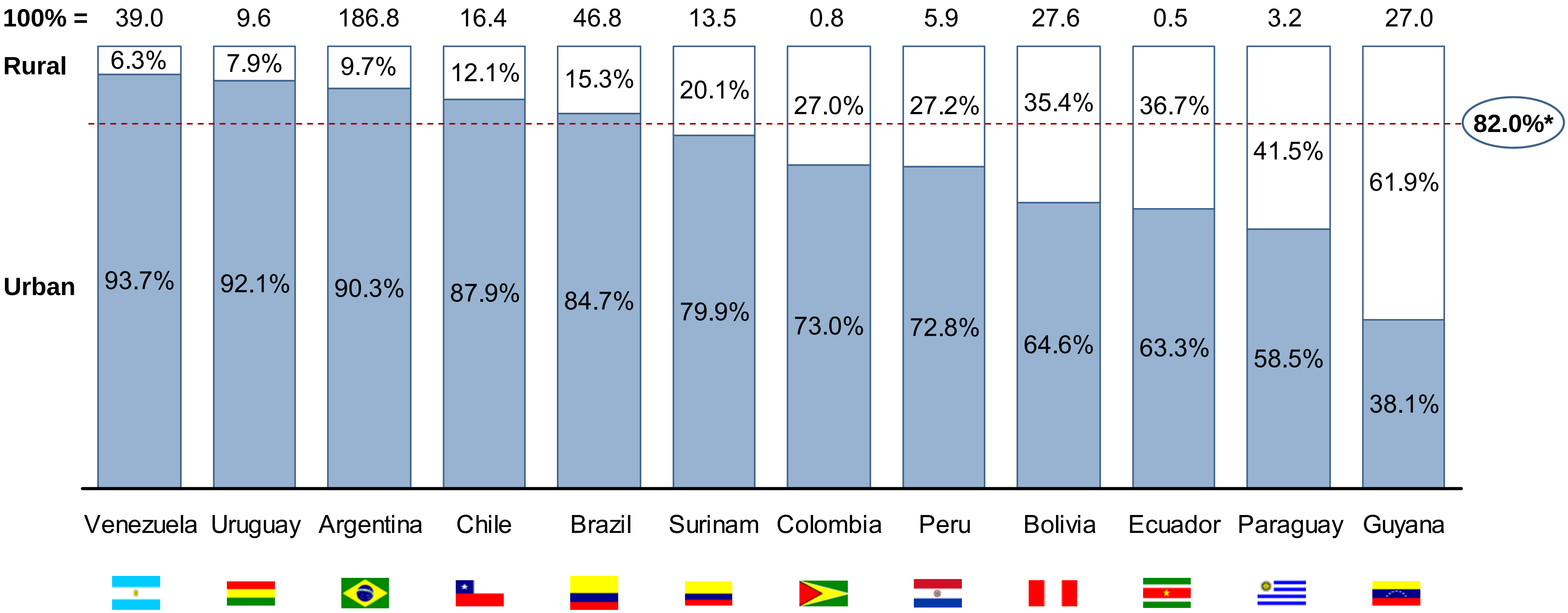


Source: INE (Chile), DGEEC (Paraguay), IBGE (Brazil), Work team analysis

Figure 11 - Ranking of South American countries according to percentage of urban population

Urban residents represent 82% of the total population, but there also exist countries that are predominantly rural, such as Guyana (38% urbanization)

2006, Millions of people, Percentage



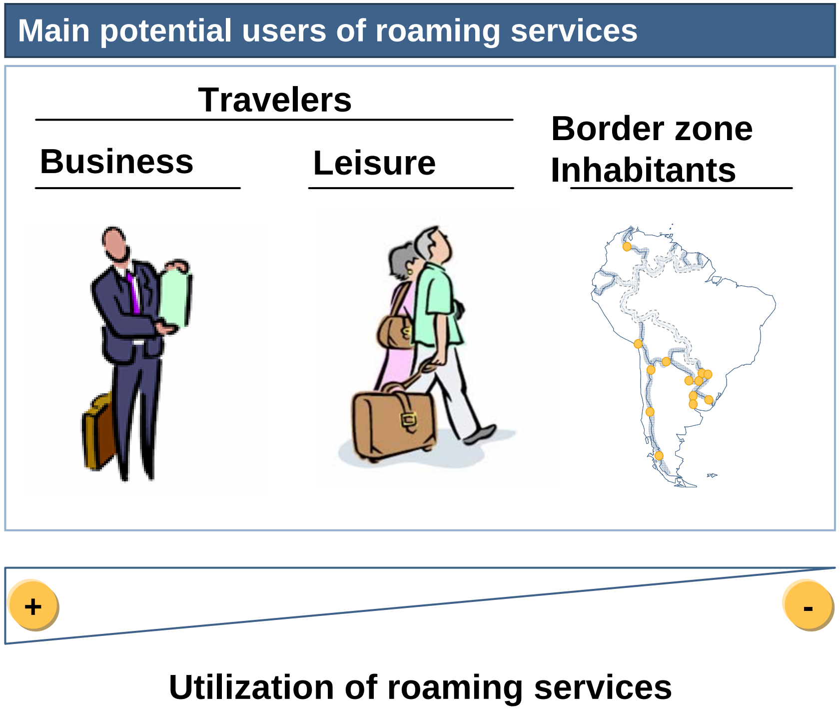
* Weighted average of population

Source: CELADE, CIA The World Factbook, EIU, UN, Work team analysis

Document contents

Figure 12 – Main potential roaming users

This section analyzes the profiles of different segments of the population with greater potential for utilizing roaming services



Main potential users of roaming services

Travelers

Business

Leisure

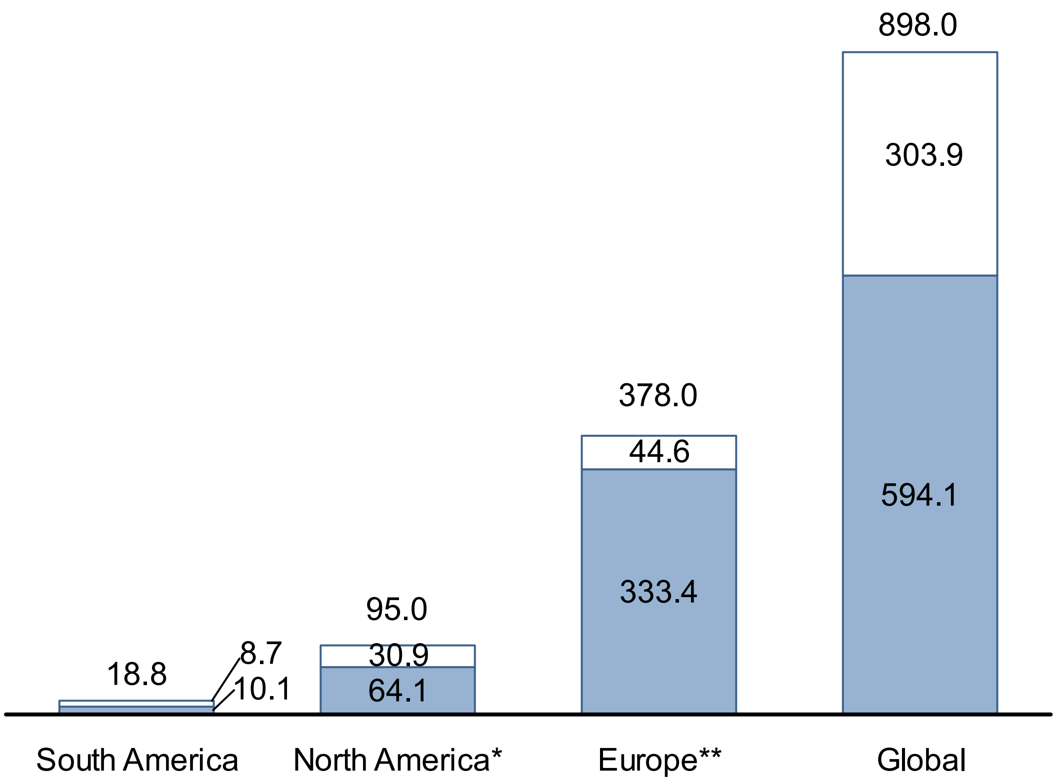
Border zone Inhabitants

Utilization of roaming services

Figure 13 – Comparison of intra-regional and international travel

On a global scale, South America is a region with a relatively low propensity for travel, both intra-regionally and internationally

2006, Millions of trips per year, Millions of people, Percentage



	South America	North America*	Europe**	Global
Population	382.4	443.7	794.0	5,000.3
Intra-regional penetration* **	2.6%	14.4%	42.0%	11.9%

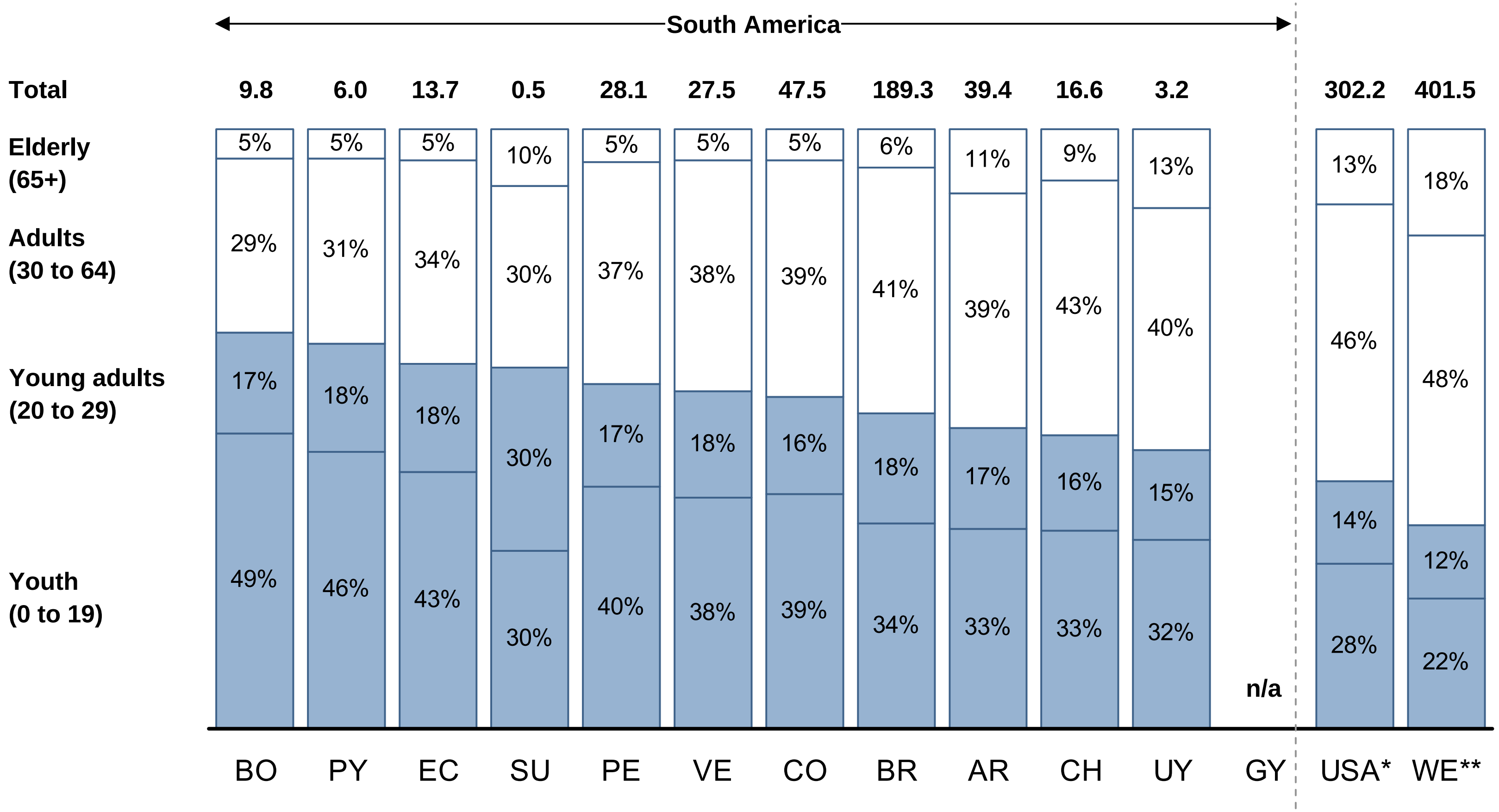
- **North America's population** surpasses **South America's** population by **16%**
- However, the number of **visitors** to North America is **5 times** that of **South America**
- Globally, **South America** represents **less than 2%** of **total travel**

* Including Canada, USA and Mexico
** Not including Turkey
*** Percentage of intra-regional travelers from the total population in the region
Source: IMF, WTO, European Spatial Planning Observation Network, Work team analysis

Figure 14 – Population pyramid among countries in the region

Due to the large proportion of the population under 30, the population pyramid of South America is dominated by young individuals

2007, Millions of persons, Age groups, Percentage



* United States of America

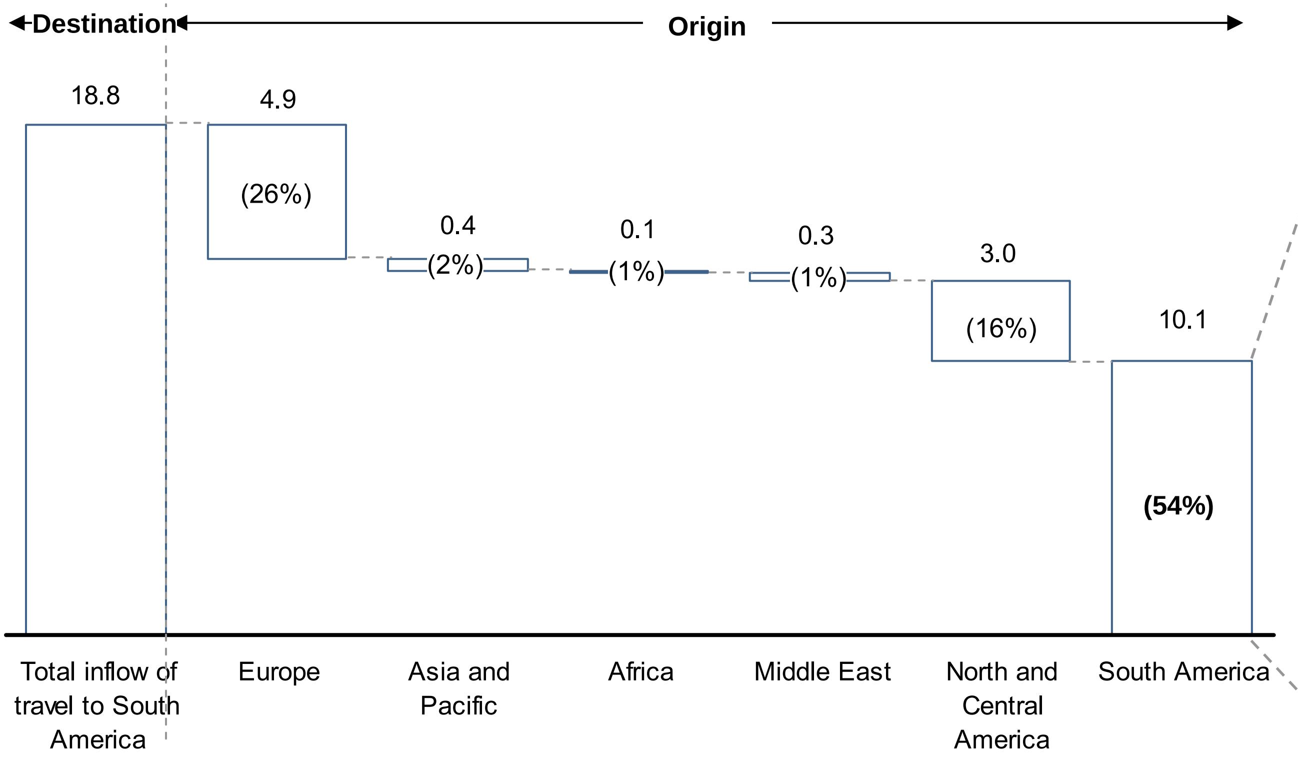
** Western Europe includes Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Holland, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom

Source: EIU, National Bureaus of Statistics, Work team analysis

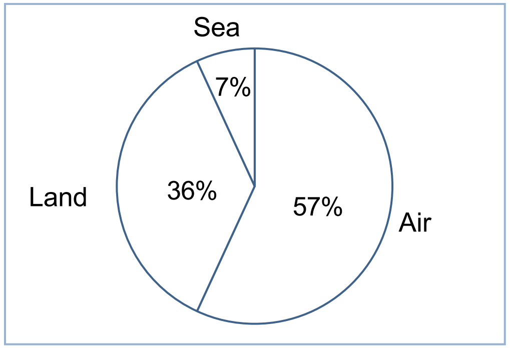
Figure 15 – Analysis of travel in South America, according to place of origin

More than half of all travel* in South America is intra-regional, at ~10.1 million travelers in 2006

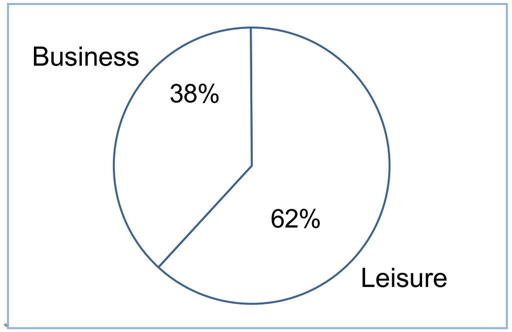
2006, Millions of trips per year



Mode of transportation



Travel motive



- The majority of **travel to South America** is made by travelers from **Europe** and **North and Central America**
- **Air travel is the most utilized mode of transportation,** at 57%
- **62% of travel is for leisure**

* Annual visits

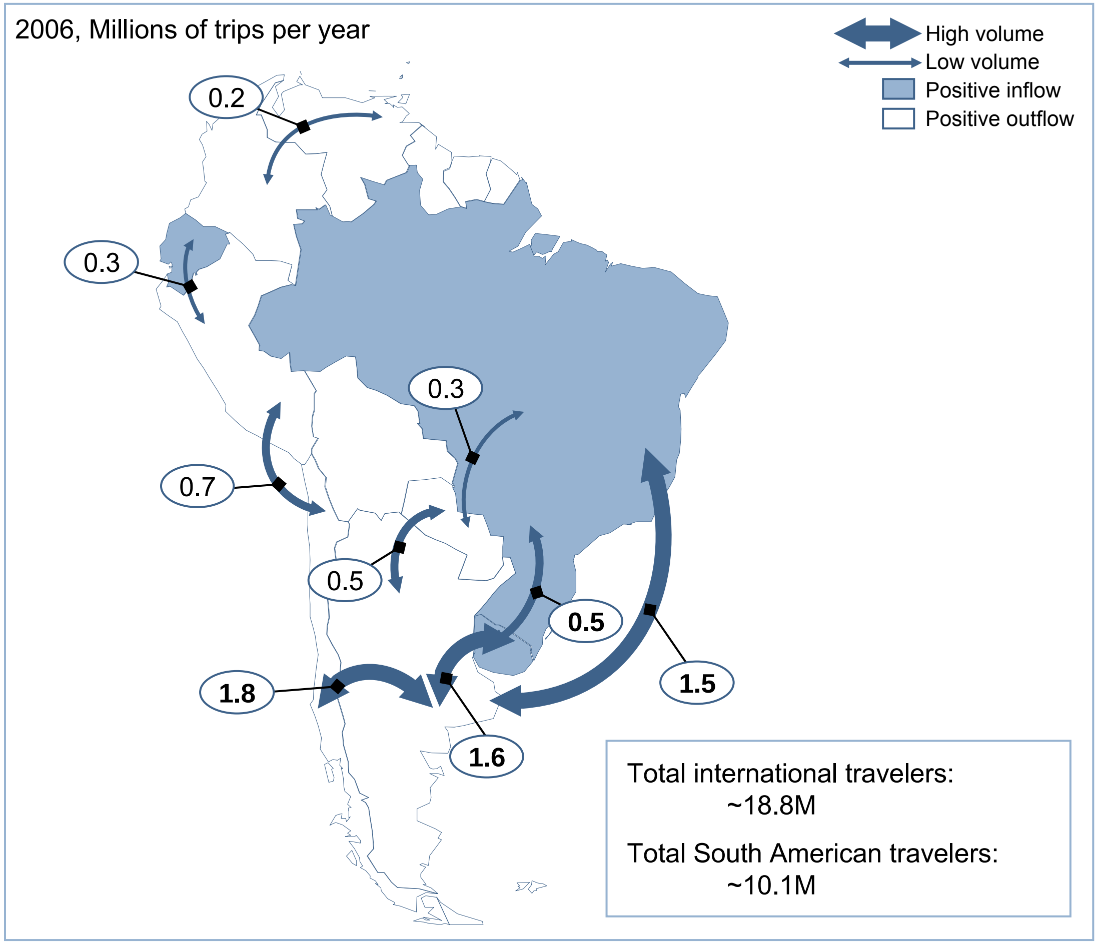
Source: World Tourism Organization (WTO), Work team analysis

Figure 16 – Main flows of travel in South America, 2006

The most important flows of intra-regional travel occur within Argentina, Chile, Uruguay and Brazil, routes that concentrate 54% of total traffic

Main flows of travel*

2006, Millions of trips per year



Total international travelers:
~18.8M

Total South American travelers:
~10.1M

- Other important travel routes exist between **Peru and Chile**
- **Brazil, Ecuador and Uruguay have positive inflows of travel** (there is more travel into than out of the country) in the region

* Only considers arrivals of travelers to the destination country
Source: WTO, Work team analysis

Figure 17 –Travel matrix in South America

Travel matrix in South America

2006, Thousands of trips per year*

🟨 Higher flows

To From	AR	BO	BR	CH	CO	EC	GY	PY	PE	SU	UY	VE	Total SA
AR		45.9	**953.2**	**698.4**	39.4	16.8	< 0.1	194,5	60,7	< 0,1	**1,098.7**	28.9	3,064.6
BO	169.0		66.0	204.1	6.7	4.6	< 0.1	4.0	80.3	< 0.1	2.7	< 0.1	524.2
BR	**505.4**	35.7		192.6	31.5	11.8	0.6	98.5	48.7	6.0	196.1	20.9	1,123.0
CH	**1,090.8**	21.2	163.3		22.1	18.2	< 0.1	14.3	398.0	< 0.1	41.8	13.0	1,739.2
CO	104.7	9.5	45.4	38.8		164.6	< 0.1	2.5	54.8	0.2	< 0.1	40.6	452.5
EC	44.8	5.9	14.6	27.4	110.9		< 0.1	1.3	99.5	0.1	< 0.1	< 0.1	298.1
GY	< 0.1	3.2	3.1	4.9	3.2	0.5		1.1	< 0.1	13.6	< 0.1	< 0.1	29.8
PY	336.9	4.2	239.2	15.5	< 0.1	< 0.1	< 0.1		< 0.1	< 0.1	20.0	< 0.1	600.7
PE	161.5	85.4	57.9	254.9	51.5	210.3	< 0.1	2.8		0.2	12.5	6.0	828.2
SU	< 0.1	2.2	2.6	3.3	2.2	0.4	20.2	0.9	< 0.1		< 0.1	< 0.1	32.1
UY	488.5	2.6	328.2	28.7	4.5	4.0	< 0.1	10.3	5.7	< 0.1		3.8	854.8
VE	76.9	2.6	46.7	15.4	131.6	16.2	0.9	1.0	23.3	0.4	5.8		314.9
Total SA	**2,978.5**	**218.4**	**1,920.0**	**1,484.3**	**403.5**	**447.5**	**21.7**	**331.1**	**771.2**	**20.5**	**1,377.6**	**113.1**	**10,087.5**
Total	**4,261.8**	**275.8**	**5,146.8**	**2,334.0**	**1,079.8**	**862.4**	**108.2**	**398.4**	**1,676.6**	**57.4**	**1,793.6**	**789.6**	**18,783.1**
% approx. total**	69.9%	79.2%	37.3%	63.6%	37.4%	51.9%	20.0%	83.1%	46.0%	35.7%	76.8%	14.3%	53.7%

* Includes all means of transportation: air, sea, land

** Percentage of travel inflow from South American travelers out of the total travel inflow to the destination country

Note: Registrations of <0.1 are not included in the grand total for lack of specific values

Source: WTO, Work team analysis

Document contents

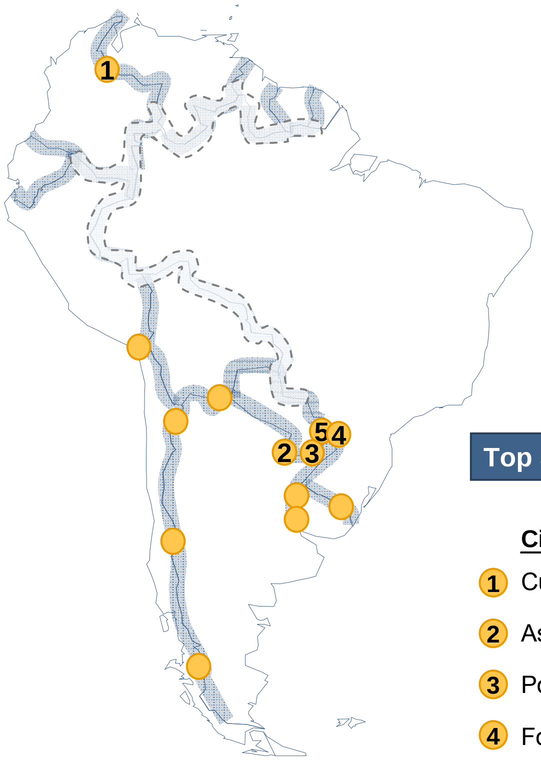
Figure 18 – Border zone population

In South America there are ~16 million people living in border zones (~4% of the total population),...

2006, Millions of persons, Percentage

▭ Low concentration*

● Points of high concentration



Top 5 border zone cities

	City	Country	Inhab.	Total% border zones
①	Cucuta	Colombia	0.7	46.7%
②	Asuncion	Paraguay	0.5	31.3%
③	Posadas	Argentina	0.3	9.4%
④	Foz de Iguazu	Brazil	0.3	10.3%
⑤	Ciudad del Este	Paraguay	0.2	12.5%
	Total		**2.0**	**12.6%**

Country	Border zone population**	Approx. % of total population
Argentina	3.2	8%
Brazil	2.9	2%
Venezuela	2.1	8%
Peru	1.8	7%
Paraguay	1.6	**27%**
Colombia	1.5	8%
Chile	1.4	3%
Bolivia	1.0	11%
Uruguay	0.4	12%
Guyana	0.0	5%
Suriname	0.0	5%
Ecuador	n/a	n/a
Total	**15.9**	**4%*** **

* Low concentration in Amazon Forest border zone

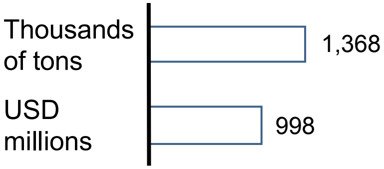
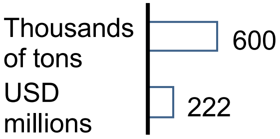
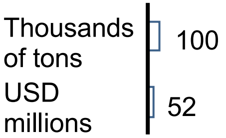
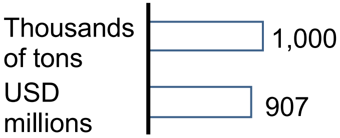
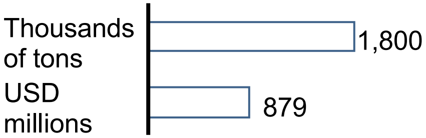
** Estimation for 2006

*** Weighted average by total population

Source: National Bureau of Statistics for each country except Suriname and Guyana, Work team analysis

Figure 19 – Characteristics of the main border zones cities

…with the largest border zone cities predominately dedicated to trade

City	Countries sharing border	Annual cross-border traffic	Characteristics	Economic Activity	Commercial flow, in tons and USD, (2000)
Cucuta *(Colombia)*	• Colombia • Venezuela	• n/a	• **Most active duty-free zone in the country** • **Capital** of Santander	• Trade and services • Industry (dairy, construction, textiles)	Thousands of tons 1,368 USD millions 998
Asuncion *(Paraguay)*	• Paraguay • Argentina	• 42,000 private cars	• **Capital** of Paraguay • Main river **port**	• 80% Trade and services • 16% Industry and construction • 4% Other	Thousands of tons 600 USD millions 222
Posadas *(Argentina)*	• Argentina • Paraguay	• 780,000 private cars	• **Capital** of the Misiones province	• Agro-business (yerba mate and lumber) • Industrial	Thousands of tons 100 USD millions 52
Foz de Iguazu *(Brazil)*	• Brazil • Argentina	• 280,000 private cars	• **Key travel destination** (Iguazu waterfalls) • **Hydroelectric power plant** in Itaipu (with Paraguay)	• Trade and tourism • Industrial	Thousands of tons 1,000 USD millions 907
Ciudad del Este *(Paraguay)*	• Paraguay • Brazil	• n/a	• **Main commercial city** in Paraguay • **Tri-border** city	• Trade and services	Thousands of tons 1,800 USD millions 879

Source: IIRSA, Newspaper clippings, Work team analysis

Document contents

South American mobile telecommunications market: Introduction

- This section will study the South American mobile telecommunications market with the objective of understanding its **evolution and current situation**:
    - The South American mobile market has experienced **strong growth** in the last few years. The biggest growth has come from **prepaid service**, which already represent 82% of total lines
    - In recent years the ARPU, in USD terms, has been relatively stable in the region, and combined with strong growth in the subscriber base, has led to sustained growth in total revenue
- To fully understand the mobile market with regards to roaming services, one must analyze the relevant stakeholders and the rules of the game

South American mobile telecommunications market: Executive summary

Economic

- **The strong expansion of South American mobile telecommunications was prompted by prepaid services**:
  - Overall **South American telecommunications service subscriptions** have had major growth (21% CAGR), attributable to the **expansion of mobile services**
  - On an international level, however, there is still **room for growth** in many of the countries within the region
  - **Prepaid service was the driver of growth in the mobile market**, with an average of 82% of total lines and penetration of more than 90% in 5 countries
  - In 2007 the **average revenue per subscriber (ARPU) was USD ~14**, representing ~4% of disposable income
  - Measured in local currency, however, the ARPU decreases slightly from 4 to 9% annually
- **GSM is the dominant technology in the region**, used by 80% of South American handsets at year end 2007
- **The mobile market is concentrated in certain countries and by specific business groups**
  - In 2007 mobile services revenue in the region **reached USD 41 billion,** heavily concentrated in **3 countries that generated 74% of the total**…
  - …and this concentration is also present at the business level, where **3 groups make up ~70% of total revenue**
- **MVNOs* are almost nonexistent** in the region **and their presence is expected to continue to be small in the medium-term**:
  - MVNOs, operators that offer mobile services by renting access to the infrastructure from traditional operators, present different roaming dynamics
  - **In South America** some MVNOs are already present and are expected to gain **~ 300 thousand subscribers** by 2011 **(<1% of total mobile subscribers**)

Regulatory

- Current **telecommunications regulation has little focus on international roaming**:
  - Almost all South American countries have **consolidated legal frameworks and standardized regulators**, that in regards to **roaming**, focus on the **national level**
  - Anti-fraud regulation is rare and focuses on anti-fraud procedures and policies
  - In general, **the short-term agenda for South America does include regional roaming as a priority**
- South American regulatory coordination is carried out by two agencies **focused on telecommunications** (Regulatel and CITEL) **and regional economic integration initiatives** (MERCOSUR, CAN and IIRSA) ...
- ... yet there is still little **regulatory activity regarding international roaming**, with MERCOSUR Resolution No. 19, 2001 being the main regulatory framework

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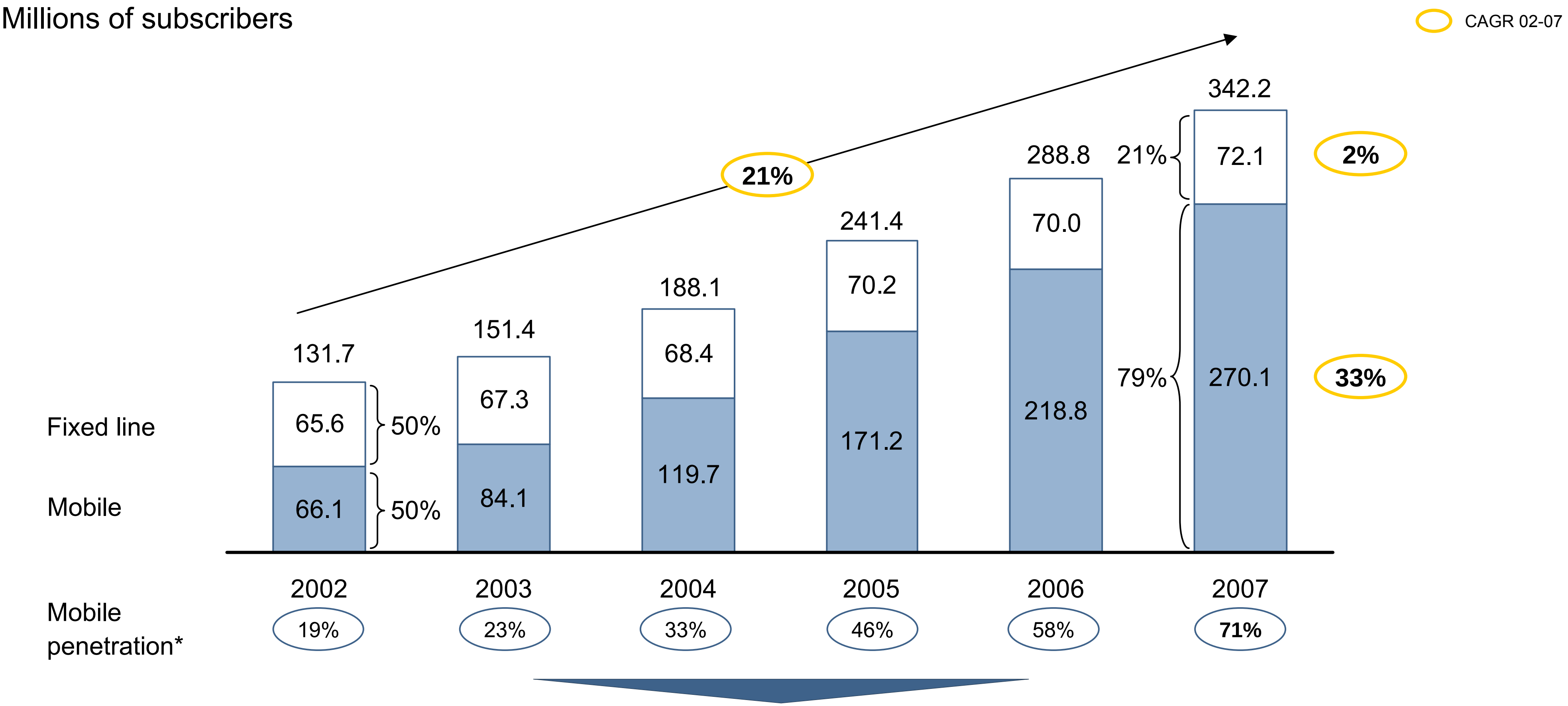
* Mobile Virtual Network Operator

Document contents

Figure 20 – Evolution of fixed line and mobile subscriptions in South America

Subscriptions to telecommunications services in the region has had major growth (21% CAGR), caused by expansion of mobile services…



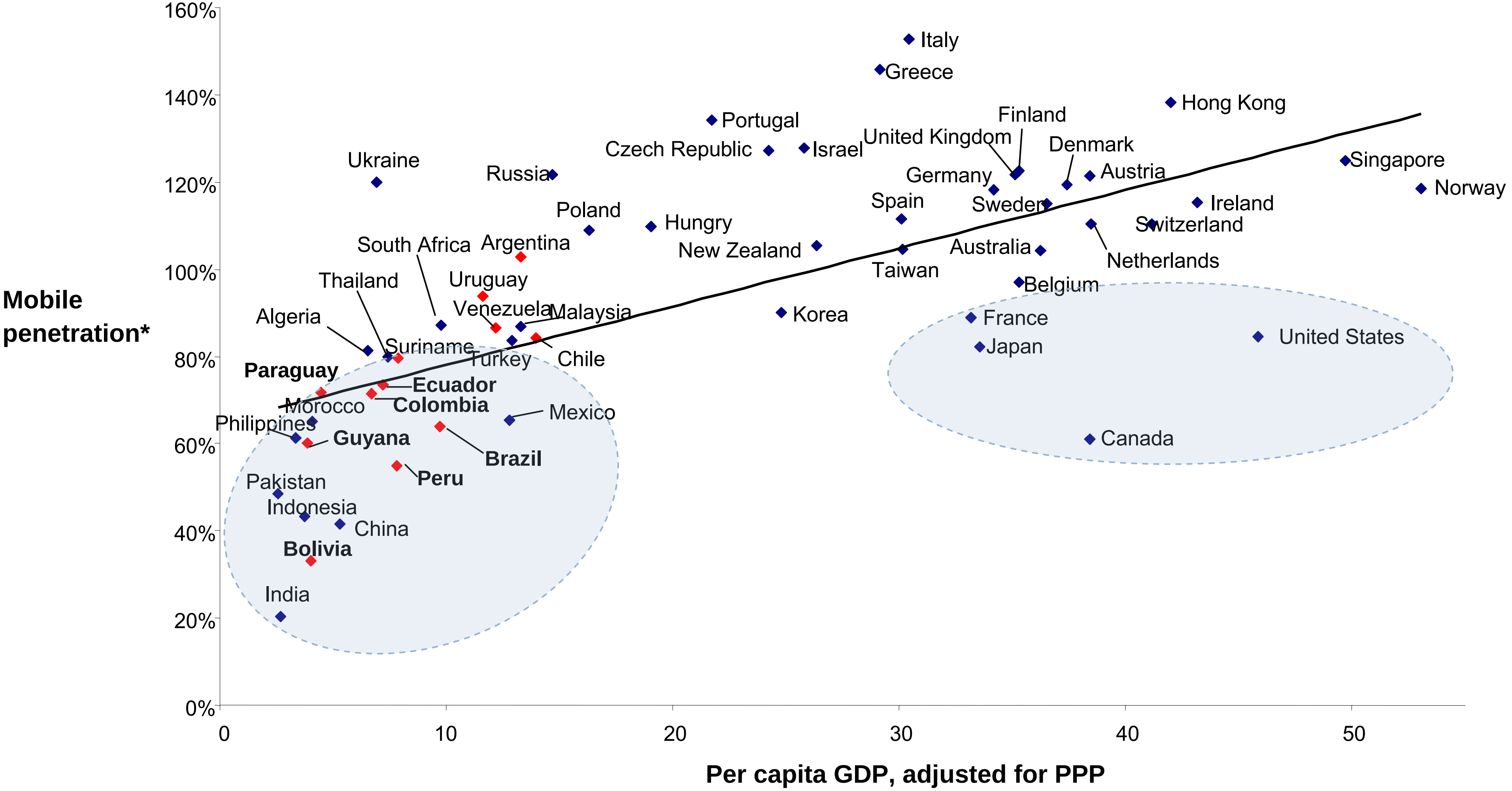
- Because of its greater versatility and cheaper infrastructure, the mobile services market has became the main segment of the telecommunications sector in the region, with annual growth rates of 33% during 2002-2007,…
- … and is also integral in the universal provision of telecommunications services, covering more than 70% of the population

* Mobile subscriptions over the total population
Source: ITU 2007, Company Reports

Figure 21 – Map of the growth potential of the telecommunications market, per country

...compared to international levels, however,...

2007, USD thousands, Percentage



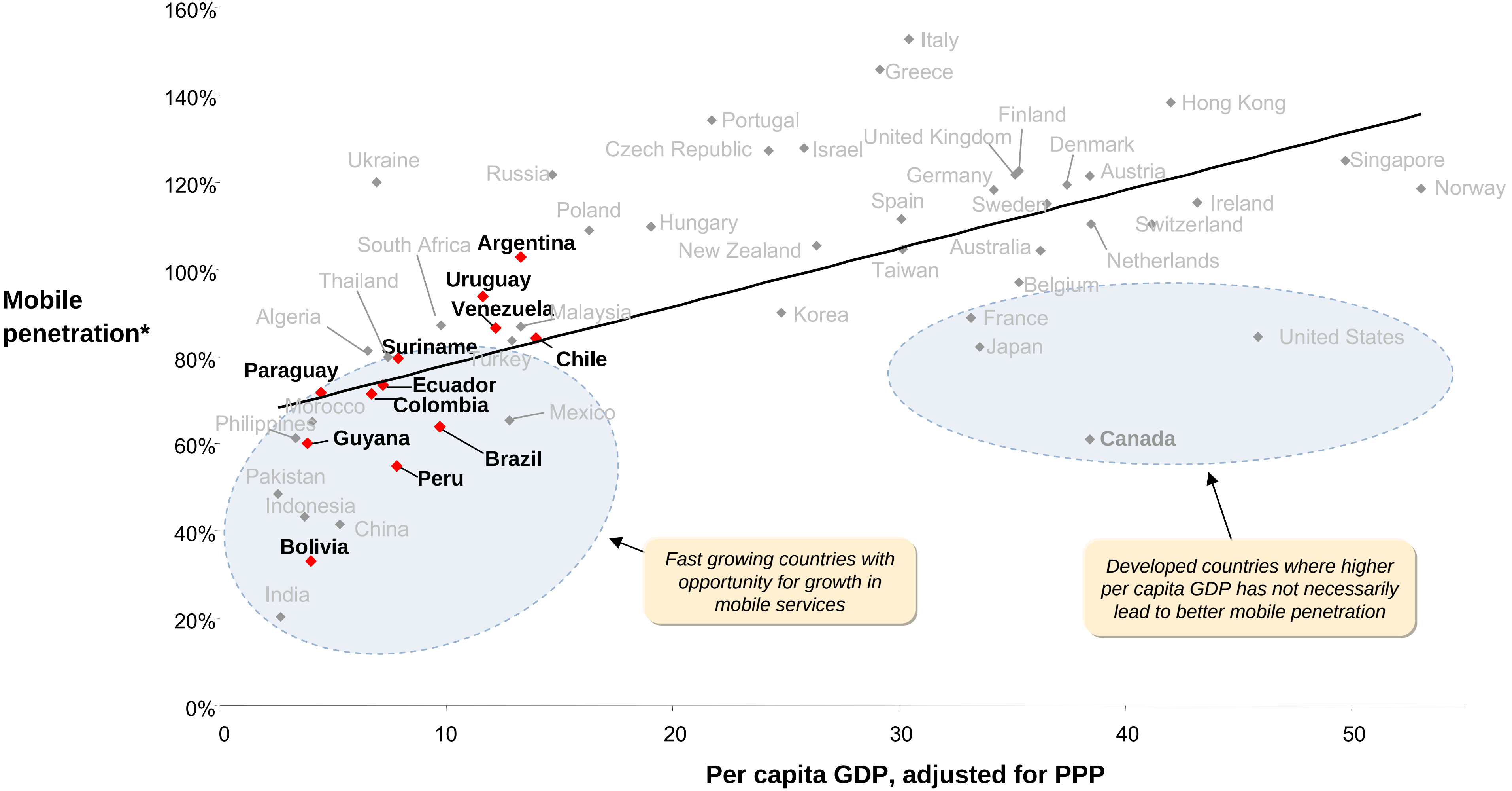
* Mobile subscriptions over total population

Source: ITU 2007, Company Reports, Merrill Lynch, IMF Global Economic Outlook

Figure 22 – Map of the growth potential of the telecommunications market, per country (cont.)

…there is still room for growth in many of the countries within the region

2007, USD Thousands, Percentage



Fast growing countries with opportunity for growth in mobile services

Developed countries where higher per capita GDP has not necessarily lead to better mobile penetration

* Mobile subscriptions over total population

Source: ITU 2007, Company Reports, Merrill Lynch, IMF Global Economic Outlook

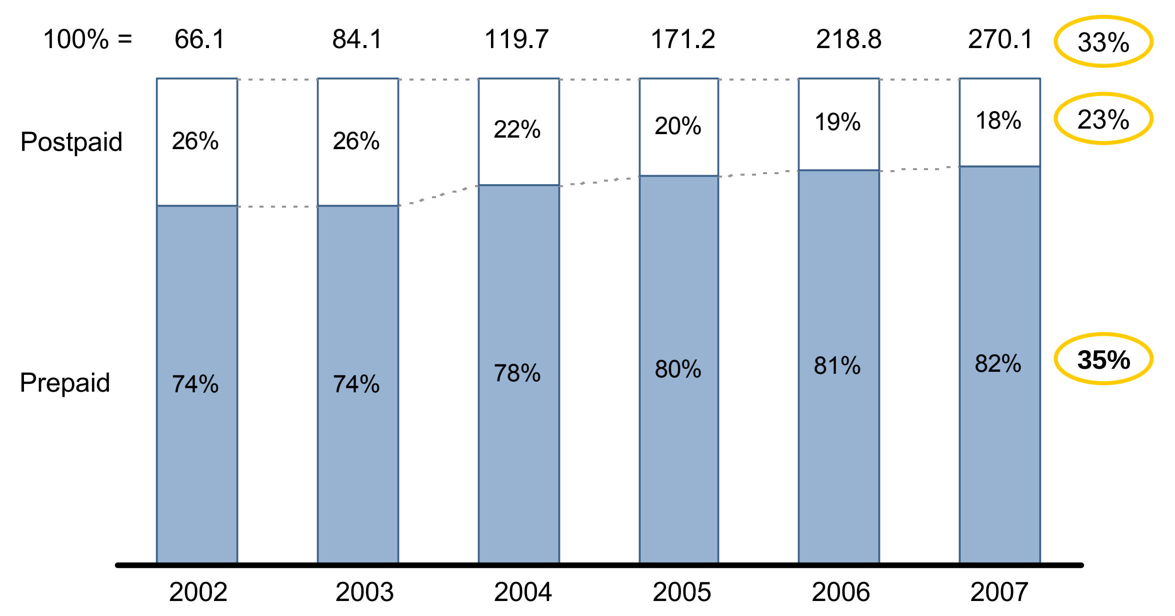
Figure 23 – Mobile subscriptions in South America, by type of service and country ranking

Prepaid service was the driver of growth in the region, with an average of 82% of the lines and penetration of more than 90% in 5 countries

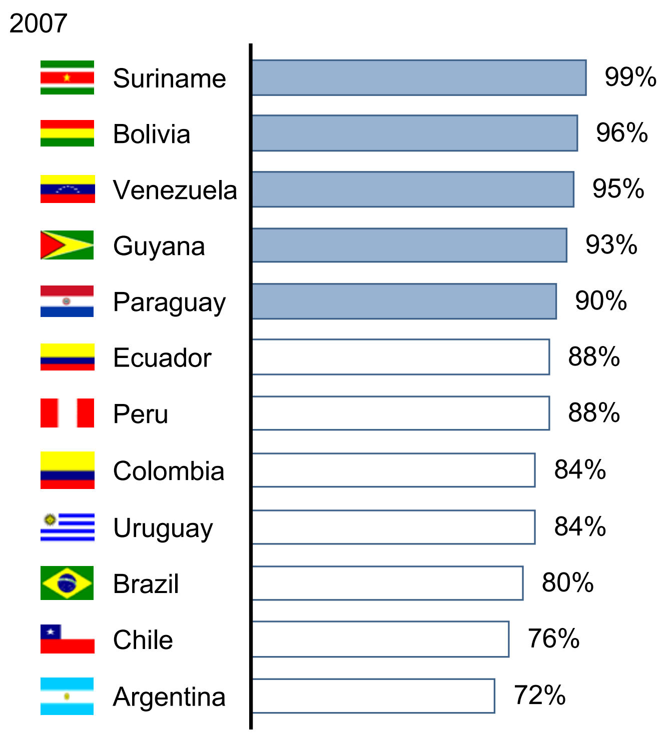
Millions of subscriptions, Percentage

○ CAGR 02-07

Mobile subscriptions in South America, by type of service



Percentage of prepaid subscriptions, per country



- In South America the **prepaid services market has grown on average 35% in recent years**, representing more than 90% of the market in Suriname, Bolivia, Venezuela, Guyana and Paraguay
- The increasing **success** of prepaid services **is based** on its **high flexibility of use** and greater **accessibility** for lower income segments, of which are **continually joining** the subscriber base

Source: ITU, WCIS Informa, Work team analysis

Figure 24 – Evolution of ARPU for mobile services in South America and ARPU country ranking

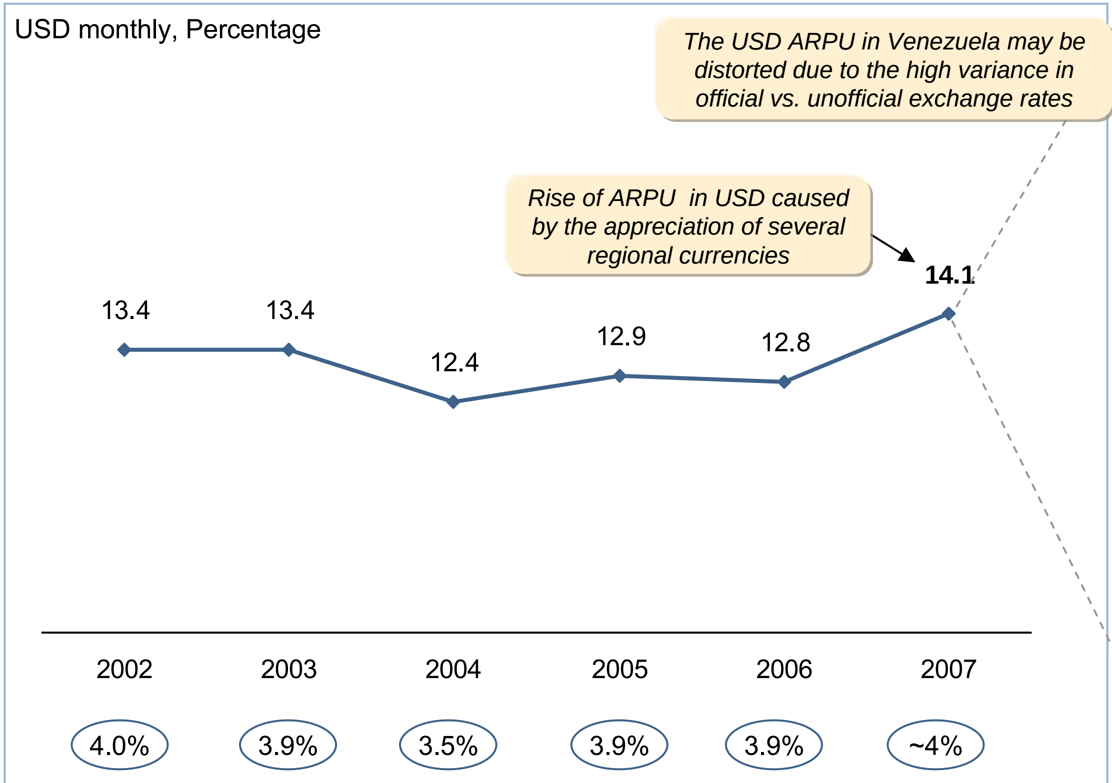
The average revenue per subscriber (ARPU) was USD ~14 in 2007, representing ~4% of disposable income

USD monthly, Percentage

○ % of disposible income**

Evolution of ARPU for mobile services in South America*

USD monthly, Percentage

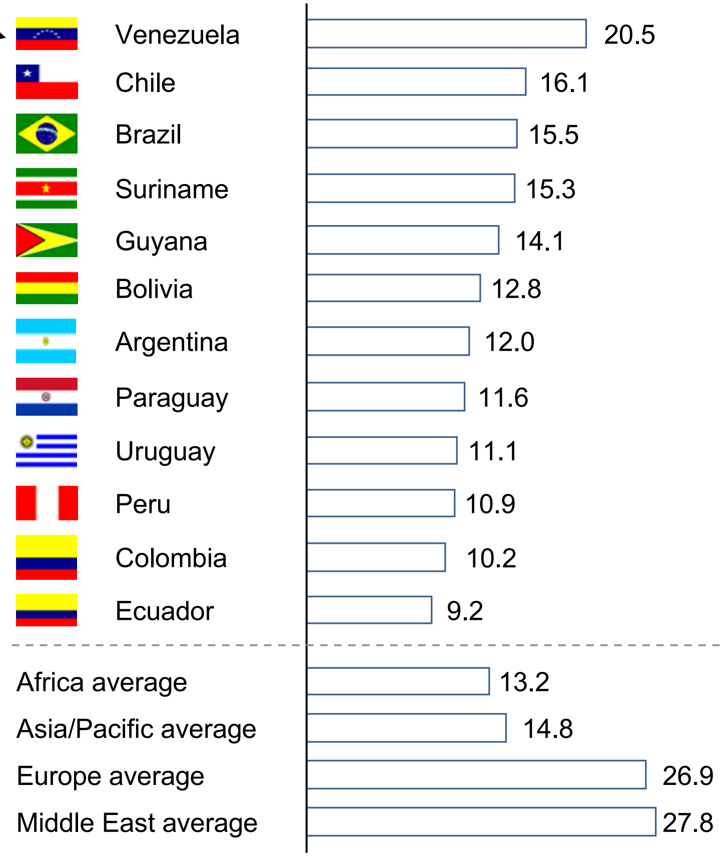


The USD ARPU in Venezuela may be distorted due to the high variance in official vs. unofficial exchange rates

Rise of ARPU in USD caused by the appreciation of several regional currencies

Mobile ARPU by country

2007, USD monthly, Percentage



* Weighted average of subscribers from the 12 countries covered in this study

** Adjusted for PPP

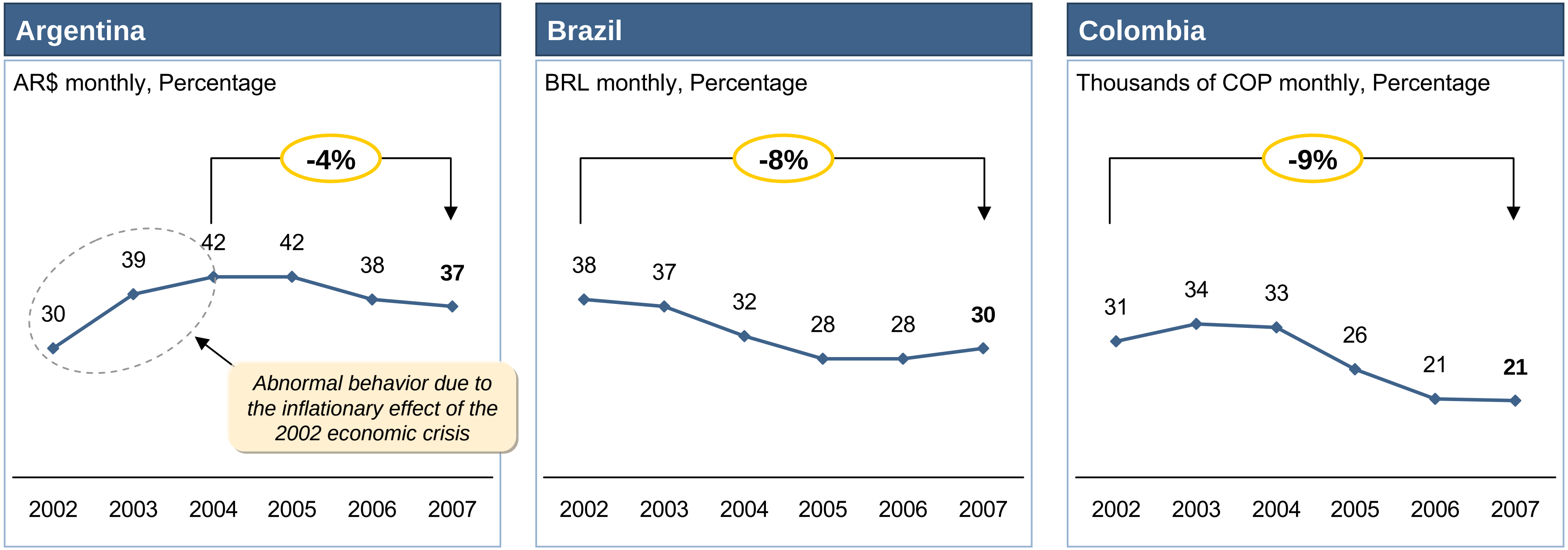
Source: ITU, Merryll Lynch, Pyramid, The Mobile World, Reuters, Work team analysis

Figure 25 – Evolution of ARPU for mobile services in Argentina, Brazil and Colombia, measured in local currency

Measured in local currency, however, the ARPU decreases slightly from 4 to 9% annually

Local currency, Evolution of ARPU for mobile services, Percentage

◯ CAGR



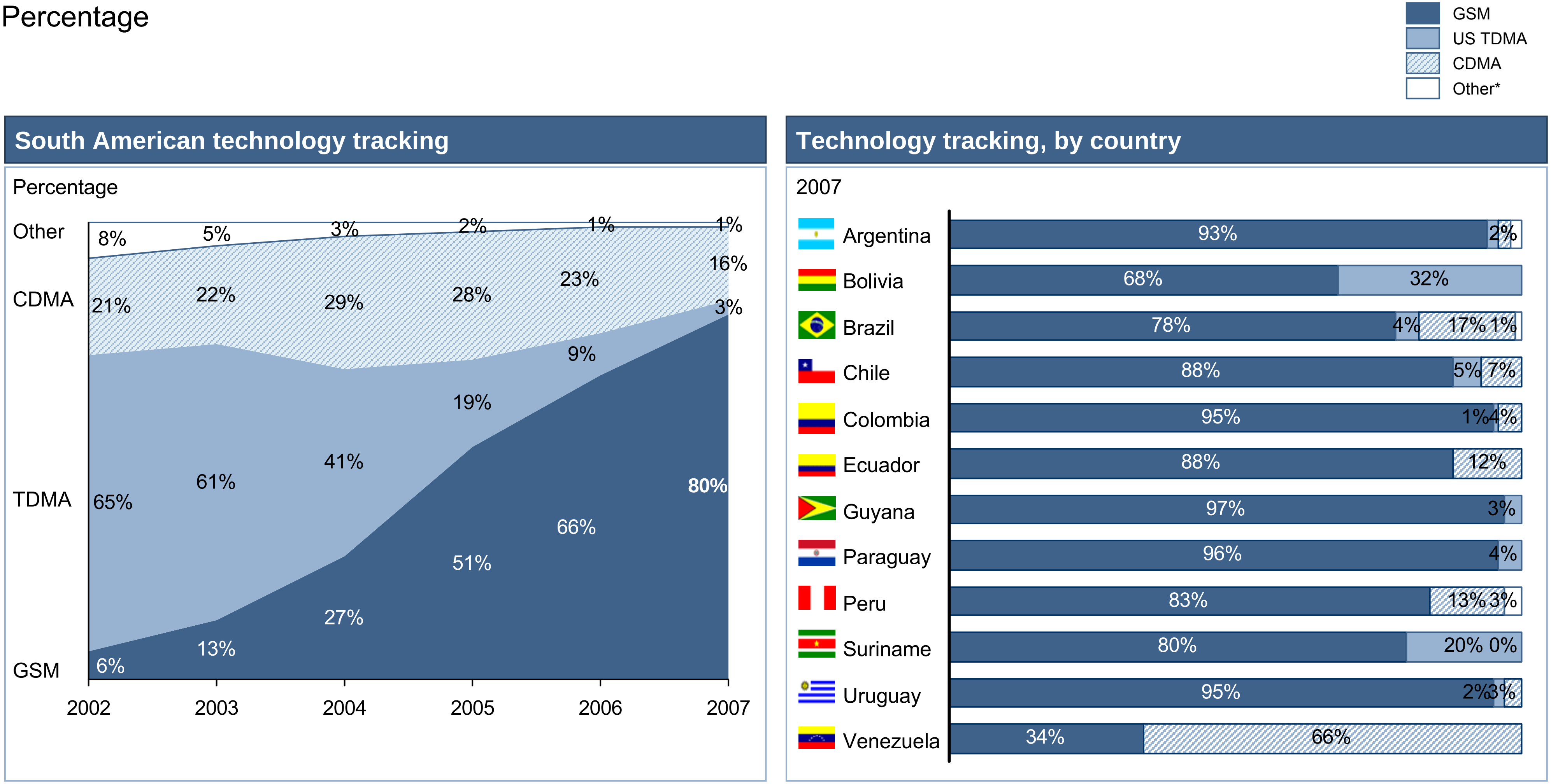
The ARPU decreases as operators , following the international trend, seek to expand their user base into lower-income segments

Source: Merryll Lynch, Work team analysis

Figure 26 - Technology tracking in South America and breakdown by country

GSM is the dominant technology in the region, used by 80% of South American handsets at year-end 2007

Percentage



South American technology tracking

Technology tracking, by country

* IDEN and Analog

Source: Informa

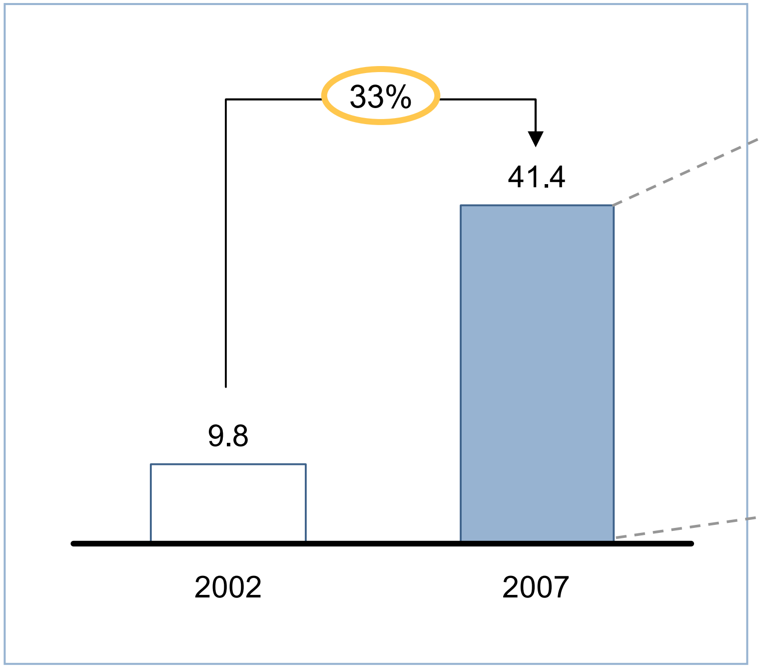
Figure 27 – Mobile services revenue growth in South American and breakdown by country

Revenue from mobile services in the region reached USD 41 billion in 2007, and is highly concentrated in 3 countries that generate 74% of the total…

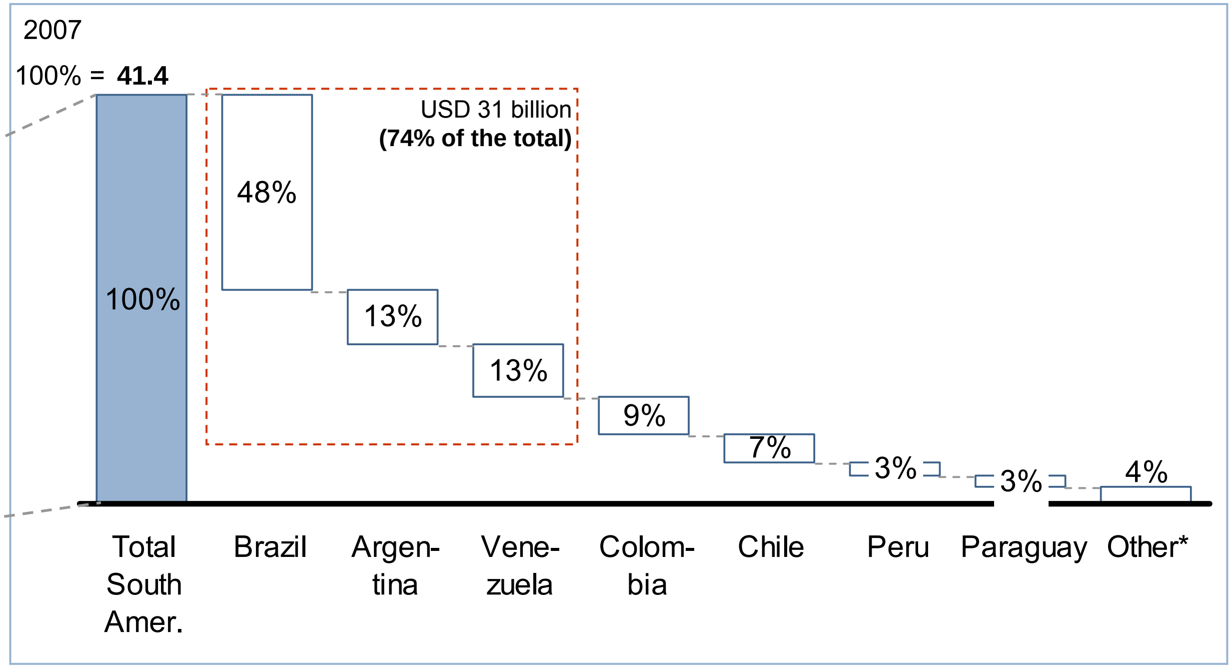
USD billions, Percentage

○ CAGR 02-07

Mobile services revenue in South America



Mobile services revenue, by country



Revenue from mobile services has grown in line with the subscriber base despite the drop in average revenue per user (ARPU), due to the strong expansion of the service toward new market segments

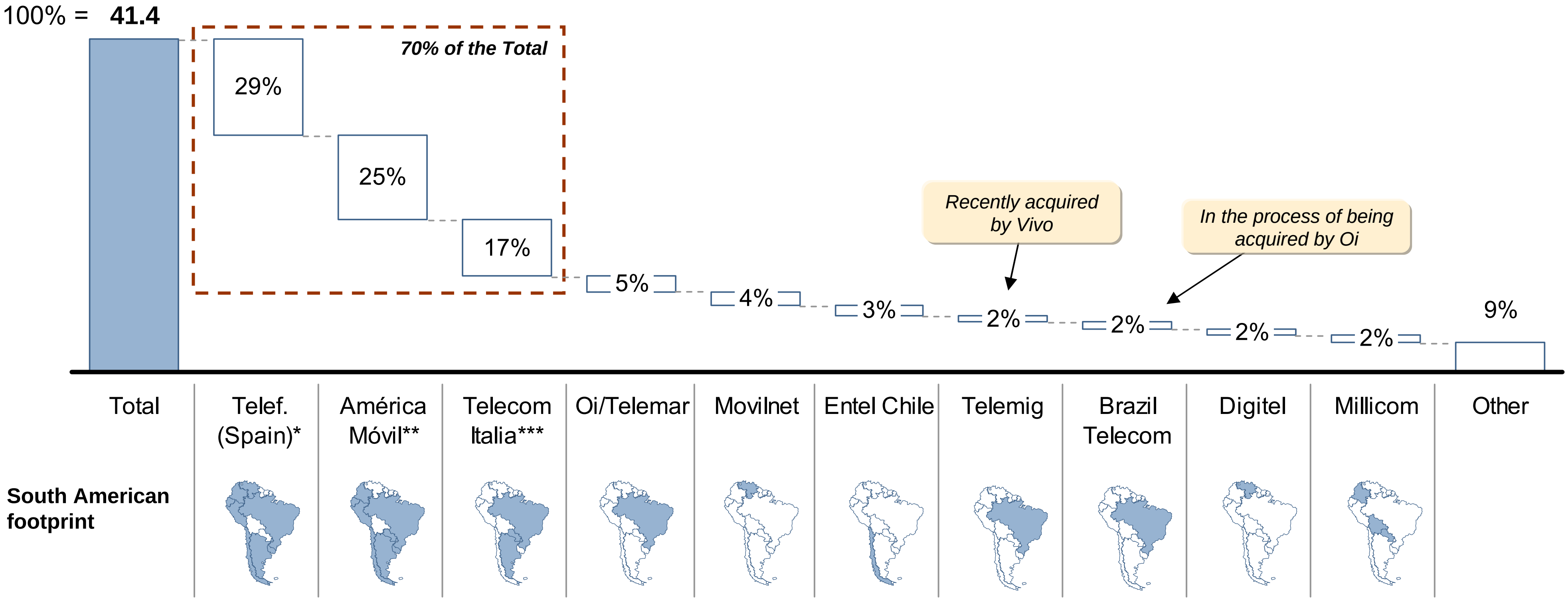
* Includes Bolivia, Ecuador, Guyana, Suriname and Uruguay

Source: ITU, Merryll Lynch, Pyramid, The Mobile World, Reuters, Work team analysis

Figure 28 – Detail of mobile services revenue in South American, by provider

…and three business groups that generate ~70% of the total revenue from mobile services

2007, USD billions, Percentage



% of total regional subscriptions 31% 30% 16%

In terms of revenue, the mobile market is highly concentrated, with the ***major players*** *being* ***multinationals*** *that have a strong regional presence*

* Includes Movistar and Vivo (Joint venture with Portugal Telecom in the Brazilian market)
** Includes Claro, CTI/Claro, Comcel and Porta
*** Includes TIM Brazil and Telecom Personal

Source: ITU, Merryll Lynch, Pyramid, The Mobile World, Company reports, Work team analysis

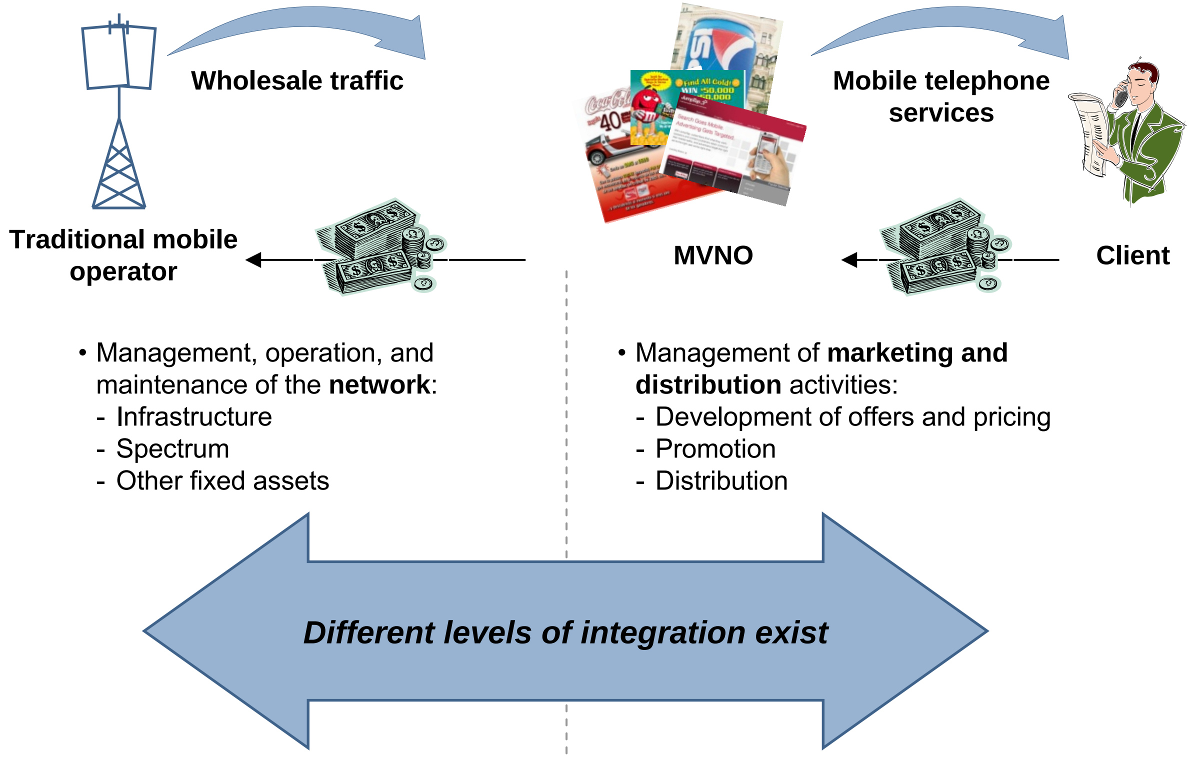
Figure 29 - MVNO and the macro-level business model

MVNOs*, operators that offer mobile services by renting access to the infrastructure of traditional operators, present different roaming dynamics

MVNO characteristics

- A Mobile Virtual Network Operator (**MVNO**) **provides mobile services by "renting" access to the network of a traditional operator**:
  - **It buys wholesale traffic and resells** it as a “service provider” **to final clients**
- In general MVNOs focus on **niche services**, serving specific market segments (eg. young, immigrant, elderly)
- To form **roaming** agreements**,** they **must use the agreements already in place** by the traditional operator, from whom they rent network access

Macro-level business model



Principal activities

- Management, operation, and maintenance of the **network**:
  - Infrastructure
  - Spectrum
  - Other fixed assets

- Management of **marketing and distribution** activities:
  - Development of offers and pricing
  - Promotion
  - Distribution

Different levels of integration exist

* Mobile Virtual Network Operator

Source: Work team analysis

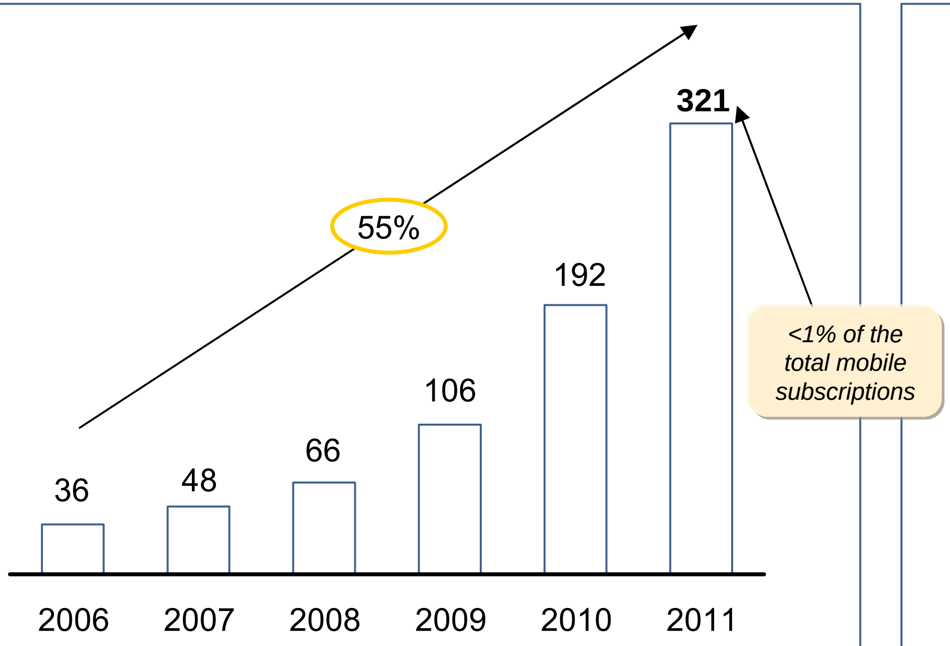
Figure 30 –Projection of MVNO subscribers in South America

In South America some MVNOs are already present and are expected to gain ~300 thousand subscribers by 2011 (<1% of total mobile subscribers)

Thousands of subscribers

◯ CAGR

Projected MVNO subscribers in South America



Examples of MVNOs present in the region

Operator	Characteristics
Cotas *(Bolivia)*	• Founded by an operator of fixed-line and broad-band • Mobile service focused on **prepaid and 4-play offers*** • Uses the **Nuevatel network**
SECOMunica *(Uruguay)*	• Startup of a prepaid calling card company • Mobile service **focusing on the elderly** segment • Will use the **Ancel network**

- Expected **strong growth in MVNOs**, although with a low overall **volume** in terms of the total market in the region…
- … suggesting a **relatively low medium-term impact** by MVNOs **in the regional roaming market**

* 4-play offers refer to product packages including mobile, fixed line, internet and television

Source: Informa, Operator web sites, News clippings, Work team analysis

Document contents

Figure 31 - Main regulatory frameworks and South American telecommunications regulatory agencies

Almost all South American countries have consolidated legal frameworks and formalized regulatory agencies...

Country	Legal Framework		Regulatory Entity	
	Law	Year		
Argentina	National Telecommunications Law	1972	CNC	National Communications Commission
Bolivia	Telecommunications Law	1995	Sittel	Superintendent of Telecommunications
Brazil	General Telecommunications Law	1997	Anatel	National Telecommunications Agency
Chile	General Telecommunications Law	1982	Subtel	Telecommunications Sub-secretary
Colombia	General Telecommunications Law	1989	SIC	Superintendent of Industry and Trade
Ecuador	Special Telecommunications Law	1992	Conatel-Senatel	National Telecommunications Secretary
Guyana	Telecommunications Act	1998	Guyana	Guyanese Government
Paraguay	Telecommunications Law	1995	Conatel	National Telecommunications Commission
Peru	Telecommunications Law	2004	Osiptel	Private Investment Supervisor Agency for Telecommunications
Suriname	Law on Telecommunications Provision	2004	TAS	Suriname Telecommunication Authority
Uruguay	National Public Services – Telecommunications Regime	1991	Ursec	United Communication Service Regulators
Venezuela	Organic Telecommunications Law	2000	Conatel	National Telecommunications Commission

Source: Regulations web site, Work team analysis

Figure 32 – Main national roaming regulatory framework

…that have so far mainly focused on national roaming

NON EXHAUSTIVE

Country	National roaming regulation	National roaming arrangement		
		Obligation to provide service when requested*	**Impartial conditions**	**Important considerations**
Bolivia	• **1995 Supreme decree No. 24,132 -** Article 371 (modified by 2006 Supreme Decree No. 28994)	✓		• Obligation restricted to national voice roaming (does not include messaging and data) *Currently in the process of implementation*
Brazil	• **“*Súmula*” Anatel, 1998**		✓	
Peru	• **2002 Resolution of the MTC No. 418** – Article 15	✓	✓	• Determines sanctions by OSIPTEL in the case of conflicting agreements or application of discriminatory conditions
Venezuela	• **2004 Conatel Resolution No. 408**		✓	• Obligation of the operator to offer national roaming services, in order to provide access to all users including prepaid users

- **National roaming** is provided by multiple operators **within the same country**, especially in cases **where the geographical coverage of the joined networks is complementary**
- The majority of national roaming **regulations** are arranged under the:
  - **Obligation to provide national level service** to improve coverage
  - **Impartial conditions** of neutrality and transparency **among national operators**
- In the case of **Brazil,** which has multiple regional operators, **national roaming was key** in assuring **utilization and service coverage at the national level**

* Requested by another operator

Source: Web sites of regulatory agencies, Work team analysis

Figure 33 – Main anti-fraud regulatory framework

Anti-fraud regulation is rare and focuses on anti-fraud procedures and policies

NON-EXHAUSTIVE

Country	Anti-fraud regulation	Arrangement	
		Obligation to implement anti-fraud procedure/policy	**"Criminalization" of acts of telecommunications fraud**
Argentina	**2004, Law No 25,891 (known as "Blumberg Law")**	✓ Daily exchange among operators and the regulatory entity regarding blacklist of stolen handsets	✓ Prison time for those who commit acts of fraud
Brazil	**July 2005, Anatel Resolution No. 410– General Regulation of Interconnection**	✓ Anti-fraud procedures in interconnection contracts	
Colombia	**2001, External Joint Circular No. 011 from the Superintendent of Industry and Commerce** **2007, Resolution CRT No. 1732**	✓ Anti-fraud policies for mobile and fixed-line operators ✓ Confidential management of user data and mobile blacklist	

- Among themselves, **South American operators have adopted some anti-fraud procedures, and formalized them in interconnection agreements,** even when tax regulations do not exist
- **Regulations that criminalize specific acts of telecommunications fraud are very rare** because consideration of such acts is already accounted for in general criminal legislation

Source: Regulation agency web sites, Work team analysis

Figure 34 - Main short-term South American regulatory issues

In general, the short-term agenda for South America does not include regional roaming as a priority

Main regulatory topics for the short-term agenda of South American countries

- **Increase access** to telecommunication services, especially **broadband**
- **Number portability**
- **Utilization of third party networks and resale** of telecommunications services:
  - **Fixed line: Unbundling***
  - **Mobile: MVNO**
- **Market patterns and competition**:
  - Definition of **relevant markets**
  - Assessment of operators with **significant market power**
- **Improve quality levels and coverage** of services
- **Auction of 3G spectrum**

- **South American regulators** are focused on **initiatives** related to:
  - **Increasing penetration** of basic services
  - **Promoting competitive pricing**
- The initiatives are especially centered **on domestic markets…**
- **…giving less priority to international coordination initiatives,** such as international roaming

* Unbundling gives access to last mile infrastructure of incumbent fixed line operators to other fixed line competitors

Source: ARCEP, Informa Telecom, Work team analysis

Figure 35 – Main multilateral telecommunications and regional integration initiatives

South American regulatory coordination is carried out by 2 agencies focused on telecommunications (Regulatel and CITEL), and also regional economic integration initiatives (MERCOSUR, CAN and IIRSA)…

Multilateral initiatives	Organization	Objectives	AR	BO	BR	CH	CO	EC	GY	PA	PE	SU	UR	VE	Other
Telecomm-unications	**Regulatel**	• **Promoting the cooperation and coordination** for the development of Latin American telecommunications through: - **Information Exchange** - Promoting regulatory **coordination** - Defense of **regional interests** at international forums	✓	✓	✓	✓	✓	✓		✓	✓		✓	✓	• Mexico • Cuba • 7 Central American countries
	CITEL	• **Promoting the development of telecommunications** for American nations through: - **Information exchange** - Unification of technical **norms and criteria** - **Perfecting and** coordinating procedures - Promoting adoption of **official agreements** among governments	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	• U.S.A. • Canada • Mexico • 20 Central American and Caribbean countries
Regional integration	**MERCO-SUR**	• **Creation of a common market** with: - Free circulation of goods - Common trade policies - Coordination of sectorial and macroeconomic policies - **Coordination of legislation**	✓		✓					✓			✓		
	CAN	• Community for **integration and development** through: - Economic and social cooperation - Promotion of free-trade - Strengthening of regional solidarity - **Coordination of legislation**		✓			✓	✓			✓				
	IIRSA	• Creation of competitive roaming markets in the South American region to improve: costs, quality and coverage • Regulator coordination at the regional level	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

Source: Regulator web sites, MERCOSUR, Work team analysis

Figure 36 - MERCOSUR Resolution No.19, 2001

… yet there has been little regulatory activity for international roaming, with MERCOSUR Resolution No. 19, 2001 being the main regulatory framework

This resolution does not affect countries from the expanded MERCOSUR

MERCOSUR Resolution No. 19, 2001

- **Argentina**
- **Brazil**
- **Paraguay**
- **Uruguay**

Initiative for the simplification of roaming use by means of one central customer service number for Argentina, Brazil, Paraguay and Uruguay (this has not yet been implemented)

Principal arrangements		Description
General arrangements for international roaming	**Information**	• Obligation by operators to **inform** users regarding roaming: - **Rates** - **Operational procedures** - **Customer service number**
	Administrative agreements	• Obligation of operators to present the **roaming agreements** to the national regulators within 30 working days • In case of controversy among operators, **the national regulators will be able to act as mediators** at the operators request
	Technical norms and anti-fraud	• **Recommendations** regarding implementation are: - **Network Identification** (defined by norm E.212 of ITU) · Mobile Station Identification Number (MSIN) · International Mobile Subscriber Identity (IMSI) - **Anti-fraud procedures**
Radio frequency coordination procedures manual in 800 MHz* for mobile service		• **Determination of coordination procedures to avoid interference in border zones defining**: - Border zones extending 5 kilometers within each country - Technical methodology to avoid foreign operators from having stronger signals than national mobile operators within the national territory

Though the regulators from these four countries affirmed that the resolution is being enforced, there are few cases of mediation requests for roaming agreements and radio frequency coordination requests

* Complemented by Resolution No. 05, 2006 for the frequencies from 1,7GHz to 1,9GHz and from 2,1GHz to 2,2GHz

Source: MERCOSUR, Work team analysis

Document contents

South American roaming market: Executive summary

General characteristics

- **The South American roaming services market is relatively small and primarily oriented towards business travelers**:
  - Roaming users have the same ability to communicate within the visited country, their country of origin (ie, home country), and other international destinations
  - **International intra-regional roaming is estimated at ~174M minutes and USD ~343M** (~1% of total annual industry mobile revenues)
  - **Business travelers are the main roaming users,** with a postpaid ARPU of USD 154 per trip
  - **The South American roaming offer could be extended with increased availability of prepaid roaming** and improved additional services for users
- **Roaming prices are heavily influenced by inter-operator tariffs** (IOT):
  - **Inter-operator tariffs** can vary widely between incoming and outgoing services **and are established in roaming agreements,** which are private contracts between the operators
  - Inter-operator tariffs are **distinguished by voice and data, each with specific billing parameters**
- Some **South American operators are members of roaming alliances**:
  - Mobile operators form **regional alliances to create differentiation in their roaming services**
  - In South America there are **three alliances: two by business groups** and **one by independent operators**

Economic aspects

- South American **roaming rates are high and vary widely** among the South American countries:
  - **The median South American mobile ARPU** (USD ~14) **only lasts for 7 minutes of incoming roaming calls**
  - **Price variations in the same country can fluctuate up to 75% from average levels**
  - Among the most common voice traffic, **outgoing local calls are usually the cheapest** (~1.66 USD/min, average), **and calls to the country of origin are the most expensive** (3.23 USD/min, average)
  - **Countries in which the operators charge the highest rates are Peru, Venezuela and Brazil**
- **Text messaging (SMS) is a cheaper alternative** to roaming calls:
  - **Incoming text messages are usually free,** while **outgoing messages are significantly cheaper than making a call** (local or to the country of origin)
  - **Multimedia messaging and data services have limited availability, similar rate structures** per trafficked megabyte (MB) **and tend to be expensive** (~18 USD/MB average price)
- Although rare, **discounts within the alliances can reach up to 40%**

South American roaming market: Executive summary (cont.)

Economic aspects (cont.)

- **Operators are reinforcing the transparency of services and rates:**
  - **User knowledge of services and rates is reasonable,** but opportunities exist to improve client satisfaction **by increasing their understanding** of the service offering and pricing structures
  - **Pricing information to customers** on operator web sites and by call centers **could be clearer and more transparent**
  - **South American operators are standardizing their international roaming rates** in an effort to increase transparency to the customer
- **There is low availability of prepaid roaming** in the region because few operators offer the service
- **Alternative services to roaming**, although cheaper, are **less convenient**
- For the client, the **cost per minute** of roaming is significantly higher than that of competing services...
- ...and even considering the additional associated costs, these alternative services generate savings after the first 6 minutes for a local call and the first 3 minutes for a call to the home country

Tax aspects

- **Roaming** services face the **problem of double taxation because of the dual application of locality and residency concepts**, though the **tax burden is concentrated in indirect taxes** (VAT and other related sales taxes)
- Crossing indirect taxes from inbound and outbound billing generates an **intra-regional VAT matrix from which it becomes evident that, in the majority of cases** (72%), **revenue from intra-regional roaming is affected by double taxation**
- With the effect of double taxation of VAT and other fees*, **roaming services are 35 to 60% more expensive than when excluding taxes**
- The **Melbourne agreement established a residency criterion to avoid double taxation, but** due to the lack of a specific definition for roaming, the criterion is **generally not applied**

---

* Includes indirect taxes other than VAT and regulatory fees

South American roaming market: Executive summary (cont.)

Technical aspects

- **Roaming service is activated with a request to the visited network**, which after **authorization from the requestor's home network**, establishes the connection
- **The home public mobile network (HPMN) operator applies traffic steering techniques to guide traffic** through established alliances to take advantage of preferential pricing
- **The two most common methods** for the implementation of **prepaid roaming are USSD Callback and CAMEL, with the CAMEL method being the most widely adopted** both globally and in South America
- South American operators he **complexity of implementing CAMEL** has been indicated by the South American operators as a **major obstacle in expanding prepaid roaming coverage** in the region

Industry initiatives

- **Industry initiatives** focus on the problem of **fraud:**
  - **Fraud causes significant losses** for operators (3 to 5% of revenues), with ~24% occurring in roaming situations
  - The greatest risk of roaming fraud is due to the **delay in the exchange of information between operators, for which GSMA developed an initiative to implement NRTRDE** in order to significantly reduce the time for information exchange
  - **South America is relatively advanced** in the implementation of the NRTRDE initiative (~83% of operators "on-track“)

Growth prospects

- **Significant growth is expected in intra-regional roaming,** which is becoming increasingly important for operators:
  - **It is estimated that intra-regional travel in South America is growing at 12% per year**, reaching 24 million trips in 2012
  - In the current scenario, the market players describe **South American roaming users as predominantly corporate, but with significant and increasing participation of individuals**
  - **The roaming base is estimated to grow 21% annually, leveraged by the increased availability of prepaid roaming** (from 7% of roamers in 2008 to 18% in 2012)
  - **Roaming revenues should reach USD ~1 billion in 2012**, with a 1.6% share of total revenues
- **In considering alternative scenarios, a 33% increase in the prepaid roaming base increases revenues by ~1%**

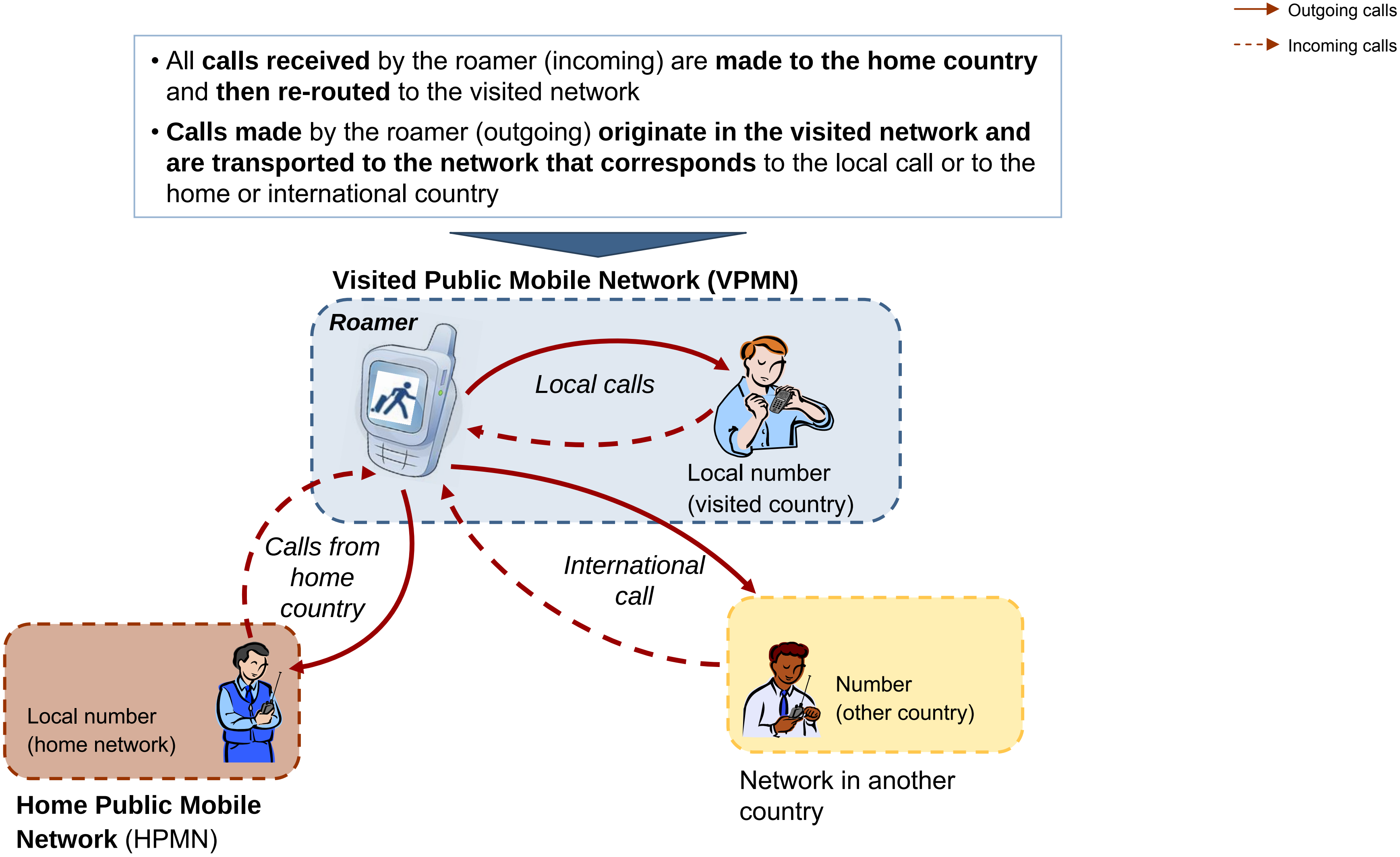
Document contents

Figure 37 - Conceptual illustration of roaming service

Roaming users have the ability to communicate within the visited country, with their country of origin (home country), and with other international destinations

CONCEPTUAL

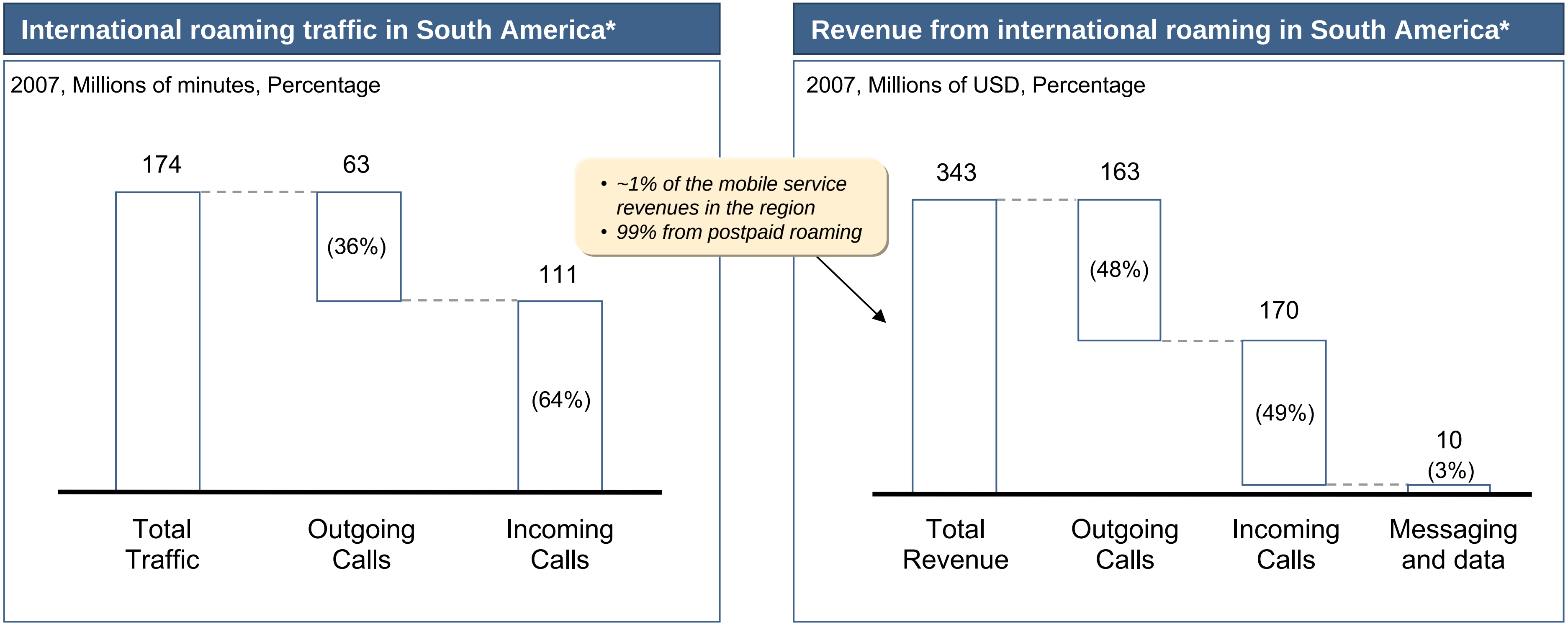
- All **calls received** by the roamer (incoming) are **made to the home country** and **then re-routed** to the visited network
- **Calls made** by the roamer (outgoing) **originate in the visited network and are transported to the network that corresponds** to the local call or to the home or international country



Source: ARCEP, Interviews, Work team analysis

Figure 38 - Traffic of minutes and revenue for South American international roaming

The size of the international intra-regional roaming market is estimated at ~174M minutes and USD ~343M (~1% of total revenue)



International roaming traffic in South America*

2007, Millions of minutes, Percentage

- *~1% of the mobile service revenues in the region*
- *99% from postpaid roaming*

Revenue from international roaming in South America*

2007, Millions of USD, Percentage

- Intra-regional roaming still represents a relatively low percentage of total revenue
- Incoming calls are the largest component of traffic (64%), while both outgoing and incoming calls generate a similar percentage of total revenue (48-49%)
- Messaging and data services are still emerging, comprising only 3% of revenue

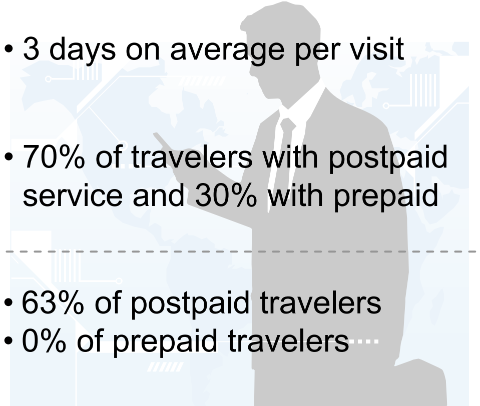
* Considers only intra-regional roaming among the 12 South American countries analyzed in the study

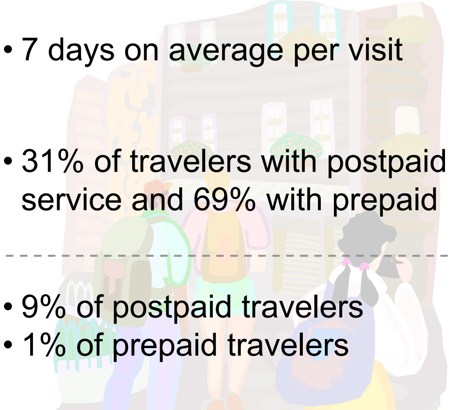
Source: ITU, The Mobile World, WSCI Informa, Telegeography, WTO, Operator web sites, Interviews, Work team analysis

Figure 39 - Profile of business and leisure travelers

Business travelers are the main roaming users, with a postpaid ARPU of USD 154 per trip

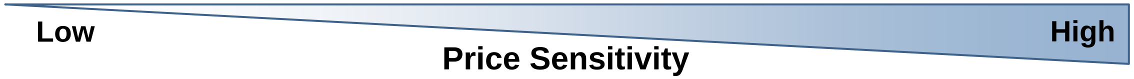
2007





		Business travelers	Leisure travelers
Travel character-istics	**Annual visits**	• ~4.8M visits (38% of all trips)	• ~7.8M visits (62% of all trips)
	Average stay	• 3 days on average per visit	• 7 days on average per visit
	Type of mobile subscription	• 70% of travelers with postpaid service and 30% with prepaid	• 31% of travelers with postpaid service and 69% with prepaid
Roaming utilization	**% Utilization of roaming**	• 63% of postpaid travelers • 0% of prepaid travelers	• 9% of postpaid travelers • 1% of prepaid travelers
	Annual travel using roaming	• 2.1M trips (90% of all trips utilize roaming)	• 0.1M trips (10% of all trips utilize roaming)
	Average minutes of use	• Postpaid: 10 minutes outgoing and 17 minutes incoming per day	• Postpaid: 1.5 min outgoing and 3 min incoming per day • Prepaid: 0.3 min outgoing and 1 min incoming per day
	ARPU per trip*	• Postpaid: USD 154	• Postpaid: USD 61 • Prepaid: USD 18

Prepaid ARPU relatively high because service predominantly used by high-end segment



Price Sensitivity

Source: UN WTO, EIU, Telegeography, Informa, Operator interviews, Work team analysis

Figure 40 - Current situation and features of the South American roaming offer

The South American roaming offer could be extended with increased availability of prepaid roaming and more additional services for users

○ Low availability
● High Availability

Features	Current Situation			
Service availability in South America (coverage)	**Payment method**	**Voice**	**Messaging (SMS)**	**Data**
	Postpaid	◕	◕	◑ • In development (eg. operators in Venezuela and Bolivia)
		← Coverage in almost all countries →		
	Prepaid	◔	◔	○ • Almost non-existent
		← Coverage in development (the operator with greatest coverage has coverage in 5 of the 12 countries) →		

There are cases where only SMS service is available → Prepaid

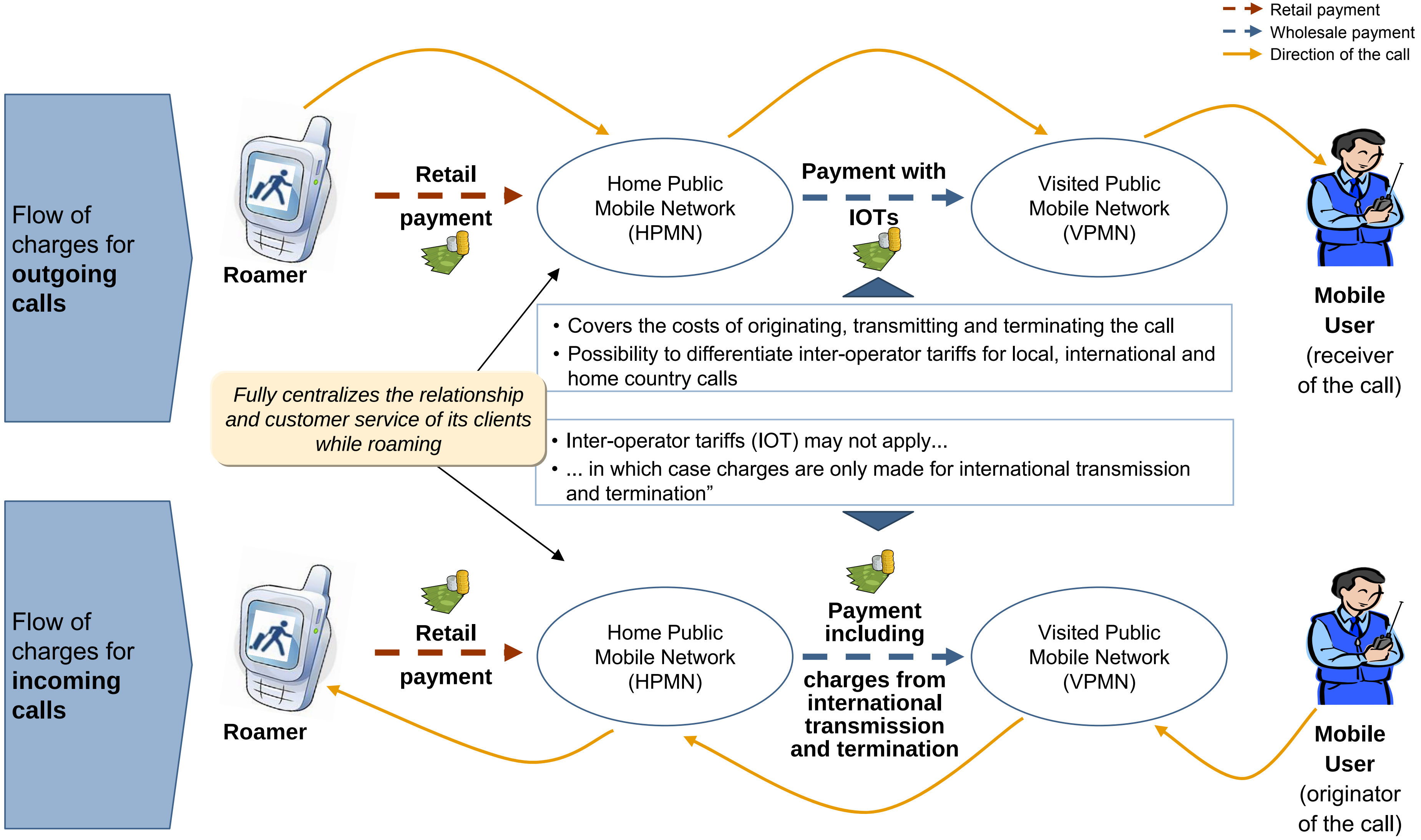
Features	Service		Characteristics	Observations
Additional services for users	**Welcome message**	◔	• Message with customer service number and the name of the preferential roaming service operator	• Customer service number can be in the SIM card
	Customer service	◔	• Shortcut dialing and free or preferred rate	• Some operators provide the option of making collect calls to customer service
	Voice mail	◔	• Shortcut dialing and free or preferred rate	• Can generate charges to the client for sending unanswered calls to voicemail
	Caller ID	◔	• Determines the identity of the calling number	• With the majority of roaming cases, identity appears as the word "private", preventing the identification of the caller

- *Currently in some cases through dialing numbers of the country of origin...* → Customer service
- *...at the cost of an outgoing call to that country* → Voice mail

Source: Interviews and opinion survey with relevant stakeholders in the South American roaming market

Figure 41 - Diagram of the flow of charges for outgoing and incoming calls

Inter-operator tariffs (IOT) can vary widely between incoming and outgoing services...



- Retail payment
- Wholesale payment
- Direction of the call

Flow of charges for **outgoing calls**

Roamer

Retail payment

Home Public Mobile Network (HPMN)

Payment with IOTs

Visited Public Mobile Network (VPMN)

Mobile User (receiver of the call)

- Covers the costs of originating, transmitting and terminating the call
- Possibility to differentiate inter-operator tariffs for local, international and home country calls

Fully centralizes the relationship and customer service of its clients while roaming

- Inter-operator tariffs (IOT) may not apply...
- ... in which case charges are only made for international transmission and termination”

Flow of charges for **incoming calls**

Roamer

Retail payment

Home Public Mobile Network (HPMN)

Payment including charges from international transmission and termination

Visited Public Mobile Network (VPMN)

Mobile User (originator of the call)

Source: ARCEP, Interviews, Work team analysis

Figure 42 - Description of the typical features and important considerations of roaming agreements between operators

...and are established in roaming agreements, which are private contracts between operators

Typical features of roaming agreements	Description/important considerations
Non-exclusivity	• **Both operators can sign roaming contracts with other** operators in the same area of coverage of the agreement
Restricted to operators with their own network	• **Mobile Virtual Network Operators (MVNOs) cannot make their own roaming agreements** • When an MVNO subscriber travels abroad, the applicable IOTs are those from the established agreements by the host operator of the MVNO
Bilateralism	• **Both operators can use the network of the other on a reciprocal basis** to provide roaming
Impartial inter-operator tariffs	• Inter-operator tariffs charged by an operator are valid for any other operator interested in forming a roaming agreement • Each operator has an IOT standard and it is available for other operators, but the document is confidential in a bilateral relationship
Volume discounts	• Volume discounts applied to the IOT are agreed upon among the operators in a **partial and confidential manner** • **Discounts from South American roaming agreements are estimated to vary 30 to 35%**
Currency in U.S. Dollars (USD) or Euros	• Inter-operator tariffs are generally established in U.S. Dollars, except for some cases which use Euros, Special Drawing Rights (SDRs), or local currency • The use of **multiple currencies hinders the administration of uniform retail rates**
Full services	• The **inter-operator tariff usually includes the services of call origination, transmission and termination end-to-end** • Currently some operators offer an unbundled method, although this offer is still not common in South America

Sources: ARCEP, Informa Telecom, Interviews with South American operators

Figure 43 - Parameters of inter-operator tariffs in South America

Inter-operator tariffs are distinguished by voice and data, each with specific billing parameters

	Parameters of inter-operator tariffs	Typical figures in South America*	Important considerations
Voice service	**Calls received while roaming**	• 0.18 - 1.16 USD/min	• -
	Calls made while roaming	• **Domestic:** 0.55 - 0.95 USD/min • **To the South American country of origin:** 0.92 - 3.02 USD/min	• In general, the charges for calls to fixed networks are the same as those applied to mobile networks • In certain cases the charge for calls to certain mobile networks can vary widely
	Pricing metrics	• **Set-up fee: no charge - 0.56 USD** • **Minimum pricing interval**: 60 seconds • **Peak hour with highest rate**: not usually defined in South America	• Set-up fee is not usually charged (the fee is charged per minute, hence, to completed calls) • The duration of the calls are usually rounded up to the minute
Messaging	**SMS received while roaming**	• **No commission**	• Globally, some networks have begun charging for this service
	SMS sent while roaming	• 0.22 - 0.40 USD/message	• Some networks are beginning to use GPRS to transmit SMSs
Data Services	**Data received or sent while roaming**	• 10.50 - 15.45 USD/MB	• Multimedia messaging (MMS) is usually treated as a data service
	Pricing metrics	• Minimum traffic pricing: 1 – 250 KB, with rounding between 1 – 100KB	• Data traffic is often rounded up when billed

* Gross values with taxes and without discounts

Sources: Informa Telecom, interviews with South American operators

Figure 44 - Types of roaming alliances

Mobile operators form regional alliances to create differentiation in their roaming service

Differentiation strategies

- Lowest rate
- Common brand
- Uniform roaming experience
- Superior service quality
- Availability of prepaid roaming service

Roaming Partnerships

Types of Alliances	Description	Examples
Large business groups	• **Investor with dominant participation** in several operators	• **América Móvil** (Latin America) • **Telefónica** (Latin America) • **Vodafone** (World) • **Millicom/Tigo** (World)
Equitable representation	• **Structure of proportional representation*** of the operators	• **FreeMove** (predominantly in Europe) • **Bridge Mobile Alliance** (Asia)
Independent operators	• **Isonomic representation** with equal voting rights by the operators	• **Roaming Alliance** (Latin America) • **Asia Pacific Mobile Alliance** (Asia) • **Starmap** (Europe)

* Degree measured in terms of number of subscribers or revenue

Source: Informa Telecom, Work team analysis

Figure 45 - Roaming alliances in South America

In South America there are three alliances: two by business groups and one by independent operators

2007, Millions of subscribers

Alliances		Claro	movistar	**Roaming Alliance**
Type		• Business group (América Móvil)	• Business group (Telefónica)	• Independent operators
Operators by country	Argentina	CTI/Claro	Movistar	Telecom Personal
	Bolivia	-	-	Entel Móvil
	Brazil	Claro	Vivo	Tim Brasil
	Chile	Claro	Movistar	Entel PCS
	Colombia	Comcel/Claro	Movistar	Tigo (formerly Ola)
	Ecuador	Conecel/Claro	Movistar	-
	Guyana	-	-	-
	Paraguay	CTI/Claro	-	Personal
	Peru	Claro	Movistar	-
	Suriname	-	-	-
	Uruguay	CTI/Claro	Movistar	Ancel
	Venezuela	-	Movistar	Digitel
Total number of clients		**• 81.9M**	**• 83.7M**	**• 60.5M**
Percentage of clients to total in the region		**• 30.3%**	**• 31.0%**	**• 22.4%**

~84% of total South American mobile users are clients of operators that belong to alliances

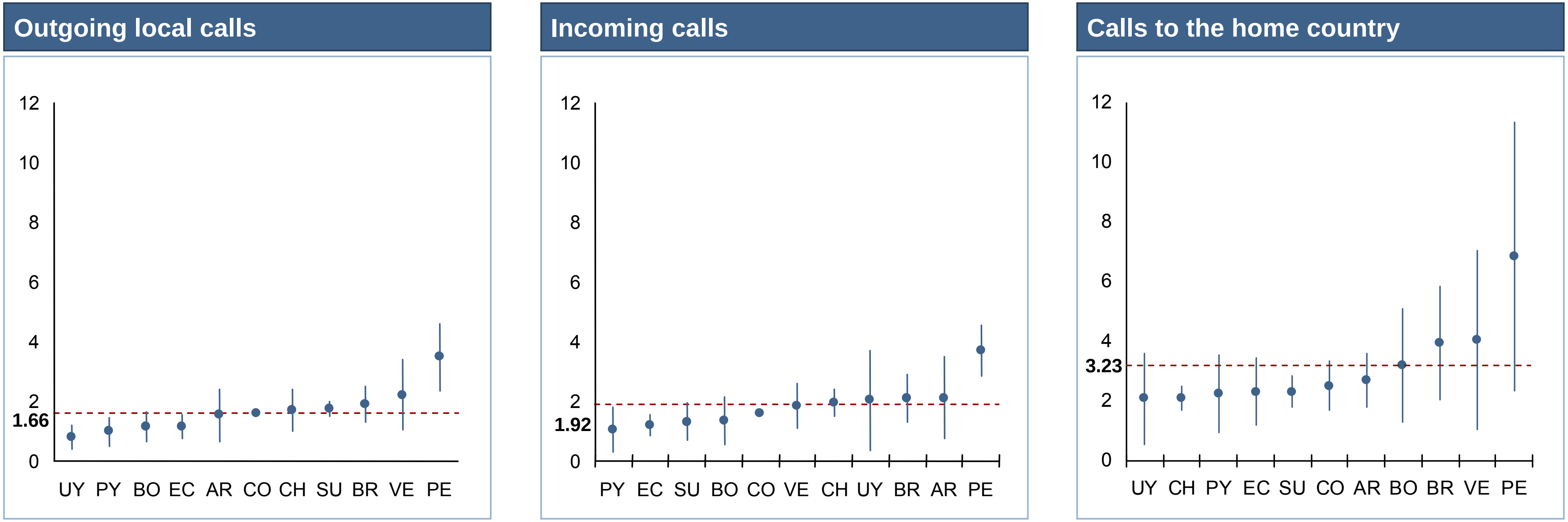
Source: WCIS, Work team analysis

Document contents

Figure 46 - South American operator retail roaming rates for roaming calls

Retail rates for roaming calls vary widely among South American countries

2008, USD retail rate per minute*, Taxes included



- **The median South American ARPU** (USD ~14) **only lasts for 7 minutes of incoming** roaming calls
- **Price variations in the same country can fluctuate up to 75% from average levels**
- Among the most common voice traffic, **outgoing local calls are usually the cheapest** (~1.66 USD/min, average) and **calls to the country of origin the most expensive** (3.23 USD/min, average)
- **Countries where the operators charge the highest prices are Peru, Venezuela and Brazil**

* Rates based on regular charges and do not consider specific promotions or unreasonably high prices (outliers)

Source: Web pages and customer service centers of each consulted operator, Work team analysis

Figure 47 - South American operator retail roaming rates for SMS, MMS and data

Text messaging (SMS) is a cheaper alternative to roaming calls

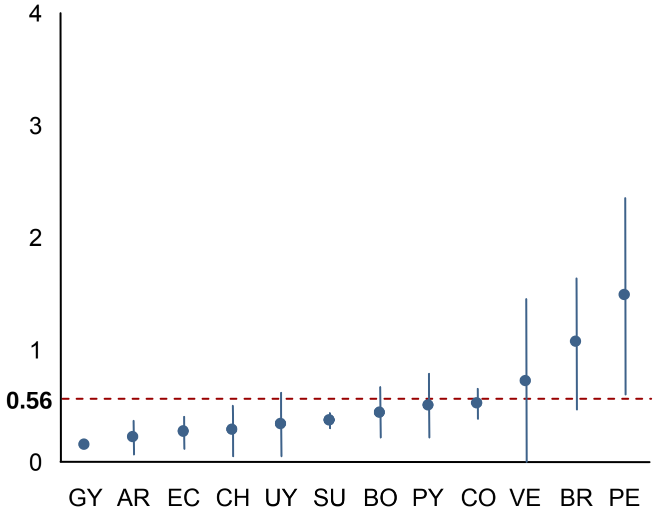
2008, USD retail rate per message*, USD retail rate per MB*, Taxes included

--- Average price

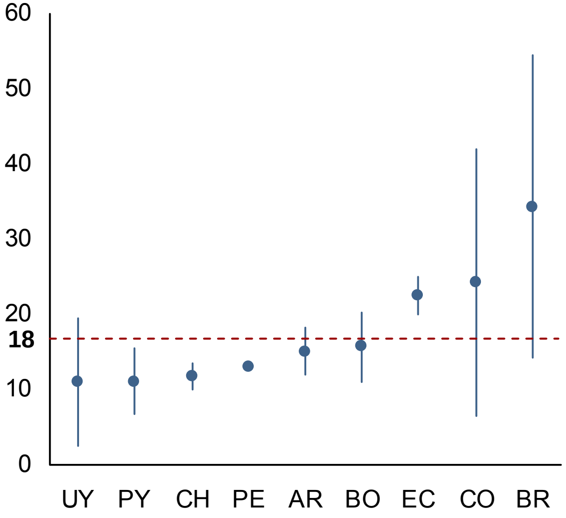
Incoming text messages

- **No charge by almost all operators in South America****

Outgoing text messages



MMS and data traffic



- **Incoming text messages are usually free,** while **outgoing messages are significantly cheaper than making a call** (local or to the home country)
- **Multimedia messaging and data services have limited availability, similar rate structure** (per trafficked MB) **and tend to be expensive** (on average USD ~18/MB)

* See Roaming Agreements Annex

** Rates based on regular charges and do not consider specific promotions or unreasonably high prices (outliers)

Source: Web pages and customer service centers of each consulted operator, Work team analysis

Figure 48 - International roaming offer from South American alliances

Although rare, discounts within alliances can reach up to 40 %

2008

Alliance	movistar	Claro	**Roaming Alliance**
International roaming offer	• Movistar Passport - Uniform rates for the following countries: . Argentina . Peru . Brazil . Uruguay . Colombia . Venezuela . Ecuador	• Does not provide an explicit differentiated offer within the group	• Offer not explicitly communicated: . Argentina . Paraguay . Bolivia . Brazil . Uruguay . Chile . Venezuela . Colombia
Pricing differentials within the alliance	✗ Present among operators outside the group	✓ Present in some South American countries (eg. Argentina/Brazil), but not with all operators	✓ Present among the operators that form the alliance
Discounts	• N.A.	• Discounts on calls: - Local: 15-17% - Country of origin: 17-31% - SMS: no discount	• Up to 40% discount on calls

Discounts given are unclearly communicated

Source: Web pages and customer service centers of each consulted operator, Work team analysis

Figure 49 - Current situation and difficulties regarding awareness and satisfaction of roaming services

User knowledge of services and rates is reasonable, but opportunities exist to improve client satisfaction through improved communication of the service offering

○ Low
● High

		Current Situation		Difficulties
Awareness	**Roaming service**	◕	- Service is well-known among users because of communication via: - Mobile user **guides/brochures** - Operator **web sites**	- -
	Rates	◑	- The operators have made efforts to **standardize and simplify** roaming fees	- **The inter-operator tariffs are in USD or Euros, and the volatility of exchange rates** makes it difficult to maintain uniformity
Satisfaction	**Quality**	◔	- **Lower quality** than conventional mobile experience (in home country)	- User belief that **roaming service cannot have the same quality** as that of local service
	Coverage	◑	- Need for **multi-band mobile handsets**	- **Non-complementary mobile frequency ranges** of the South American countries
	Service utilization	◑	- **Need to enable service** - **Difficulties in making calls** (eg. use of network service provider selection code for visitors in Brazil to make long distance calls)	- In general, the **service is not automatically enabled because of the risk of fraud** - **Lack of complementary rules for calls** between South American countries

*While operators make efforts to increase international roaming, they perceive that **most of the dissatisfaction** is due to **the lack of client understanding regarding the structure of services and rates***

Source: Interviews and opinion survey with relevant stakeholders in the South American roaming market

Figure 50 - Quality of information on rates provided to the client, by country

Information on operator web sites and by call centers about client rates should be clearer and more transparent

	Web site					Customer service*	
	Researched operators with information on web site are:	Main problems with the inquiry					
Country		Rates do not include VAT	Info. out of date	Confusing information about roaming	Incomplete rate info. for South America	Unawareness of the service by front-end support	Lack of problem resolution
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	✓	✓	✓	✓	✓	

* Inquiries made in the event that the web site did not have full information on roaming

Source: Web pages and customer service centers of each consulted operator, Work team analysis

Figure 51 - Level of uniformity of rates, by country

South American operators are standardizing their international roaming rates in an effort to increase transparency to the customer

○ No operator with standardized rates

● 100% of national mobile operators with standardized rates

Uniformity of rates

Country	International roaming calls		To country of origin	Outgoing SMS	MMS and Data
	Local	Incoming			
Argentina	◕	◕	◕	◕	◕
Bolivia	○	○	○	○	Without Service
Brazil	◕	◕	◕	◕	◕
Chile	●	●	●	●	●
Colombia	●	●	●	●	●
Ecuador	●	●	●	●	●
Guyana	●	●	●	●	●
Paraguay	○	◔	○	○	○
Peru	◑	●	◑	◑	◑
Suriname	○	○	○	◑	○
Uruguay	◔	◔	◔	◔	◔
Venezuela	◔	◔	◔	◕	Without Service

- Operators are standardizing their rates for **the majority of South American countries....**
- ...on their **own initiative** (without public intervention) within their specific business strategies
- **Standardization** of rates:
  - **Covers the main roaming services**
  - Implies greater **complexity in the management of wholesale costs and exchange rate risk**

Source: Web sites of the consulted operators, Work team analysis

Figure 52 - Matrix of prepaid roaming availability in South America

There is low availability of prepaid roaming in the region because few operators offer the service

☐ 0
▨ 2
☐ 1
■ 3 or more

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	■

TIM Brasil has prepaid service with 15 countries

Service only for transferring data

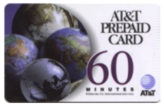
Prepaid roaming coverage is currently limited to certain regions with the greatest flows of travel, *reflecting the* ***lack of development of this component throughout South America***

Figure 53 - Detail of alternative services to roaming

Alternative services to roaming, although cheaper, are not as convenient

NON-EXHAUSTIVE

○ Indifferent
● Significantly cheaper

Alternative services		Rates related to roaming		Inconveniences				
Service	**Description**	**Local calls**	**International calls**	**Purchasing of cards**	**Credit charge**	**Ability to be reached***	**Cannot receive calls**	**Internet connection required**
Long-distance calling card 	• Fixed price for free minutes on international calls • Card has PIN code	◕	◕	✓	✓	✓	✓	
Local prepaid SIM card 	• Prepaid SIM card of the operator in the visited country • Service preserves mobility	◕	◔	✓	✓	✓		
Voice over IP (VoIP) 	• Use of services such as Skype, Vonage, UMA, to make calls via the internet	●	●		✓	✓	✓ • Only able to receive when online	✓

***Given the drawbacks,** mobile operators usually **do not consider these alternative services as substitutes** to roaming*

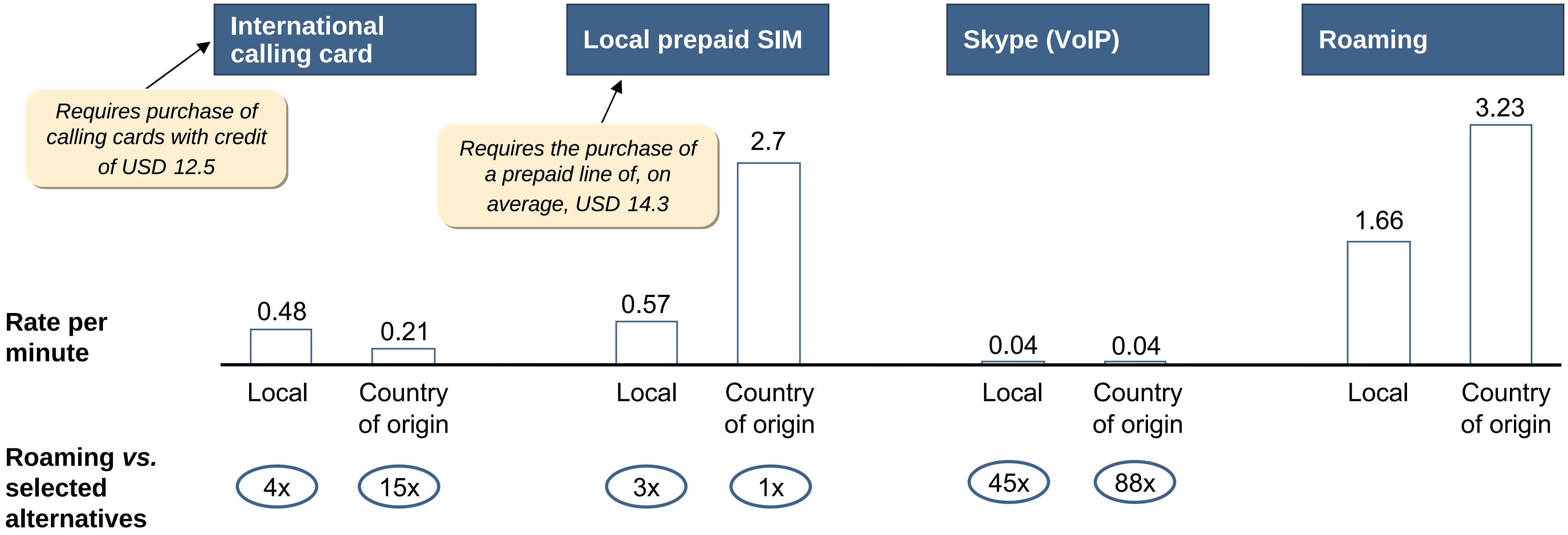
* Able to be contacted at all times with the same number, even while in roaming

Source: Web sites of international card providers, Operator web sites, Skype, Work team analysis

Figure 54 - Rate per minute for roaming, by type of service

The cost per minute of roaming is significantly higher than that of alternative services...

USD/minute, Taxes included, Pool of selected countries*



Requires purchase of calling cards with credit of USD 12.5

Requires the purchase of a prepaid line of, on average, USD 14.3

- **Despite its availability limited** to locations with internet access, **Skype** (VoIP) is the **most economical option**
- The **second most economical option** is the **prepaid card**, which has **rates fifteen times lower than roaming** calls to the country of origin, and four times lower for local calls
- **Local prepaid service** does not have benefits for calls to the country of origin but is **highly convenient for local calls** and shares the **mobility and "always on" features** of roaming

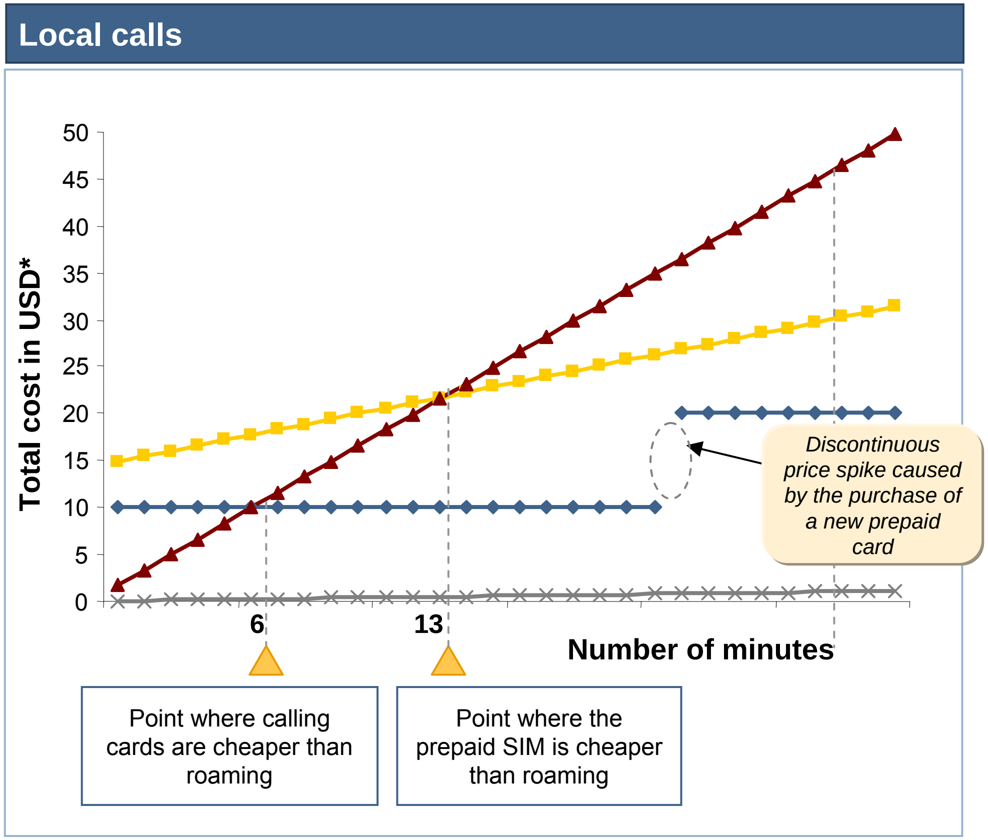
* Calls crossed between Argentina-Brazil and Venezuela-Colombia

Source: Web sites of international card providers, Operator web sites, Skype, Work team analysis

Figure 55 - Analysis of the total cost in USD vs. number of minutes for local calls and calls to the home country

...and even considering additional associated costs, these alternative services generate savings after the first 6 minutes of a local call or 3 minutes of a call to the home country

USD/minute with taxes, Pool of selected countries*

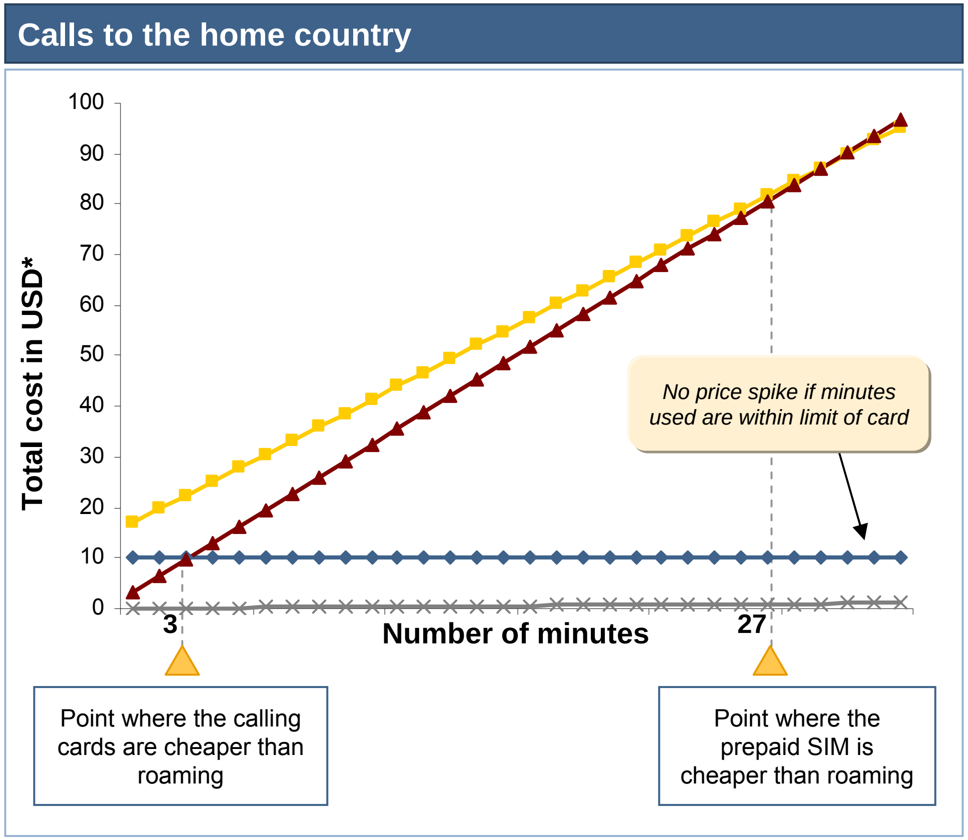


Local calls

Discontinuous price spike caused by the purchase of a new prepaid card

Point where calling cards are cheaper than roaming

Point where the prepaid SIM is cheaper than roaming



Calls to the home country

No price spike if minutes used are within limit of card

Point where the calling cards are cheaper than roaming

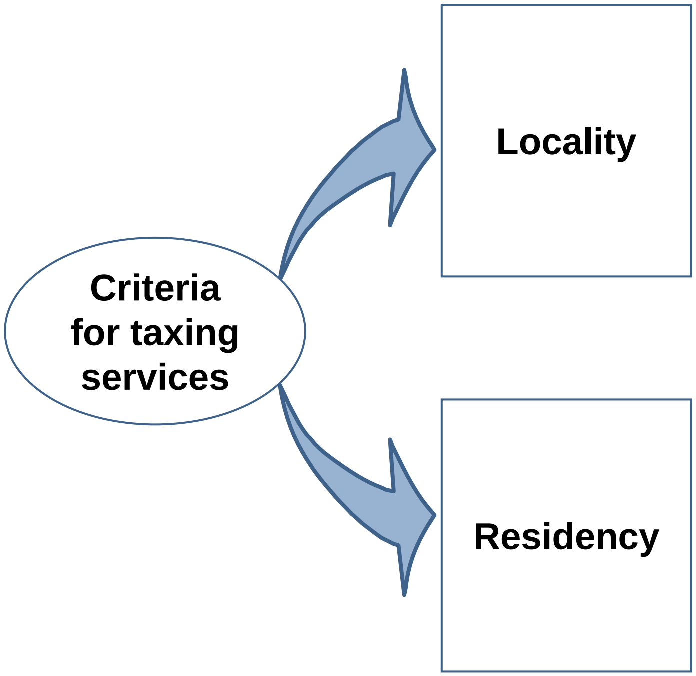
Point where the prepaid SIM is cheaper than roaming

Note: Considers the additional costs of purchasing SIM for local prepaid and minimum purchase price for calling cards
* Calls crossed between Argentina-Brazil and Venezuela-Colombia
Source: Web sites of international card providers, operator web sites, Skype, Work team analysis

Document contents

Figure 56 - Criteria for taxing services

Roaming services face the problem of double taxation in the application of concepts of locality and residency...



Locality

Rational

- **Taxes are paid** in the country **where the services were rendered**
- There is no distinction between whether the service is provided to residents or non-residents of the country

Application to roaming

- **Impacts the inter-operator tariffs** that the visited network applies to the **home network**
- Justified because the billing for roaming in the visited country (inbound) is for a service utilized in that country

Residency

Rational

- **Taxes are paid** in the country **where the end user is billed** (eg. roaming user)
- The component of the costs that originated abroad can be considered as an imported service

Application to roaming

- Impacts the **retail rates** that the home network applies **to the roamer**
- Justified because the roaming service abroad (outbound) is billed in the roamer's home country

- **Locality and residency criteria overlap** in the allocation of taxes, **creating double taxation**
- To **avoid double taxation**, **coordinated or complementary tax agreements** between the roamer's home country and the visited country should be established

Source: Tax experts, Web sites of regional tax organizations

Figure 57 - Types of taxes applicable to roaming by level of double taxation

...although the double taxation charge is mainly concentrated in indirect taxes

Level of double taxation: **High** → **Low**

	Application features for roaming
Indirect taxes (on consumption)	• **VAT is the main indirect tax** in the region, with **rates between 9 and 25%,** depending on the country • **Roaming suffers double taxation in the visited country** (inbound billing) and **in the roamer's home country** (outbound billing)
Regulatory and sectorial taxes	• Several taxes **applied** in general **on the billing from the operator** (financing the regulation or universal service funds), with **lower rates at 5%** ... • **Roaming suffers double taxation in the visited country** (inbound billing) and **in the roamer's home country** (outbound billing)
Direct taxes (on income and capital)	• **Without distinct effect on roaming,** since it applies to the overall operation of the company • In principle, **does not generate double taxation in roaming** because of the nature of the type of tax, where the **inbound billing is a cost of the outbound income**

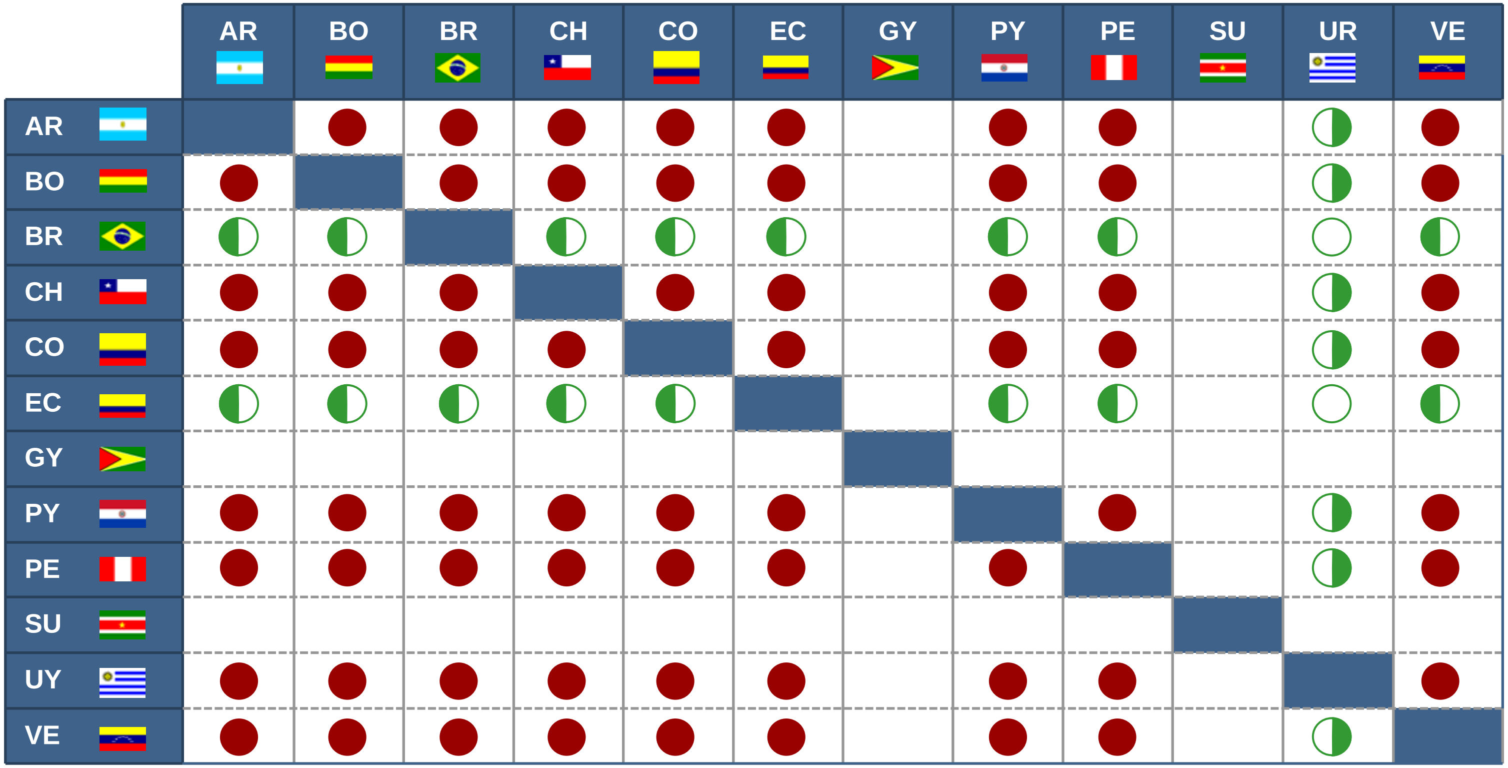
- *In general, to resolve double taxation, **VAT** can be applied using either the locality or residency criteria, but not both,...*
- *...which is only now in the process of **being implemented in the Andean Community** (Art.12 Decision 599),...*
- *...but it is **still not clear for roaming***

Source: Tax experts, Web sites of regional tax organizations

Figure 58 - Intra-regional VAT matrix

Crossing the taxes for both inbound and outbound billing generates an intra-regional VAT matrix,...

● Double taxation
◑ Non-taxed outbound
◐ Non-taxed inbound
○ Never taxed



Country of origin (outbound billing)

Destination country (inbound billing)

	AR	BO	BR	CH	CO	EC	GY	PY	PE	SU	UR	VE
AR		●	●	●	●	●		●	●		◑	●
BO	●		●	●	●	●		●	●		◑	●
BR	◐	◐		◐	◐	◐		◐	◐		○	◐
CH	●	●	●		●	●		●	●		◑	●
CO	●	●	●	●		●		●	●		◑	●
EC	◐	◐	◐	◐	◐			◐	◐		○	◐
GY												
PY	●	●	●	●	●	●			●		◑	●
PE	●	●	●	●	●	●		●			◑	●
SU												
UY	●	●	●	●	●	●		●	●			●
VE	●	●	●	●	●	●		●	●		◑	

- In most cases there is double taxation for roaming, except for...
- ...Brazil, which does not tax the inbound service, because it is considered an exported service...
- ...Ecuador, which does not tax the inbound service by applying the residency criterion to the VAT ...
- ...and Uruguay, which does not tax outbound services by applying the locality criterion to the VAT

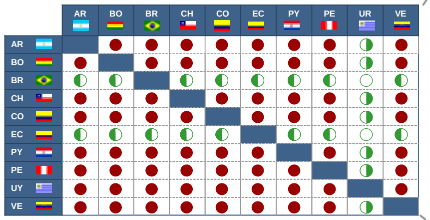
Source: Tax experts, Web sites of regional tax organizations

Figure 59 - Analysis of South American cases, by type of tax

…which shows that, in the majority of cases (72%), revenue from intra-regional roaming is affected by double taxation

2008, Number of cases, Percentage

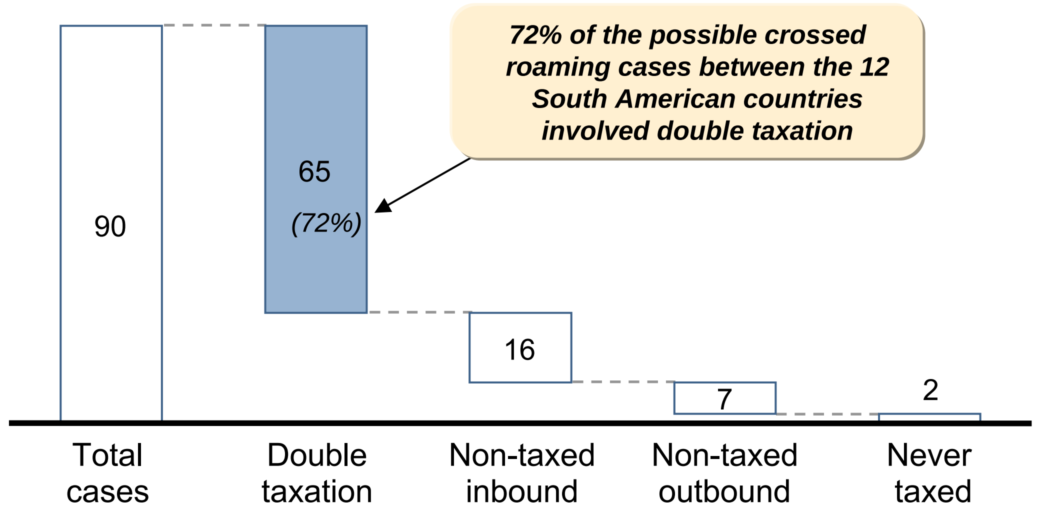
Regional VAT matrix



	AR	BO	BR	CH	CO	EC	PY	PE	UR	VE
AR		●	●	●	●	●	●	●	◑	●
BO	●		●	●	●	●	●	●	◑	●
BR	◐	◐		◐	◐	◐	◐	◐	○	◐
CH	●	●	●		●	●	●	●	◑	●
CO	●	●	●	●		●	●	●	◑	●
EC	◐	◐	◐	◐	◐		◐	◐	○	◐
PY	●	●	●	●	●	●		●	◑	●
PE	●	●	●	●	●	●	●		◑	●
UY	●	●	●	●	●	●	●	●		●
VE	●	●	●	●	●	●	●	●	◑	

90 possible cases among the ten countries analyzed

Types of intra-regional taxes



72% of the possible crossed roaming cases between the 12 South American countries involved double taxation

Source: Tax experts, Web sites of regional tax organizations

Figure 60 - Impact of various taxes at the full final rate

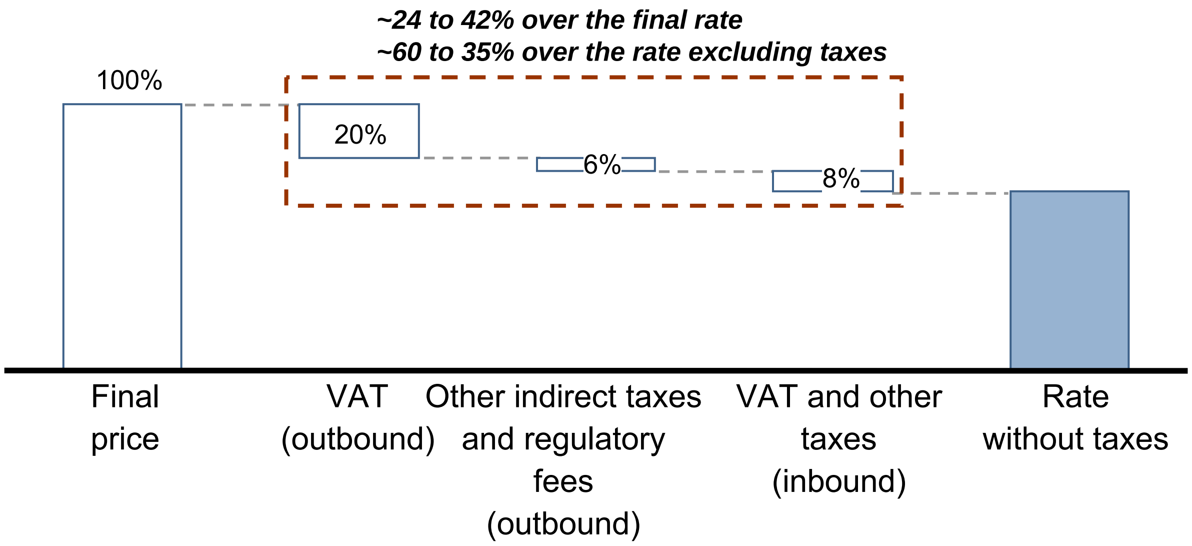
As an effect of the double taxation of VAT and other fees*, roaming services end up being 35 to 60% more expensive than when excluding taxes

2008, Average percentage

Estimation criteria

- Consideration of **indirect taxes and regulatory fees** applied to **inter-operator tariffs and retail rates**
- **Impact assessment for selected cases**:
  - Brazilian roamers in Venezuela
  - Venezuelan roamers in Peru
  - Argentine roamers in Bolivia
  - Colombian roamers in Uruguay

Impact of various taxes on the full final rate



* Includes indirect taxes (other than VAT) and regulatory fees

Source: Tax experts, Web sites of regional tax organizations

Figure 61 - Melbourne Agreement

The Melbourne agreement establishes a residency criterion to avoid double taxation, but it lacks specific definition for roaming

Considerations of the Melbourne agreement (1988)

- At the 1988 conference of the International Telecommunications Union (ITU), which is part of the United Nations (UN), the **main articles of international telecommunications regulation** were defined
- In Article 6.1.3 of the Final Act from the mentioned conference, it is written that "Where, in accordance with the national law of a country, **a fiscal tax is levied** on collection charges for international telecommunication services, this tax shall normally be collected only in respect of **international services billed to customers in that country**, unless other arrangements are made to meet special circumstances."
- While more than 177 countries worldwide ratified the Melbourne agreement, in general they each **do not apply the same principles** to **international mobile roaming***, given:
  - The **ambiguous nature** of the articles, which depend on accordance with national laws
  - The **outdated focus of the main articles**, aimed at fixed line operators
- The ITU is expected to hold a **world conference in 2012** where the existing defined **articles will be amended** an most likely **include a more direct mention of roaming** services

- The **Melbourne agreement tries to avoid double taxation by taxing telecommunications services** only in the **country of the end client** (residency criterion)...
- ... however the same **cannot be applied to international roaming for lack of specific definition** of this service
- **A good opportunity** to **eliminate the double taxation of roaming is to promote the inclusion of this topic directly in the 2012 world conference** to amend the original articles defining telecommunications regulation

---

* In some specific cases, such as the European Union, principles of taxation are applied using the residency criterion but within the context of other initiatives

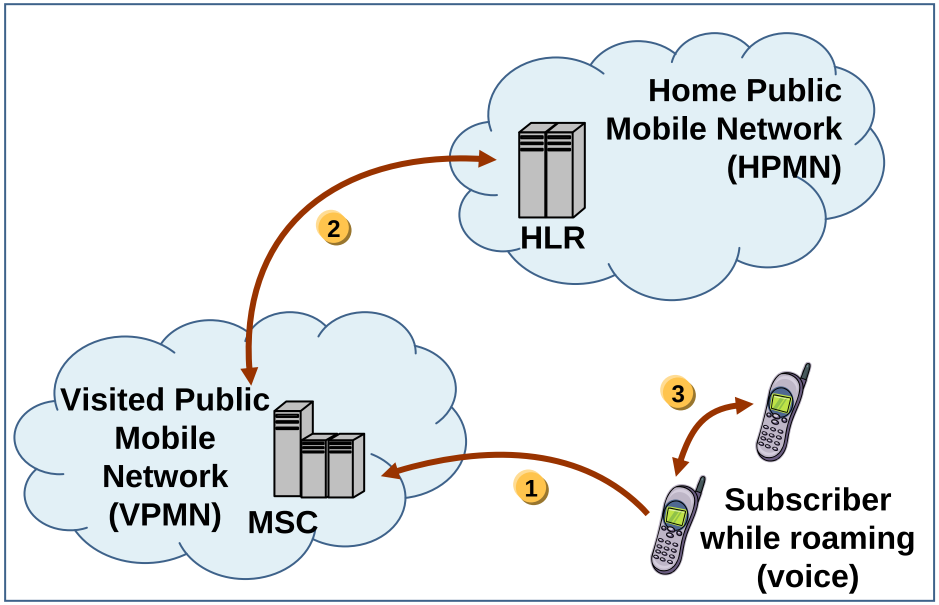
Source: EC Tax Journal, Final Acts of the World Administrative Telegraph and Telephone conference 1988, ITU web site

Document contents

Figure 62 - Activation process for roaming service

Roaming service is activated with a request to the visited network, which after authorization from the requestor's home network, establishes the connection

Roaming: voice

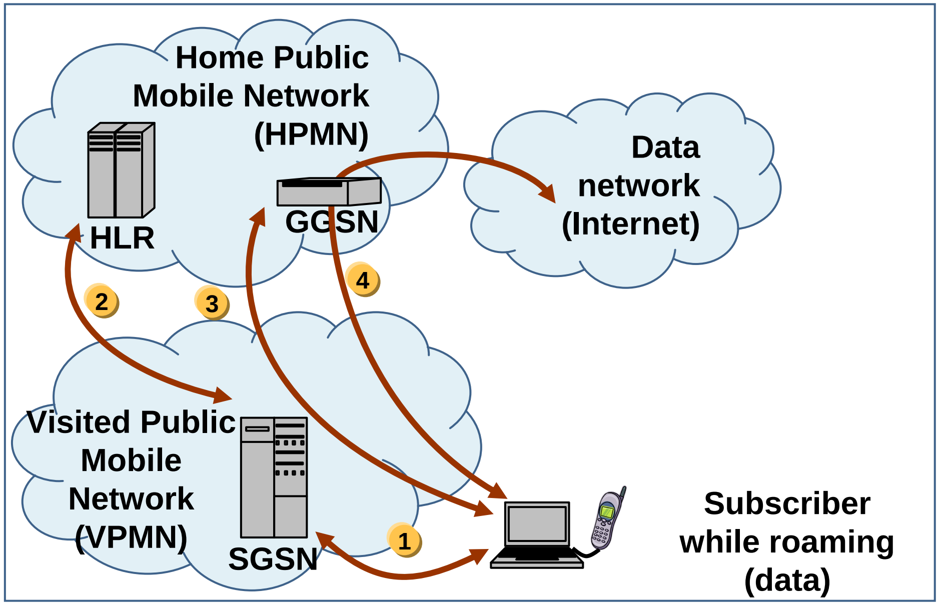


① Connection request to the visited network (MSC)

② Consultation between MSC and Home Location Register (HLR) regarding subscription

③ Establishment of the voice connection

Roaming: data



① Connection request to Serving GPRS Support Node (SGSN)

② Consultation between SGSN and HLR regarding subscription

③ Petition of context establishment to the GGSN

④ Establishment of the data connection

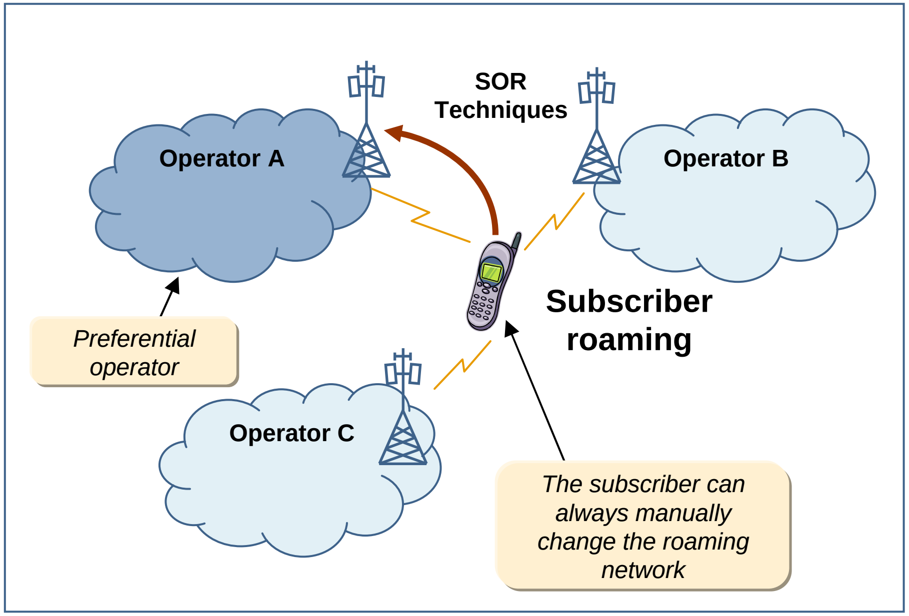
- **Voice and data roaming services differ** in:
  - The **network elements** involved (eg. MSC vs SGSN)
  - **In data roaming, traffic should travel via the HPMN**; with regards to voice, it can also travel via the VPMN

Source: GSMA

Figure 63 - Detail of traffic routing and steering techniques

The home network service provider applies traffic steering techniques to route traffic through established alliances to take advantage of preferential tariffs

Routing of roaming traffic



Steering of Roaming (SOR) Techniques

Techniques	Requirements
List of preferential operators (PMN) **in the SIM cards**	SIM card phase II
Update of Over the Air* (OTA) list	Terminal that supports OTA, together with SIM and list of preferred networks
Routing based in the network (SS7): interception of registered traffic in the visited network, rejecting requests for location updates if the requirement does not come from a preferred visited network	Preparation of the subscriber network for "Smart MAP"

- In roaming, the subscriber has available all the mobile operators in the visited country
- **The home operators guide the client to solicit roaming from preferential operators in the** visited country to take advantage of better rates or services (eg: operator alliances)...
- **...utilizing different steering of roaming (SOR) techniques to maximize the effect**

---

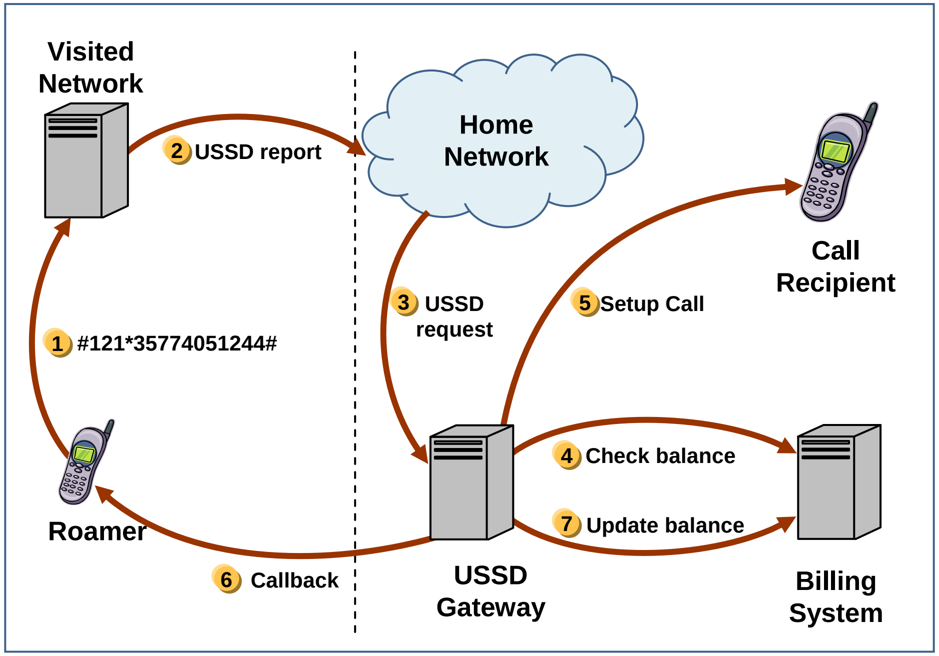
* Method of distributing new software updates to mobile phones or equipping handsets with the necessary setting with which to access services such as WAP or MMS

Source: GSMA

Figure 64 - Prepaid roaming implementation methods: USSD and CAMEL

The two most common methods for implementing prepaid roaming are USSD Callback and CAMEL,...

USSD (Unstructured Supplementary Services Data) **Callback**



Visited Network

Home Network

Call Recipient

Roamer

USSD Gateway

Billing System

① **#121*35774051244#**

② **USSD report**

③ **USSD request**

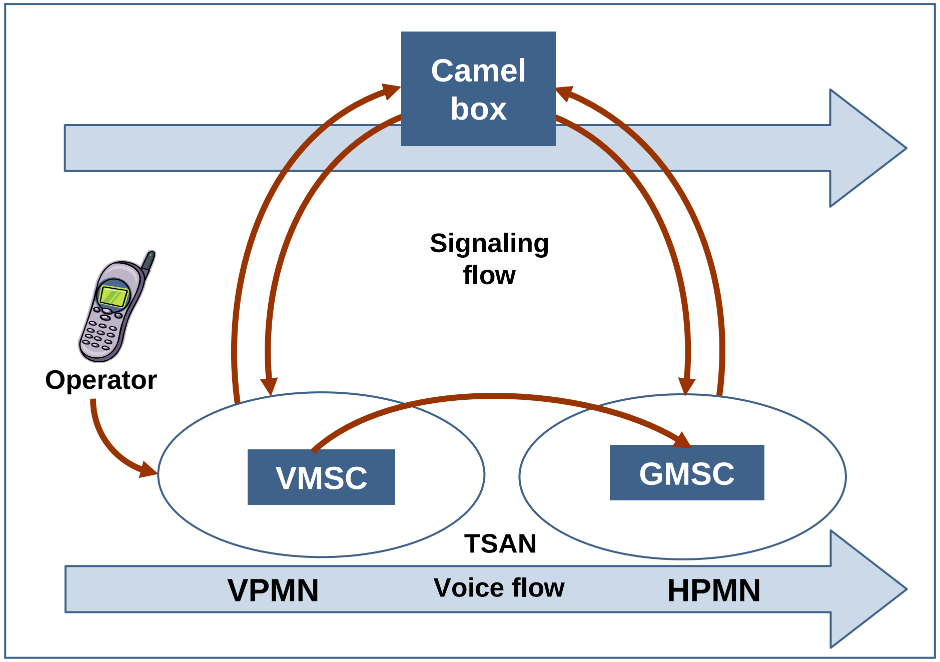
④ **Check balance**

⑤ **Setup Call**

⑥ **Callback**

⑦ **Update balance**

CAMEL (Customized Applications for Mobile Enhanced Logic)



Camel box

Signaling flow

Operator

VMSC

GMSC

TSAN

VPMN

Voice flow

HPMN

- GSM terminal capacity is associated with messaging services but without the ability to store and forward
- Used to transmit information over GSM signaling channels, sending information about available balances for prepaid subscribers

- CAMEL is a specification of ETSI* for Intelligent Networks (IN) in GSM technology
- There are 5 stages of the pattern:
  - Phase II allows prepaid roaming for voice and SMS **
  - Phases III to V: increases the access to prepaid data services

* European Telecommunication Standardization Institute

** Prepaid SMS roaming requires complimentary paths to CAMEL II

Source: Work team analysis

Figure 65 - Features of the USSD and CAMEL methods

...with the CAMEL method being the most widely adopted worldwide and also in South America

Features	USSD Callback		CAMEL	
Global adoption	👉	• 18%*	👍	• 78%* - 12% Phase I - 66% Phase II or higher
User-friendliness	👎	• User must remember a long and complex access code	👍	• Transparent to the user
Operation	👎	• Call is always routed through the HPMN	👍	• Real-time control: can disconnect the call when credit expires
Implementation complexity	👍	• Simple and inexpensive	👎	• Both operators (VPMN and HPMN) must implement particular settings (one-on-one) • Need for software upgrades in the central network and new service control points (SCP) • Difficult to complete technical and transaction trials for roaming launch

4% adopt other prepaid roaming solutions

South American operators indicate the ***complexity of implementing CAMEL*** *as a* ***major obstacle to expanding the coverage of prepaid roaming*** *in the region*

* Represents the 58 operators surveyed worldwide (5 of them in South America)

Sources: Informa Telecom, Interviews with South American operators

Document contents

Figure 66 - Types of the most common fraud cases

Fraud causes significant losses for operators (3 to 5% of revenue), with ~24% occurring in roaming

- *It is estimated that fraud causes losses of 3 to 5% of total telecommunications operator revenue*
- *~24% of fraud losses occur in roaming situations*

🟦 Most common frauds in roaming situations

Type of Fraud	Most common cases of fraud	
	Fraud	**Description**
Process • Inefficient or poorly designed business process	🟦 • **Subscription**	• Using forged or stolen identity to gain access to mobile services (eg. telephone calls, data and m-commerce)
	🟦 • **Calls to premium rate numbers or IRSF** (International Revenue Share Fraud)	• Calls destined for services with differentiated pricing: - Premium rate numbers (900) - High cost numbers to select international destinations (eg. small island nations) - Numeration ranges of satellite services
	🟦 • **Card theft**	• SIM card theft and subsequent activation
	• **Resale fraud**	• False sales to inflate commissions on sales
Technical • Technical failure in the configuration, design or architecture of the networks or communication terminals	🟦 • **Skimming**	• Copying of SIM cards and IMEIs (International Mobile Equipment Identification)
	• **Hacking**	• Invasion of insecure systems to explore or sell telecommunications credits
	• **Pirating**	• Copying of copyrighted content (eg. music videos)
Internal • Carried out by employees of the companies via: - Permissive protocols - Lack of security	• **False prepaid credits**	• False activation or multiple reactivations of prepaid credit
	• **Removal of CDR**	• Removal of Call Detail Records (CDR) from the billing cycles

The premium service provider usually participates in the fraud with the caller

Frequent theft of trial cards for roaming scenarios

Sources: CITEL/IIRSA; Billingworld Berlin privacy group, Informa Telecom, GSMA

Figure 67 - Most common roaming frauds

The greatest risk of roaming fraud is linked to the delay in the exchange of information between operators,...

○ Low
● High

Most common roaming frauds		Frequency	Weaknesses specific to roaming	Possible countermeasures
Process frauds	• Subscription • Calls to premium rate numbers or IRSF • Card Theft	◕	• **Change of CDRs** between operators for roaming calls are **delayed up to 24 hours** • **Some anti-fraud departments do not work on weekends** • **The diverseness of VPMN and HPMN networks** make it difficult to integrate prevention, detection and automated response systems	• **Rapid exchange of information about users,** especially those with high usage patterns • **24x7 anti-fraud operations** • **Black list** with suspected premium rate numbers or IRSF
Technical frauds	• Cloning*	◔	• **More common for CDMA and TDMA terminals when entering analog roaming** (AMPS)	• Utilization of **encryption techniques** • **Obligation to protect PIN** (Personal Identification Number)

- **To combat the fraud process, the immediate exchange of information** between operators **is key**
- On the other hand, technical fraud using **cloning is becoming less common in South America** with the advancement of GSM

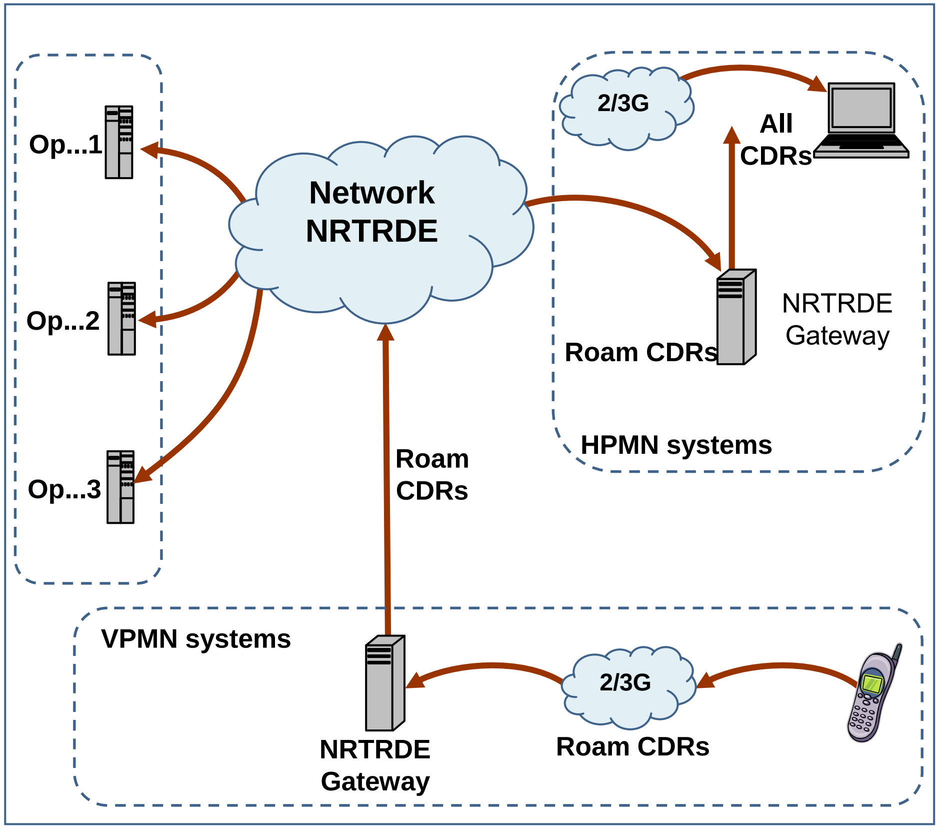
* Copying the identity of one mobile phone to another mobile phone

Sources: Billingworld, Berlin privacy group, Informa Telecom, GSMA

Figure 68 - Switch from CDR to NRTRDE

…for which the GSMA developed an NRTRDE* implementation initiative, with the aim to significantly reduce the time in information exchange

Flow from CDR to NRTRDE*



Important considerations

Date of implementation	• October 2008
Time to exchange CDR	• **Reduction of 4 hours vs. the current 24 hours**
Cost of implementation	• USD ~50,000 per NRTRDE gateway
Operational implications	• Need for a central organization to coordinate fraud incidents and information exchange (roaming clearing house)
Additional benefits	• More attractive commercial offer • Increased traffic (incoming and outgoing) • Reduction in HUR (High Usage Reports) costs

The GSMA association has asked all its members to implement NRTRDE

* Near-Real-Time Roaming Data Exchange

Source: GSMA

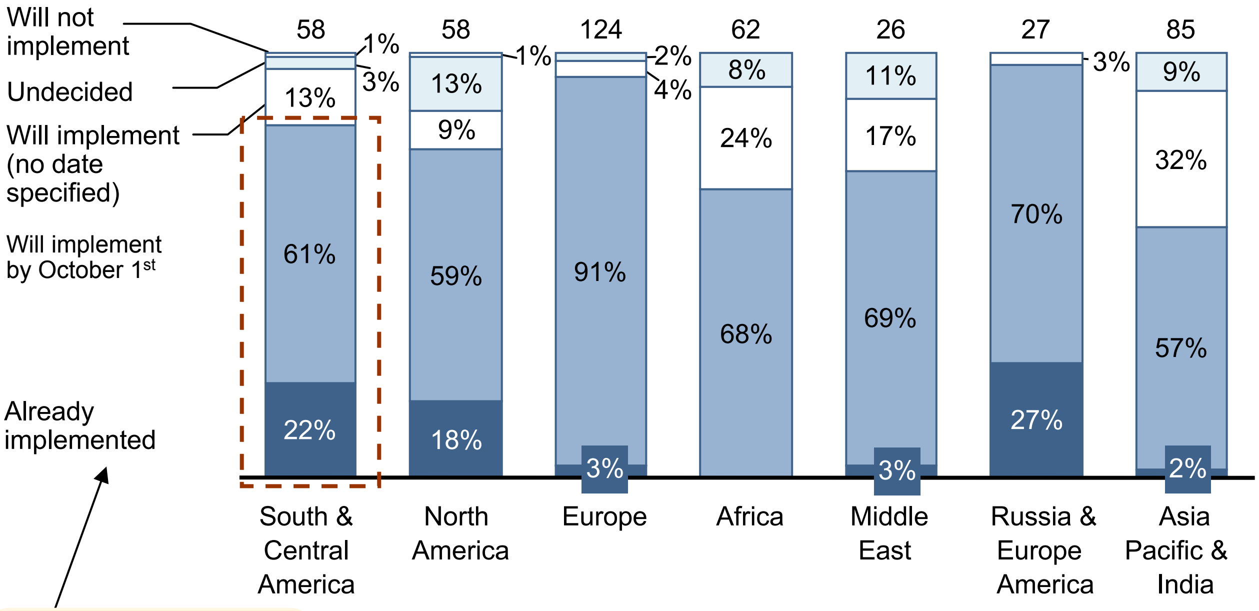
Figure 69 - Regional plans to implement NRTRDE and the proportion of agreements that support it

South America is relatively advanced in the implementation of the NRTRDE initiative (~83% of operators "on-track"*)

February 2008, Interviewed operators, Percentage

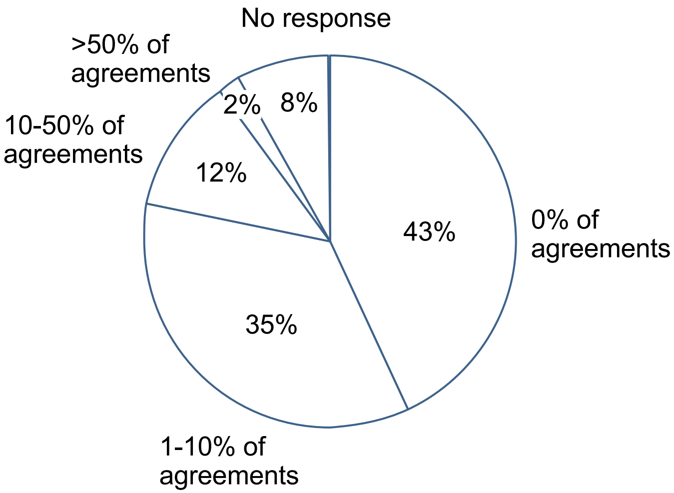
On-track

Regional plans to implement NRTRDE



- *In South America:*
  - *Digicel Group in Guyana and Suriname*
  - *Telefónica Móviles in Ecuador (Otecel)*

Proportion of roaming agreements that support NRTRDE (worldwide)



***The greatest challenge will be updating roaming agreements** to support NRTRDE, which requires coordination between operators*

* Statistic includes Central America

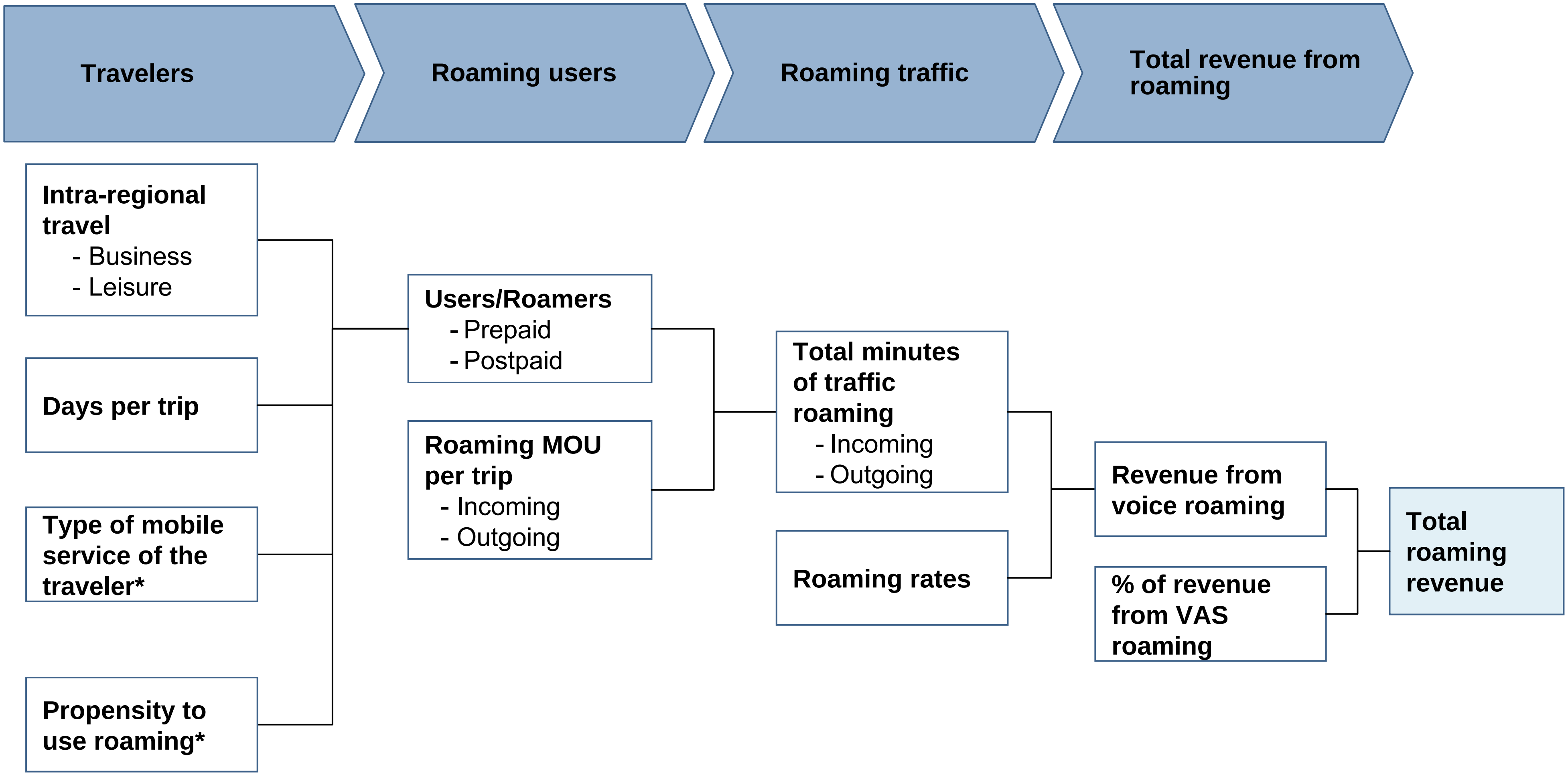
Source: GSMA

Document contents

Figure 70 – Structure of the South American intra-regional roaming model

Structure of the South American intra-regional roaming model

CONCEPTUAL



Travelers

Roaming users

Roaming traffic

Total revenue from roaming

Intra-regional travel
- Business
- Leisure

Days per trip

Type of mobile service of the traveler*

Propensity to use roaming*

Users/Roamers
- Prepaid
- Postpaid

Roaming MOU per trip
- Incoming
- Outgoing

Total minutes of traffic roaming
- Incoming
- Outgoing

Roaming rates

Revenue from voice roaming

% of revenue from VAS roaming

Total roaming revenue

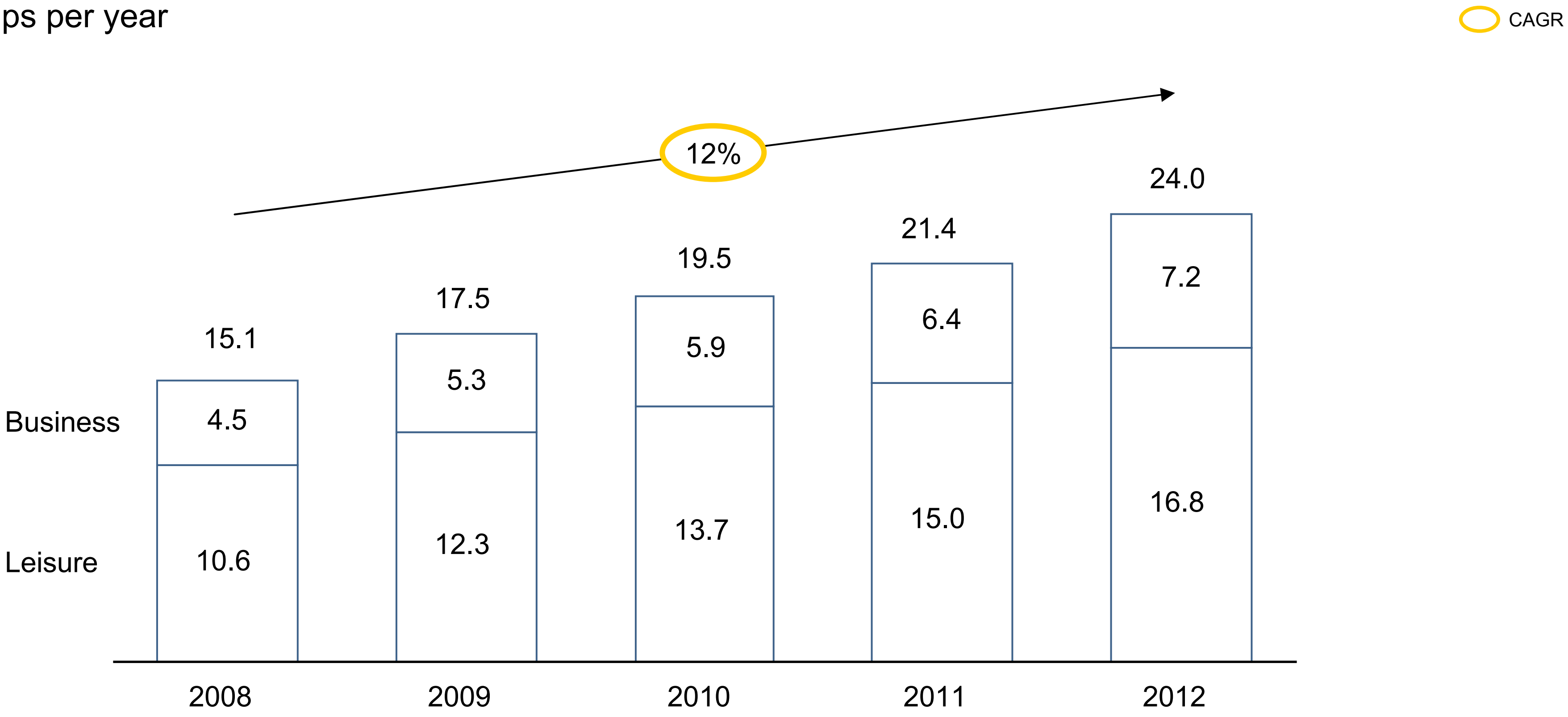
* Postpaid vs. prepaid

** Percentage of travelers who used their cell phone in roaming while traveling

Figure 71 - Evolution of intra-regional travel in South America, by reason of trip

It is estimated that intra-regional travel in South America will grow by 12% per year, reaching 24 million trips in 2012

Millions of trips per year



	2008	2009	2010	2011	2012
Business	4.5	5.3	5.9	6.4	7.2
Leisure	10.6	12.3	13.7	15.0	16.8
	15.1	17.5	19.5	21.4	24.0

It is expected that intra-regional travel will experience stable growth in the next few years at 12% annually, given the stable growth of South American economies

Source: UN WTO, EIU, Informa, Operator interviews, Work team analysis

Figure 72 - Profiles of roaming users

In the current scenario, market players describe South American roaming users as predominantly business travelers, but with significant and increasing participation of leisure travelers

○ Low
● High

Profile of roaming users	Characteristics			
	Participation in base of roaming users	**Growth trend**	**Price sensitivity**	**Important considerations**
Business travelers (corporate)	~80-90%	◑	◔	• 100% postpaid segment • Use mobile for work purposes • Usually the bill is paid by the employer
Leisure travelers (individuals)	~10-20%	●	◑ Postpaid ● Prepaid	• Segment ~90-100% postpaid • Growth attributable to - Increased awareness of service - Greater prepaid roaming coverage
Residents of border zones	~0%	●	●	• Unrepresentative segment for being highly price sensitive • Usually adopts alternative services (eg. prepaid card of the neighboring country operator)

- In the current scenario, international roaming in South America **is still viewed as an elite service**...
- ...however, that perspective is changing **mainly with increased communication about the service and development of prepaid roaming coverage**
- According to the operators, roaming from inhabitants of border zones is still of little relevance until the service becomes more widely used by the individual and low-income segments

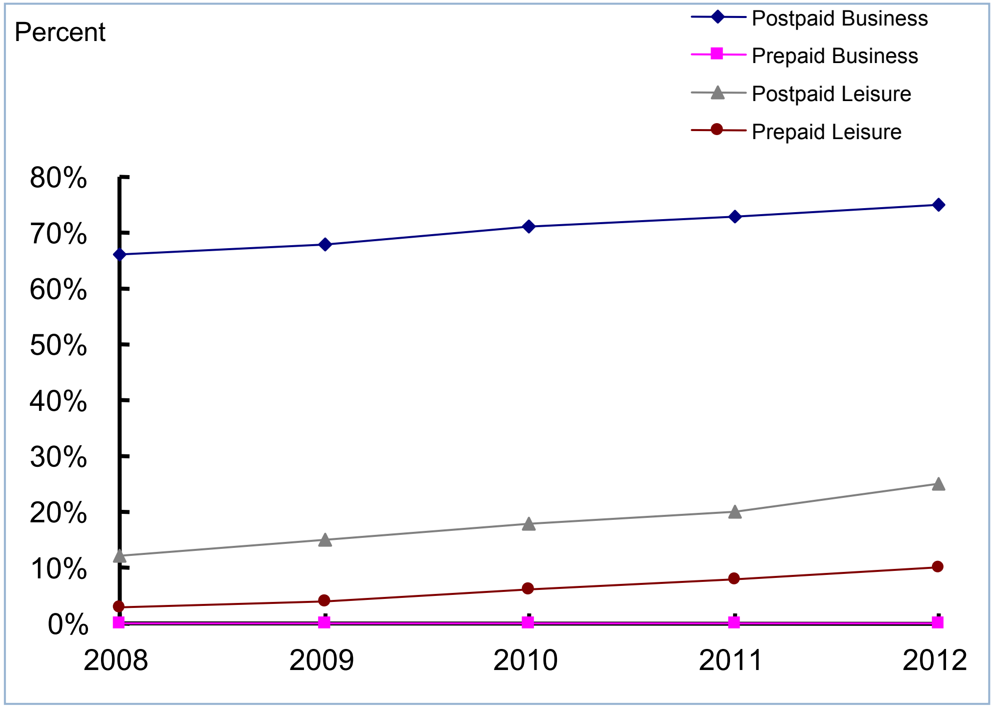
Source: Interviews and opinion survey with relevant stakeholders in the South American roaming market

Figure 73 - Propensity to use roaming services, by passenger profile and projections in the base of roaming users

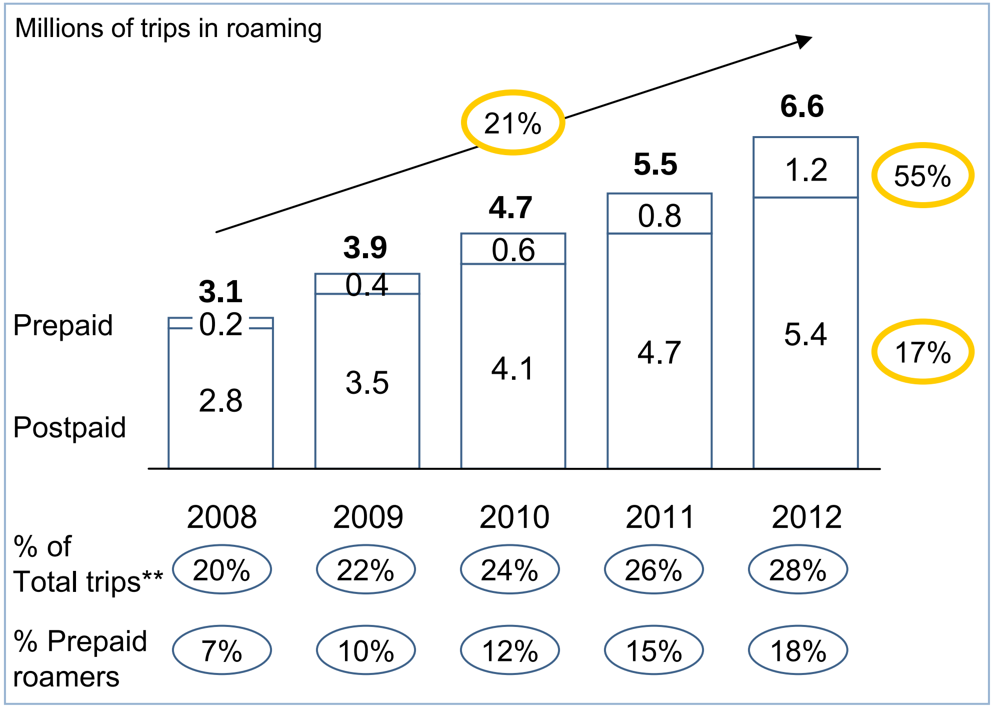
The base of roaming users is expected to grow by 21% annually, leveraged by the increased availability of prepaid roaming (from 7% of roaming users in 2008 to 18% in 2012)

CAGR

Propensity to use roaming services*



Base of roaming users*



- An **increase in the propensity to use roaming services** is projected as the service becomes increasingly well-known and affordable for prepaid users...
- ...resulting in a **base of 7.4 million trips in roaming in 2012**, reaching nearly one third of total intra-regional travel

* Considers the number of trips applicable to roaming

** Percentage of trips where mobile phones are used while roaming

Source: UN WTO, EIU, Informa, Operator interviews, Work team analysis

Figure 74 - Composition of the South American ARPU for roaming

ARPU for roaming is a composite of minutes per trip and average regional rates for roaming

○ CAGR

ARPU (USD)	2008	2009	2010	2011	2012
Business (post)	162	170	179	188	197
Leisure (post)	66	71	77	83	90
Leisure (pre)	18	18	18	18	18
Average*	**146**	**147**	**149**	**152**	**153**

MOU** Outgoing (min)	2008	2009	2010	2011	2012
Business (post)	29.4	29.4	29.4	29.4	29.4
Leisure (post)	10.8	11.1	11.5	11.8	12.2
Leisure (pre)	1.8	1.8	1.8	1.8	1.8
Average*	**26.2**	**25.2**	**24.3**	**23.6**	**22.6**

MOU** Incoming (min)	2008	2009	2010	2011	2012
Business (post)	51.0	51.0	51.0	51.0	51.0
Leisure (post)	22.7	23.4	24.1	24.8	25.6
Leisure (pre)	7.0	7.0	7.0	7.0	7.0
Average*	**46.1**	**44.4**	**43.1**	**41.9**	**40.4**

Outgoing rate (USD/min)	2008	2009	2010	2011	2012
Business (post)	2.7	2.8	3.0	3.1	3.3
Leisure (post)	2.7	2.8	3.0	3.1	3.3
Leisure (pre)	3.1	3.1	3.1	3.1	3.1
Average**	**2.7**	**2.9**	**3.0**	**3.1**	**3.3**

Incoming rate (USD/min)	2008	2009	2010	2011	2012
Business (post)	1.6	1.7	1.8	1.9	2.0
Leisure (post)	1.6	1.7	1.8	1.9	2.0
Leisure (pre)	1.8	1.8	1.8	1.8	1.8
Average**	**1.6**	**1.7**	**1.8**	**1.9**	**2.0**

- *Rate net of taxes, with increments of:*
  - *~5% per year for postpaid (in line with inflation)*
  - *~ 1% for prepaid (greater price sensitivity)*

The South American ARPU for roaming considers the usage profile (MOU) based on information collected from interviews with operators in the region and the rates gathered during the study

* Weighted average per number of trips in roaming

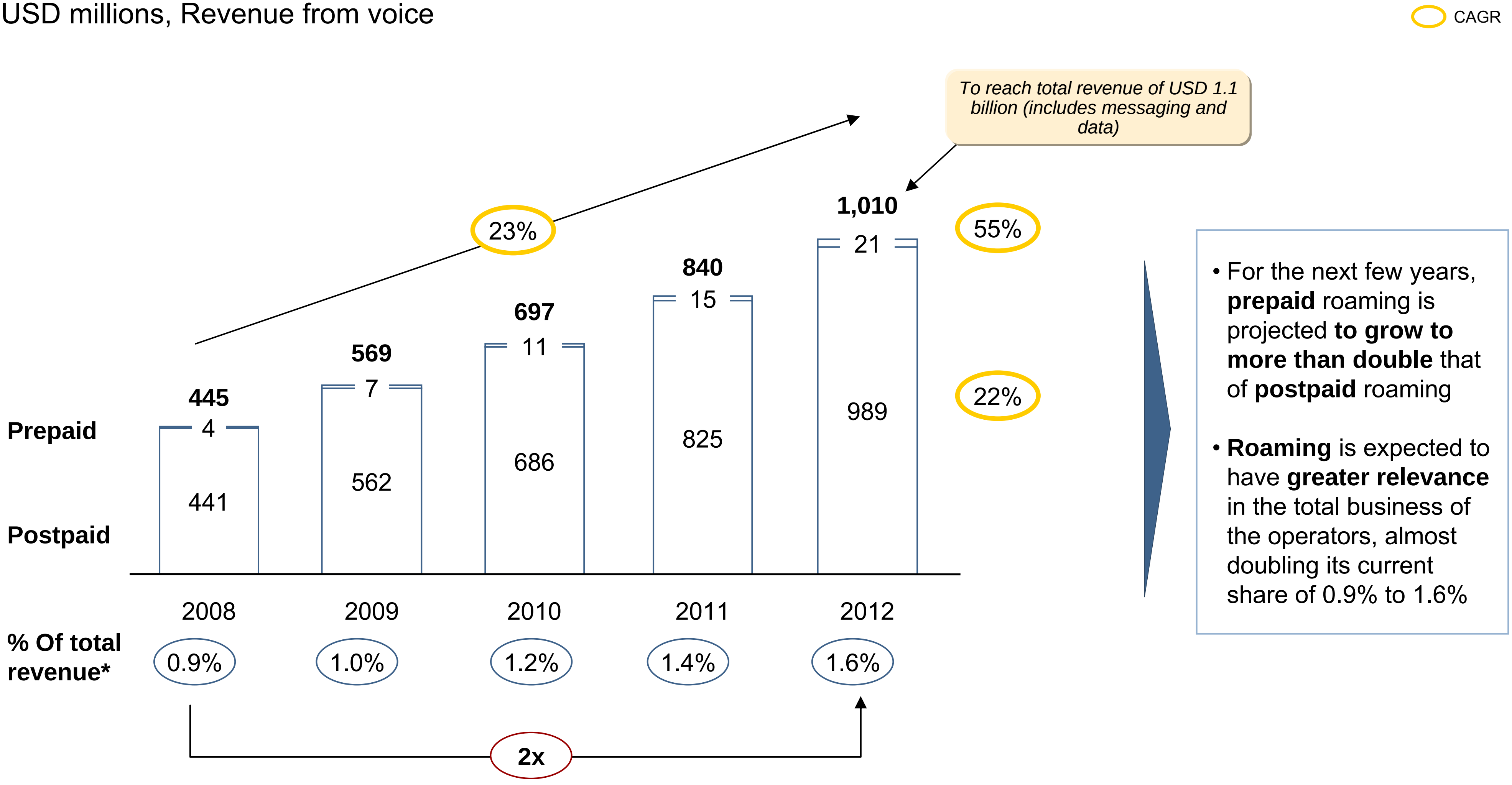
** Minutes per user: 3 days per trip for business travelers and 7 days per trip for leisure travelers

Source: UN WTO, EIU, Informa, Interviews with operators, Operator web sites, Work team analysis

Figure 75 – Projected roaming revenue to 2012, by type of roaming service

Roaming revenue should reach USD ~1 billion in 2012, with a 1.6% share of total revenue

USD millions, Revenue from voice



- For the next few years, **prepaid** roaming is projected **to grow to more than double** that of **postpaid** roaming
- **Roaming** is expected to have **greater relevance** in the total business of the operators, almost doubling its current share of 0.9% to 1.6%

* Considers total mobile service revenue expected for the South American region

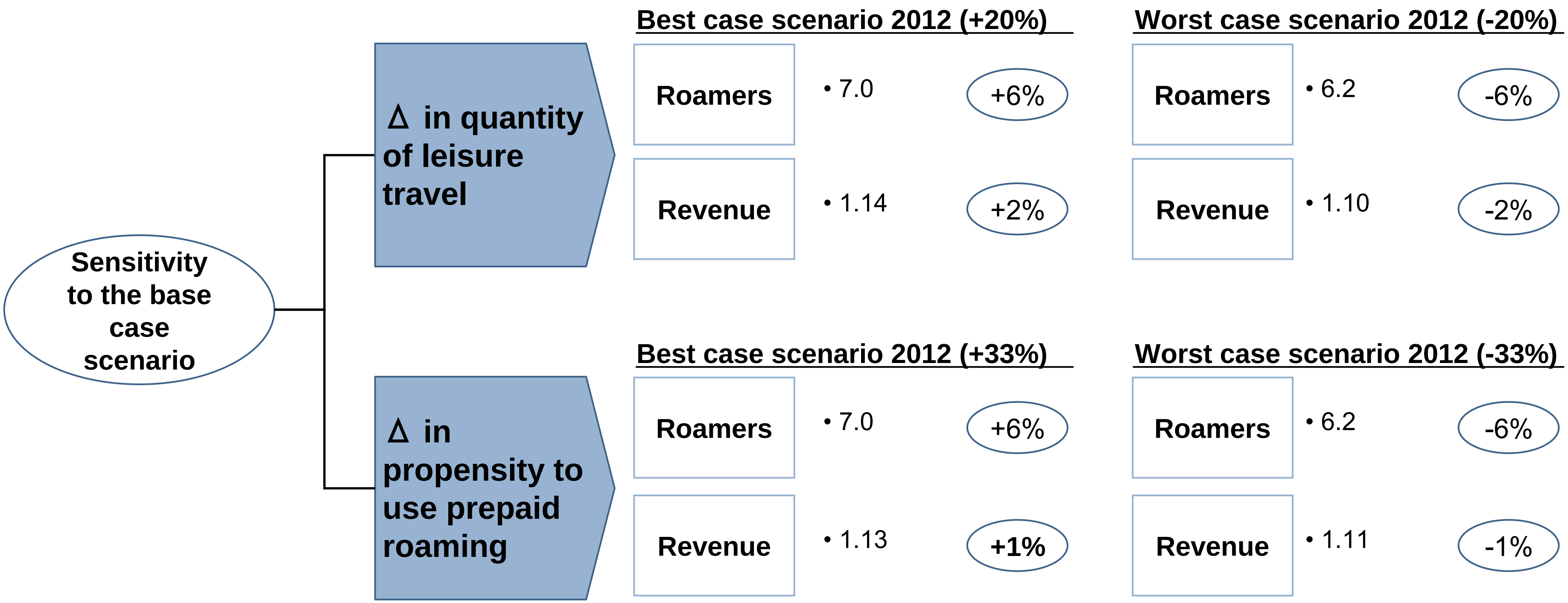
Source: UN WTO, EIU, Informa, Telegeography, Operator interviews, Work team analysis

Figure 76 - Alternative scenarios of the base of roaming users

In considering alternative scenarios, a 33% increase in the prepaid roaming base increases revenue by ~1%

2012, Millions of trips in roaming, USD billions

○ Difference vs. base case scenario



Sensitivity to the base case scenario

Δ in quantity of leisure travel

Best case scenario 2012 (+20%)

Roamers	• 7.0	+6%
Revenue	• 1.14	+2%

Worst case scenario 2012 (-20%)

Roamers	• 6.2	-6%
Revenue	• 1.10	-2%

Δ in propensity to use prepaid roaming

Best case scenario 2012 (+33%)

Roamers	• 7.0	+6%
Revenue	• 1.13	**+1%**

Worst case scenario 2012 (-33%)

Roamers	• 6.2	-6%
Revenue	• 1.11	-1%

Source: Work team analysis

Figure 77 – Alternative scenarios: GSMA Latin America study

The GSMA Latin America study considers an alternative scenario for South American roaming

Similar level for roamers in 2008 vs. the recent study

The recent study has a CAGR of 17% for postpaid and 55% for prepaid

Roamers (Millions of trips)	2008	2009	2010	2011	2012	CAGR
Business (post)	2.3	2.5	2.7	2.9	3.1	8%
Leisure (post)	0.3	0.3	0.3	0.4	0.4	8%
Leisure (pre)	0.3	0.3	0.3	0.4	0.4	8%
Total roamers GSMA LA	**2.9**	**3.1**	**3.4**	**3.7**	**3.9**	**8%**
Difference vs. recent study	**-5%**	**-19%**	**-27%**	**-34%**	**-40%**	

ARPU (USD)	2008	2009	2010	2011	2012	CAGR
Business (post)	103.6	103.6	103.6	103.6	103.6	0%
Leisure (post)	41.2	41.2	41.2	41.2	41.2	0%
Leisure (pre)	11.9	11.9	11.9	11.9	11.9	0%
Average ARPU GSMA LA	**87.7**	**87.7**	**87.7**	**87.7**	**87.7**	**0%**
Difference vs. recent study	**-40%**	**-40%**	**-41%**	**-42%**	**-43%**	

Income (USD millions)	2008	2009	2010	2011	2012	CAGR
Business (post)	238.3	257.3	277.9	300.2	324.2	8%
Leisure (post)	12.4	13.4	14.4	15.6	16.8	8%
Leisure (pre)	3.6	3.8	4.1	4.5	4.8	8%
Total Income GSMA LA	**254.2**	**274.5**	**296.5**	**320.2**	**345.8**	**8%**
Difference vs. recent study	**-43%**	**-52%**	**-57%**	**-62%**	**-66%**	

- A more conservative increase of roaming users is expected …
- … which could underestimate the current behavior, especially in prepaid, by low current usage and increasing service availability (eg. Argentina-Brazil, Argentina-Uruguay, Brazil-Uruguay)
- ARPU is projected to be significantly lower and stable over time, however, stemming from a lower estimated use of the service*
- As a result, the difference in total income is explained by a lower increase of roaming users and, in particular, lower usage levels

*As roaming rates are public knowledge, the difference in ARPU should be explained by distinct values for minutes of use (MOU) per user

Source: Convergencia Research, Work team analysis

Figure 78 – Alternative scenarios: Scenario considering levels of ARPU from the GSMA Latin America study

Using the GSMA estimates for ARPU and postpaid growth, the South American roaming market is expected to reach USD ~430M by 2012

- An additional income scenario is considered, based on the assumptions of the GSMA LA study:
  - CAGR of 8% for business and leisure postpaid roamers (GSMA LA estimate), CAGR of 55% for prepaid roamers (estimate from the recent study)
  - ARPU values from the GSMA Latin America study

ARPU (USD)	2008	2009	2010	2011	2012	CAGR
Business (post)	103.6	103.6	103.6	103.6	103.6	0%
Leisure (post)	41.2	41.2	41.2	41.2	41.2	0%
Leisure (pre)	11.9	11.9	11.9	11.9	11.9	0%
Average ARPU	**93.8**	**90.2**	**87.0**	**84.0**	**80.1**	**-4%**

Total roamers (Millions of trips)	2008	2009	2010	2011	2012	CAGR
Business (post)	2.9	3.1	3.3	3.6	3.9	8%
Leisure (post)	0.2	0.2	0.3	0.3	0.3	8%
Leisure (pre)	0.2	0.4	0.6	0.8	1.2	55%
Total roamers	**3.3**	**3.7**	**4.2**	**4.7**	**5.4**	**13%**

Roaming income (USD millions)	2008	2009	2010	2011	2012	CAGR
Business (post)	295.9	319.5	345.1	372.7	402.5	8%
Leisure (post)	9.3	10.0	10.8	11.7	12.6	8%
Leisure (pre)	2.4	4.5	6.9	9.6	13.8	55%
Total roaming income	**307.5**	**334.0**	**362.8**	**394.0**	**428.9**	**9%**

58% lower than base scenario of USD 1.017Bn

Source: Convergencia Research, Work team analysis

Document contents

Analysis of feedback from the relevant stakeholders: Executive summary

- The study revealed the views of key figures in the South American roaming market with **face-to-face interviews in four countries and supplementary questionnaires with the remaining stakeholders**
- **The stakeholders are generally optimistic** about the development of roaming, proposing **an increase in the relative importance of total revenue from roaming services** (from 1-5% in 2008 to 5-12% in 2011)
- **Emerging opportunities** have been identified to promote roaming in the region ...
  - **Universalization of the service**
  - **Improvement in education and communication to consumers**
  - **Leveraging the standardized GSM technology**
  - **Anti-fraud initiatives** by the industry
- ...and **major challenges for development** have also been identified
  - **Investment in the coverage** and **availability of prepaid** roaming service
  - **Criminalization of fraudulent activity**
  - Creation of special **roaming plans for border zones**
  - **Avoiding double taxation**

Figure 79 - Structure of the consulted key figures in the South American roaming market

The study revealed the views of key figures in the South American roaming market with face-to-face interviews in four countries and supplementary questionnaires with the remaining stakeholders

		Regulators	Operators	Consumer protection	Associations
Face-to-face interviews	**Argentina**	• CNC	• Movistar Argentina • Telecom Personal	• Adelco	• GSMLAA • GSMA • ABRT (Brazilian Association of Telecommunications Resources)
	Bolivia	• Sittel	• Tigo Bolivia • Entel Bolivia • NuevaTel / Viva	• Codedco / Aisbol	
	Brazil	• Anatel	• Vivo • TIM	• Pro Teste	
	Venezuela	• Conatel	• Digitel • Movilnet • Movistar	• Indecu	
Opinion survey with questionnaire		• 2 of 8 regulators	• 2 of 8 operators	• 8 consumer protection agencies	• -

Receptiveness to the study

- Almost all the key players interviewed were very interested and willing to cooperate in the study
- Some operators did not participate within the time period of the study, citing confidentiality issues
- Several players who were questioned did not respond to the questionnaires within the allotted time period

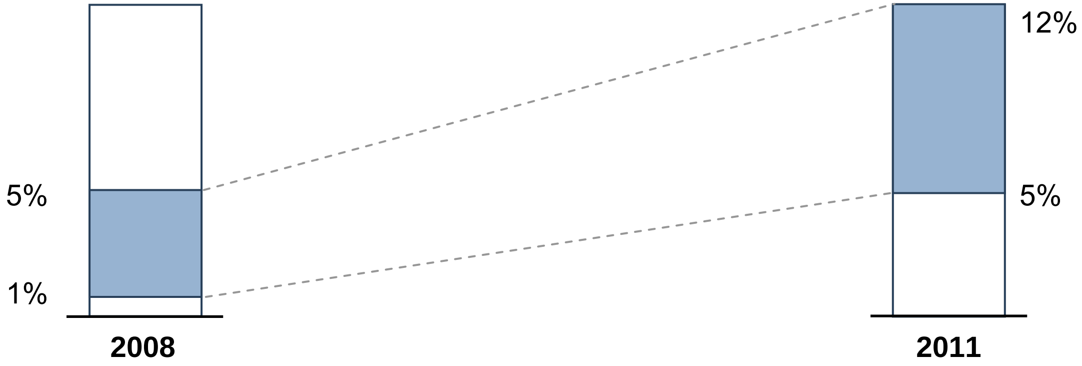
Figure 80 - Current status and future prospects on the development of roaming in the region

The stakeholders are generally optimistic about the development of roaming, proposing an increase in the relative importance of total revenue from roaming services (from 1-5% in 2008 to 5-12% in 2011)

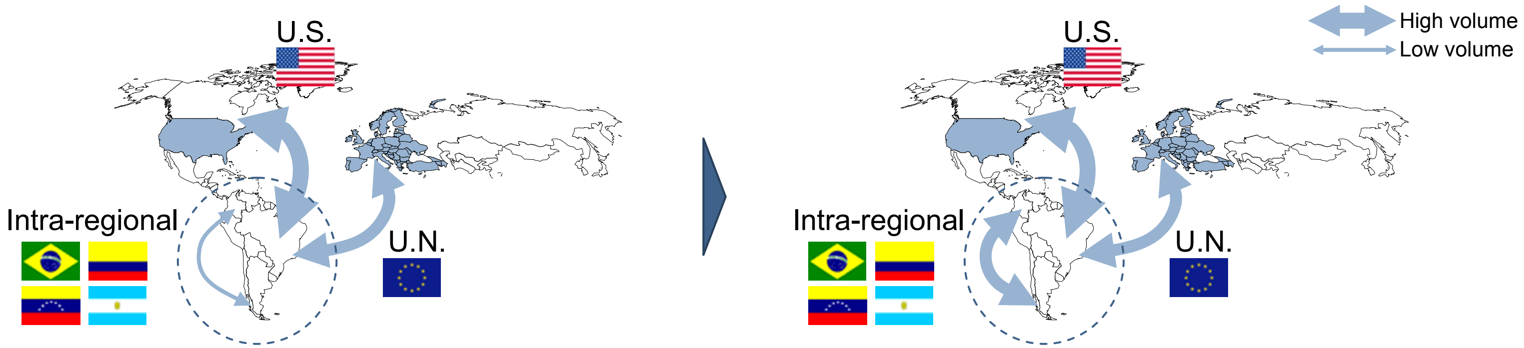
Current situation

Future prospects

Participation of roaming revenue in total service revenue



Countries where operators have the greatest roaming traffic



- **Predominance of the U.S. and major European countries** as main roaming partners
- **Generally, a South American country with a large population** (eg. Argentina, Brazil, Colombia and Venezuela) appears among the major partners

- **Relative importance of South American countries expected to increase** gradually, ...
- ...although **U.S. leadership will continue, based on its use of incoming roaming in the region**

Source: Interviews and opinion survey with relevant stakeholders in the South American roaming market

Figure 81 - Initiatives and opportunities identified by stakeholders in the telecommunications market

Opportunities and initiatives were identified to promote roaming in the region …

Opportunities	Rational	Selected statements	
Popularization of the service	• **Inclusion of new roaming users through:** - Discounts on special plans or alliances - Expansion of prepaid coverage	"Today there is a lot of competition among operators to specific destinations such as Uruguay" (Operator)	"We already include prepaid roaming users through SMS. Now we will make voice roaming available" (Operator)
Improvement in education and communication to consumers	• **Efforts by the operators** to: - Simplify pricing structures - Improve communication of the service	"Operators are beginning to offer uniform rates that are easy to understand" (Operator)	“Communication to the client regarding charges has been clarified, although rates are still high” (Consumer Protection)
Advancement in GSM technology	• **Easing the integration of mobile networks** to provide roaming service	"The dominance of GSM technology is crucial for the development of roaming in the region" (Operator)	"GSM is a technology that was created already prepared to carry out international roaming" (Operator)
Anti-fraud initiatives by the industry	• **Improved timing of information exchange** among operators on suspicious usage patterns	"With NRTRDE, which we will implement in October, we hope to lower delays in information exchange to one hour" (Operator)	"Our understanding is that industry initiatives can often be more effective at combating fraud than regulation" (Governor)

Source: Interviews with operators, regulators and other institutions

Figure 82 - Key challenges identified by stakeholders in the telecommunications market

...and main challenges for development were also identified

Challenges	Rational	Select statements	
Investment in the coverage of prepaid roaming service	• The implementation of the **CAMEL system** for prepaid roaming involves: - **Special configurations** between operators (one-to-one) - **Software upgrades and new service control points** (SCP)	"The delay in implementing CAMEL; There are specific details for each operator with whom we have agreements" (Operator)	"Our priority is to complete postpaid coverage in the region. After this we will implement CAMEL" (Operator)
Criminalization of fraudulent activity	• In almost all South American countries there is **no specific legislation classifying acts of fraud as a crime**	"We are obliged to bring criminals to justice under the charge of a formalized legislative body" (Operator)	"Laws against fraud are the responsibility of the legislature. We can hardly support this initiative" (Regulator)
Creation of special roaming plans for border towns	• **Investment in special billing systems** • **Difficulties in:** - Obtaining sufficient **return on investment** (ROI) - **Imposing the obligation** of border plans through regulation	"There are operators who offer border plans (eg. U.S. and Mexico), but these plans would probably would not be profitable here“ (Operator)	"For us it would be almost impossible to monitor the proper implementation of border plans or tariffs" (Regulator)
Avoiding double taxation	• **Little support by** South American **governments** to create special agreements to avoid double taxation	"Although the main offenders in the composition of rates are taxes, governments are not open to discuss double taxation" (Operator)	"Agreements to avoid double taxation need the consensus of the governments of the 12 nations" (Regulator)

Source: Interviews with operators, regulators and other institutions

Document contents

Annexes

Figure 83 – Map of operators and technologies: Argentina

Map of operators and technologies: Argentina

USD/minute, Taxes included

General information

Population **39.0 million**
90.3% urban
9.7% rural

Penetration of telecommunications services

Fixed	22.6%
Mobile	77.4%

Mobile operators

					Subscribers		Average rate				MOU
Operator	Shareholding structure	Coverage	Technology and frequency		2007	2010	Local	National	Intl.	SMS	
Claro	• 100% América Móvil	35%Geographic* 98% Population	GSM (850/1900), CDMA, AMPS	Total	14.1M	20.0M					133 min
				Pre	12.2M	17.5M	0.27	0.33-0.37	n.a.	0.05	
				Post	1.9M	2.5M	0.15	0.21-0.24	n.a.	0.04	
Telecom Personal	• 99.9% Telecom Argentina • 0.01% Nortel	28% Geographic*	GSM (1900), AMPS, US TDMA	Total	11.4M	15.4M					90 min
				Pre	7.5M	10.3M	0.25	0.32-0.35	0.55 - 0.75	0.06	
				Post	3.9M	5.1M	0.11	0.19	0.55 – 0.75	0.04	
Movistar	• 100% Telefónica Móvil	30%Geographic 88% Population	GSM (1900/1800/850) AMPS, CDMA, US TDMA, W-CDMA	Total	14.1M	19.2M					111 min
				Pre	9.3M	12.3M	0.59	0.26-0.34	n.a.	0.07	
				Post	4.8M	6.9M	0.48	0.16	n.a.	0.05	
Nextel	• 100% NII Holding Inc.	5%Geographic*	iDEN	Total	0.9M	1.2M					n.a.
				Pre	-	-	n.a.	n.a.	n.a.	n.a.	
				Post	0.9M	1.2M	0.09	0.13-0.34	0.17-0.65	n.a.	
TOTAL					**40.5M**	**55.8M**					**110 min****

* Estimate based on map coverage from web site
** Weighted average

Note: The n.a. tariff information was not provided by the operator through the consulted channels (web site and call center)
Source: Merrill Lynch, WCIS, ITU, Telefónica (Spain) annual report, Work team analysis

Figure 84 – Map of operators and technologies: Bolivia

Map of operators and technologies: Bolivia

USD/minute, Tax included

General information

Population **9.6 million**
64.6% urban
35.4% rural

Penetration of telecommunications services
Fixed 7.04%
Mobile 26.4%

Mobile operators

Operator	**Shareholding structure**	**Coverage**	**Technology and frequency**		**Subscribers**		**Average rate**				**MOU**
					2007	**2010**	**Local**	**National**	**Intl.**	**SMS**	
Nuevatel	• 28% COMTECO • 72% Western Wireless	25%Geographic	GSM (1900)	Total	0.9M	1.4M					n.a.
				Pre	0.8M	1.3M	0.80	1.50	2.66	0.09	
				Post	0.1M	0.1M	0.52	1.22	1.38	0.07	
Entel	• 97% Government • 3% Telecom Italia	n.a.	GSM (1900), US TDMA (800)	Total	1.6M	2.2M					n.a.
				Pre	1.5M	2.1M	0.70	1.90-2.45	2.55-2.90	0.09	
				Post	0.1M	0.1M	0.37	1.57-2.12	2.02-2.58	0.18	
Tigo	• 100% Millicom International Cellular Latin America	35%Geographic 64% Population	GSM (800), US TDMA (800)	Total	0.9M	1.4M					n.a.
				Pre	0.9M	1.3M	0.24	n.a.	n.a.	0.03	
				Post	0.0M	0.1M	0.12	n.a.	n.a.	0.03	
TOTAL					**3.4M**	**5.0M**					**n.a.**

Note: The n.a. tariff information was not provided by the operator through the consulted channels (web site and call center)
Source: Merrill Lynch, WCIS, ITU, Work team analysis

Figure 85 – Map of operators and technologies: Brazil

Map of operators and technologies: Brazil

USD/minute, Tax included

General information

Population 186.8 million
84.7% urban
15.3% rural

Penetration of telecommunications services

Fixed	18.2%
Mobile	53.7%

Mobile operators

Operator	**Shareholding structure**	**Coverage***	**Technology and frequency**		**Subscribers**		**Average rate**				**MOU**
					2007	**2010**	**Local**	**National**	**Intl.**	**SMS**	
Vivo	• 100% Vivo Participações S.A.	77% Population	GSM, AMPS, CDMA, US TDMA	Total	33.2M	41.6M					73 min
				Pre	27.5M	35.7M	0.84	0.77-1.12	0.89-2.65	0.21	
				Post	5.7M	5.9M	0.41	0.77-1.12	0.89-2.65	0.21	
TIM Brazil	• 100% TIM International	87% Population	GSM (1800), US TDMA (800); W-CDMA (800/1800)	Total	31.0M	39.6M					88 min
				Pre	24.3M	32.9M	0.80	0.77-1.12	0.89-2.65	0.21	
				Post	6.7M	6.7M	0.35	0.77-1.12	0.89-2.65	0.21	
Claro Brazil	• 100% América Móvil	83% Population	GSM (1800), US TDMA, W-CDMA	Total	29.7M	38.1M					68 min
				Pre	24.2M	32.1M	0.82	0.77-1.12	0.89-2.65	0.18	
				Post	4.0M	6.0M	0.36	0.77-1.12	0.89-2.65	0.18	
Oi	• 18% Telemar 82% Market	41% Population	GSM (1800), W-CDMA	Total	15.9M	21.3M					n.a.
				Pre	13.3M	18.8M	0.79	0.77-1.12	0.89-2.65	0.18	
				Post	2.6M	2.5M	0.34	0.77-1.12	0.89-2.65	0.18	
TOTAL					**109.8M**	**140.6M**					**65 min****

National and international long distance services in Brazil are provided by fixed line operators and are chosen by the user with an operator selection code

* Coverage within the region of operation
** Weighted average

Note: The n.a. tariff information was not provided by the operator through the consulted channels (web site and call center)

Source: Merrill Lynch, ITU, UCEL, Work team analysis

Figure 86 – Map of operators and technologies: Chile

Map of operators and technologies: Chile

USD/minute, Tax included

General information

Population 16.4 million
87.9% urban
12.1% rural

Penetration of telecommunications services

Fixed	22.0%
Mobile	67.8%

Mobile operators

Operator	Shareholding structure	Coverage	Technology and frequency		Subscribers 2007	Subscribers 2010	Average rate Local	Average rate National	Average rate Intl.	Average rate SMS	MOU
Telefónica	• 100% Telefónica Latin America S.A.	32%Geographic 93% Population	GSM, AMPS, CDMA, US TDMA	Total	6.0M	7.3M					98 min
				Pre	4.5M	5.5M	0.67	0.22-0.29	0.46-0.92	0.10	
				Post	1.5M	1.8M	0.22	0.22-0.29	0.46-0.92	0.12	
Entel PCS	• 99.9% Entel Telefonía Personal • 0.01% Entel Chile	95% Population	GSM (1900), W-CDMA (1900)	Total	5.4M	6.5M					136 min
				Pre	4.0M	4.8M	0.12-0.72	n.a.	0.47-0.92	0.20	
				Post	1.4M	1.6M	0.24-0.30	n.a.	0.47-0.92	0.20	
Claro Chile	• 100% América Móvil	93% Population	GSM (800/1900), CDMA (1900), W-CDMA (800)	Total	2.6M	3.0M					143 min
				Pre	2.2M	2.7M	0.24-0.60	n.a.	n.a.	0.10	
				Post	0.4M	0.3M	0.15-0.31	n.a.	n.a.	0.10	
TOTAL					**14.0M**	**16.8M**					**126 min***

* Weighted average

Note: The n.a. tariff information was not provided by the operator through the consulted channels (web site and call center)

Source: ITU, WCIS, EIU, Work team analysis

Figure 87 – Map of operators and technologies: Colombia

Map of operators and technologies: Colombia

USD/minute, Tax included

General information

Population 46.8 million
73.0% urban
27.0% rural

Penetration of telecommunications services

Fixed	16.8%
Mobile	47.9%

Mobile operators

Operator	Shareholding structure	Coverage	Technology and frequency		Subscribers 2007	Subscribers 2010	Average rate Local	Average rate National	Average rate Intl.	Average rate SMS	MOU
Tigo	• 24.5% Telecom (Bogota) • 24.5% E. Publicas (Medellin) • 50.0% Millicom International Cellular Latin America • 1.0% Other	70% Population	GSM (1900), W-CDMA (1900)	Total	3.2M	4.7M					n.a.
				Pre	2.9M	4.7M	0.17	n.a.	0.32-0.43	0.10	
				Post	0.3M	0.0M	0.15	n.a.	0.32-0.43	0.10	
Comcel	• 99.2% América Móvil • 0.7% Market • 0.1% Other	83% Population	GSM (800/1900), W-CDMA (1900)	Total	22.3M	28.4M					117 min
				Pre	19.1M	26.3M	0.34	n.a.	1.30	0.19	
				Post	3.2M	2.1M	0.15	n.a.	0.65	0.07	
Telefónica	• 100% Telefónica Móvil	8%Geographic 93% Population	GSM (1800), US TDMA, W-CDMA (800/1900)	Total	8.4M	10.6M					89 min
				Pre	6.6M	2.0M	0.24 -0.64	0.24-0.64	0.45-0.51	0.09	
				Post	1.8M	8.6M	0.17	n.a.	0.45-0.51	0.09	
TOTAL					**33.9M**	**43.7M**					**109 min***

* Weighted average

Note: The n.a. tariff information was not provided by the operator through the consulted channels (web site and call center)

Source: ITU, WCIS, EIU, Work team analysis

Figure 88 – Map of operators and technologies: Ecuador

Map of operators and technologies: Ecuador

USD/minute, Tax included

General information

Population 13.5 million
63.3% urban
36.7% rural

Penetration of telecommunications services

Fixed	12.7%
Mobile	47.2%

Mobile operators

Operator	Shareholding structure	Coverage	Technology and frequency		Subscribers 2007	Subscribers 2010	Average rate Local	Average rate National	Average rate Intl.	Average rate SMS	MOU
Porta/Conecel	• 100% América Móvil	85% Population	GSM (800/1900)	Total	7.0M	9.3M					39 min
				Pre	6.2M	8.5M	0.28	n.a.	0.49	0.07	
				Post	0.8M	0.8M	0.28	n.a.	0.40-0.43	0.07	
Movistar	• 100% Telefónica Latinoamérica S.A.	20%Geographic 85% Population	GSM (800/1900), US TDMA, CDMA (800), W-CDMA (800)	Total	2.6M	3.4M					52 min
				Pre	2.2M	2.9M	0.25	0.25	0.49	0.07	
				Post	0.4M	0.5M	0.25	0.25	0.49	0.09	
Alegro PCS	• 100% Andinatel S.A.	n.a.	GSM (800/1900), CDMA (1900)	Total	0.5M	0.5M					n.a.
				Pre	0.4M	0.4M	0.15	0.15	0.31	0.07	
				Post	0.1M	0.1M	0.44	0.44	0.31	0.07	
TOTAL					**10.1M**	**13.2M**					**43 min***

* Weighted average
Note: The n.a. tariff information was not provided by the operator through the consulted channels (web site and call center)
Source: ITU, WCIS, EIU, Work team analysis

Figure 89 – Map of operators and technologies: Guyana

Map of operators and technologies: Guyana

USD/minute, Tax included

General information

Population 0.8 million
38.1% urban
61.9% rural

Penetration of telecommunications services

Fixed	14.7%
Mobile	37.5%

Mobile operators

Operator	Shareholding structure	Coverage	Technology and frequency		Subscribers 2006	Subscribers 2010	Average rate Local	Average rate National	Average rate Intl.	Average rate SMS	MOU
GT&T	• 80% Atlantic Tele-Network Inc • 20% Guyanese Government	5% Geographic* 97% Population	GSM (900), US TDMA (800)	Total	0.3M	0.3M					n.a.
				Pre	0.3M	0.3M	0.18	n.a.	n.a.	n.a.	
				Post	0.0M	0.0M	0.13	n.a.	n.a.	n.a.	
Digicel Guyana	• 100% Digicel Group	5% Geographic* 98% Population	GSM (900)	Total	0.2M	0.3M					n.a.
				Pre	0.2M	0.3M	0.16	n.a.	0.35-0.68	n.a.	
				Post	0.0M	0.0M	0.11	n.a.	0.35-0.68	n.a.	
TOTAL					**0.5M**	**0.6M**					**n.a.**

* Estimate based on map coverage

Note: The n.a. tariff information was not provided by the operator through the consulted channels (web site and call center)

Source: ITU, WCIS, EIU, Work team analysis

Figure 90 – Map of operators and technologies: Paraguay

Map of operators and technologies: Paraguay

USD/minute, Taxes included

General information

Population 5.9 million
58.5% urban
41.5% rural

Penetration of telecommunications services

Fixed	5.2%
Mobile	30.6%

Mobile operators

Operator	Shareholding structure	Coverage	Technology and frequency		Subscribers 2007	Subscribers 2010	Average rate Local	Average rate National	Average rate Intl.	Average rate SMS	MOU
Claro	• 100% América Móvil	74% Population	GSM (1900), W-CDMA (1900)	Total	0.5M	0.7M					n.a.
				Pre	0.4M	0.6M	n.a.	n.a.	n.a.	n.a.	
				Post	0.1M	0.1M	n.a.	n.a.	n.a.	n.a.	
VOX*	• 25.4% Toyotoshi SA • 69.6% KDDI Co. • 2% Inepar	n.a.	GSM (1900)	Total	0.3M	0.4M					n.a.
				Pre	0.2M	0.3M	0.02	0.02	n.a.	0.05	
				Post	0.1M	0.0M	0.08	0.02	n.a.	0.05	
Núcleo	• 32.5% ABC Teleco. • 67.5% Telecom Personal S.A.	n.a.	GSM (800), US TDMA (8/19), W-CDMA (8/19)	Total	1.6M	2.2M					n.a.
				Pre	1.4M	2.0M	0.20	n.a.	n.a.	0.07	
				Post	0.2M	0.2M	0.10	n.a.	n.a.	0.02	
Tigo	• 96% Millicom • 4% Other	35% Geographic** 87% Population	GSM (800), W-CDMA (800)	Total	2.0M	3.2M					n.a.
				Pre	1.8M	3.0M	0.01	n.a.	n.a.	0.03	
				Post	0.2M	0.2M	0.06	n.a.	n.a.	0.02	
TOTAL					**4.4M**	**6.5M**					**76 min**

* Prices do not include taxes
** Estimate based on map coverage
Note: The n.a. tariff information was not provided by the operator through the consulted channels (web site and call center)
Source: ITU, WCIS, EIU, Work team analysis

Figure 91 – Map of operators and technologies: Peru

Map of operators and technologies: Peru

USD/minute, Taxes included

General information

Population 27.6 million
72.8% urban
27.2% rural

Penetration of telecommunications services

Fixed	8.1%
Mobile	20%

Mobile operators

Operator	Shareholding structure	Coverage	Technology and frequency		Subscribers		Average rate				MOU
					2007	2010	Local	National	Intl.	SMS	
Movistar	• 100% Telefónica Móviles Peru Holding SAA	12% Geographic 68% Population	GSM (1900), CDMA (800), US TDMA (800), W-CDMA	Total	8.9M	14.4M					85 min
				Pre	8.0M	13.8M	0.97	1.53	1.80	0.09	
				Post	0.9M	0.7M	0.51	n.a.	0.61	0.09	
Claro	• 100% América Móvil	64% Population	GSM (1800), W-CDMA	Total	6.0M	10.0M					68 min
				Pre	5.4M	9.5M	0.92	1.45	1.71	0.04	
				Post	0.6M	0.5M	0.61	0.98	0.98	0.09	
Nextel	• 100% NII Holding Inc.	n.a.	iDEN	Total	0.5M	0.8M					n.a. min
				Pre	0.1M	0.2M	n.a.	n.a.	n.a.	n.a.	
				Post	0.4M	0.6M	0.45	1.12-1.29	0.95-1.06	0.08	
TOTAL					**15.4M**	**25.2M**					**78 min***

* Weighted average

Note: The n.a. tariff information was not provided by the operator through the consulted channels (web site and call center)

Source: ITU, WCIS, EIU, Work team analysis

Figure 92 – Map of operators and technologies: Suriname

Map of operators and technologies: Suriname

USD/minute, Taxes included

General information

Population	**0.5**	**million**	**Penetration of telecommunications services**	
	79.9%	urban	Fixed	18.0%
	20.1%	rural	Mobile	51.8%

Mobile operators

Operator	Shareholding structure	Coverage	Technology and frequency		Subscribers 2007	Subscribers 2010	Average rate Local	Average rate National	Average rate Intl.	Average rate SMS	MOU
Digicel	• 100% Digicel Group	5% Geographic* 98% Population	GSM	Total	0.0**M	0.0***M					n.a.
				Pre	0.0M	0.0M	0.22	n.a.	0.50	0.05	
				Post	0.0M	0.0M	0.18	n.a.	0.50	0.05	
Telesur	• 100% Suriname Government	n.a.	GSM (900), US TDMA (800)	Total	0.3M	0.6M					n.a.
				Pre	0.3M	0.6M	0.18	n.a.	n.a.	0.05	
				Post	0.0M	0.0M	0.16	n.a.	n.a.	0.05	
TOTAL					**0.3M**	**0.6M**					**n.a.**

* Estimate based on map coverage
** 3,000 Subscribers
*** 20,169 Subscribers

Note: The n.a. tariff information was not provided by the operator through the consulted channels (web site and call center)

Source: ITU, WCIS, EIU, Work team analysis

Figure 93 – Map of operators and technologies: Uruguay

Map of operators and technologies: Uruguay

USD/minute, Taxes included

General information

Population	**3.2**	**million**	**Penetration of telecommunications services**		
	92.1%	urban		Fixed	31.0%
	7.9%	rural		Mobile	35.5%

Mobile operators

					Subscribers		**Average rate**				**MOU**
Operator	**Shareholding structure**	**Coverage***	**Technology and frequency**		**2007**	**2010**	**Local**	**National**	**Intl.**	**SMS**	
Movistar	• 100% Telefónica Móviles Holding Uruguay SA	65% Geographic 80% Population	GSM (8/19), AMPS (B), CDMA (1900), W-CDMA (800)	Total	1.2M	1.9M					52 min
				Pre	1.0M	1.0M	0.34	n.a.	0.34	n.a.	
				Post	0.2M	0.3M	0.32	n.a.	0.34	n.a.	
ANCEL	• 100% ANTEL S.A.	n.a.	GSM (1800), W-CDMA, US TDMA	Total	1.2M	1.9M					67 min
				Pre	1.0M	1.8M	0.33	n.a.	n.a.	0.05	
				Post	0.2M	0.1M	0.18-0.30	n.a.	n.a.	0.05	
Claro	• 100% América Móvil	n.a.	GSM (1900), W-CDMA (1900)	Total	0.6M	1.0M					n.a.
				Pre	0.5M	0.9M	0.33	n.a.	n.a.	0.02-0.05	
				Post	0.1M	0.1M	0.23	n.a.	n.a.	0.02-0.05	
TOTAL					**3.0M**	**4.7M**					**76 min****

* Coverage within the region of operation
** Weighted average

Note: The n.a. tariff information was not provided by the operator through the consulted channels (web site and call center)

Source: ITU, WCIS, EIU, Work team analysis

Figure 94 – Map of operators and technologies: Venezuela

Map of operators and technologies: Venezuela

USD/minute, Taxes included

General information

Population **27.0 million**
93.7% urban
6.3% rural

Penetration of telecommunications services

Fixed	15.7%
Mobile	71.6%

Mobile operators

Operator	**Shareholding structure**	**Coverage**	**Technology and frequency**		**Subscribers**		**Average rate**				**MOU**
					2007	**2010**	**Local**	**Nat.**	**Inter.**	**SMS**	
Movilnet	• 86% State • 14% Other	n.a.	GSM (8/19), CDMA (800), W-CDMA (1900)	Total	9.5M	13.2M					100 min
				Pre	9.1M	12.7M	0.29	n.a.	0.42-0.98	0.07	
				Post	0.4M	0.5M	0.23	n.a.	0.36-0.92	0.07	
Movistar	• 100% Telefónica Latinoamerica S.A.	17%Geographic 94% Population	GSM (1900), AMPS, US TDMA	Total	9.4M	11.9M					n.a.
				Pre	8.9M	11.4M	0.53	n.a.	0.66-1.00	0.07	
				Post	0.5M	0.5M	0.24-0.29	n.a.	0.37-0.77	0.07	
DIGITEL	• 66% Cisneros Group • 17% Victor Gill • 17% Rajendra Singh	n.a.	GSM (900)	Total	4.9M	6.8M					n.a.
				Pre	4.6M	6.5M	0.26	n.a.	n.a.	0.07	
				Post	0.3M	0.3M	0.30	n.a.	n.a.	0.07	
TOTAL					**23.8M**	**31.9M**					**100 min**

Note: The n.a. tariff information was not provided by the operator through the consulted channels (web site and call center)
Source: Merrill Lynch, WCIS, ITU, Work team analysis

Annexes

- Map of operators and technologies
- **International roaming regulatory framework**
- Roaming agreements
- Inter-operator tariffs
- Applicable taxes for international roaming
- Regional tax agreements
- Border zones
- List of acronyms
- List of figures
- Bibliography and information sources

Figure 95 – 1995 Supreme Decree No. 24,132

Roaming regulation:
1995 Supreme Decree No. 24,132

Country	Bolivia
Law/ regulation	• 1995 Supreme Decree No. 24,132 – Article 371 (modified by 2006 Supreme Decree No. 28994)
Field of action	• National roaming agreements
Principal regulation	• Provision of mandatory national roaming service, at least, for telephone communications • Determination of 90 calendar days to make applications for roaming support operational between operators ... • … subject to intervention by the Telecommunications Superintendent in the event that deadlines are not met
Excerpt from law	• “ARTICLE 371 - I. Basic Mobile Services are national in scope and coverage and should provide urban and rural areas conditions that allow the majority of people in the country to have access to such services. - II. Basic Mobile Service Operators ensure compatibility of their networks across geographic areas, so that they behave as a single network with national coverage and its use is transparent to any user. - III. Basic Mobile Service Operators must have roaming ability, at least for telephone communications. Roaming means the ease of tracking a mobile user, so access is available to the service when moved from one geographical area to another where there is coverage by some of the basic mobile service providers. - IV. To ensure that users have national coverage, Basic Mobile Service Operators will be required to provide service support for roaming, at least for voice communications, for the user of another operator who is in an area where its operator does not have coverage and makes a request for service coverage - V. Upon written request for roaming support service, the operator receiving the request must complete it so that the service is operative within ninety (90) calendar days from the date of application. If the request is not met within twenty (20) working days after taking notice, the Telecommunications Superintendent upon request by a party or official, will intervene to determine the conditions of service provision to support roaming or declare its irrelevance when it is shown that there is no technical compatibility, or that it can cause damage to the network or will harm in a technical way the services of the operator receiving the request - VI. Mobile services are subject to rate regulations, according to the pricing policy established by law and regulation."

Source: Bolivian government

Figure 96 - “Súmula” Anatel, 1998

Roaming regulation: “Súmula” Anatel, 1998

Country	Brazil
Law/ regulation	• *“Súmula”* Anatel, 1998
Field of action	• National roaming agreements
Principal regulation	• Determination of nondiscriminatory conditions for the provision of national roaming service
Excerpt from law	• “The existence of roaming agreements among Mobile Service Concessionaries (SMC) , mandate the obligation to recognize agreements to other interested SMC Concessionaries that grant equivalent conditions while observing the same technological standard of the Concessionary who will serve the visiting user. The obligation is not applicable in common geographic areas of subvention for the involved concessionaries.”

Source: Anatel

Figure 97 – 1997, Resolution CRT No. 087

Roaming regulation:
1997, Resolution CRT No. 087

Country	Colombia
Law/ regulation	• 1997, Resolution CRT No. 087
Field of action	• Assignation of International Roaming Codes
Principal regulation	• Determination that the CRT be/is responsible for the assignation of international roaming codes (IMSI, SID, etc.)
Excerpt from law	• "ARTICLE 4.2.2.8. AVAILABILITY OF ESSENTIAL FACILITIES. Operators to which this section applies shall make available to other operators who so request, by way of lease, the essential facilities as defined by the CRT to provide interconnection and the location of necessary equipment, and allow for their adequate operation. The remuneration for the rental of essential facilities will be established in accordance with the criterion of efficient cost plus reasonable profit. The interconnecting operator cannot demand from the operator funding for construction, equipment or other elements necessary for the adaptation of said essential facilities, notwithstanding that the latter can voluntarily offer to finance it. For purposes of interconnection, the following are considered essential facilities: - # 8. Automatic roaming between mobile network operators when their air interfaces allow. " • "ARTICLE 13.2.5.5. Assignation of International Roaming Codes. - The Telecommunication Regulation Commission is responsible for the assignation of international roaming codes, such as IMSI (International Mobile Subscriber Identity) according to ITU-T Recommendation E.212, and the SID codes (System Identification) referred to in the TIA/EIA-41 standard defined by the International Forum on Technology Standards ANSI-41 (International Forum on ANSI-41 Standards Technology - IFAST), among others. "

Source: CRT (Telecommunications Regulation Commission)

Figure 98 – 2002 Resolution of the MTC No. 418

Roaming regulation: 2002 Resolution of the MTC No. 418

Country	Peru
Law/ regulation	• 2002 Resolution of the MTC No. 418 - Article 15
Field of action	• National roaming agreements
Principal regulation	• Determination of nondiscrimination and neutrality conditions required for the provision of national roaming service • Application of sanctions by OSIPTEL in the case of unjustified denial of service or discriminatory conditions for the provision of roaming
Excerpt from law	• "Article 15: - Concessionaires of public mobile services may enter into agreements for the provision of facilities necessary to provide roaming, under the condition that they observe the obligatory principles of neutrality and nondiscrimination, among others, declared in the General Rules. - Unjustified denial to provide facilities for the establishment of roaming, or the application of discriminatory conditions in the provision of said facilities shall be punished by OSIPTEL in accordance with the provisions of Legislative Decree No. 701. "

Source: CRT (Telecommunications Regulation Commission)

Figure 99 – 2004 Conatel Resolution No. 408

Roaming regulation:
2004 Conatel Resolution No. 408

Country	Venezuela
Law/ regulation	• 2004 Conatel Resolution No. 408
Field of action	• Predominate national roaming agreements
Principal regulation	• Determination of nondiscrimination, neutrality and transparency conditions in roaming agreements • Obligation to offer prepaid methods of payment when there is agreement • Obligation to make precise and accurate information on prices and rates available to customers free of charge
Excerpt from law	• “Article 3. Ease of access to roaming - The operators of mobile telecommunications services, when offering roaming facilities, must provide access of this facility to all their subscribers, regardless of the method of payment for the service. • Article 4. Roaming agreements - The operators of mobile telecommunications services shall agree, in accordance with the conditions of neutrality, nondiscrimination and transparency, on the conditions for the provision of national roaming. Similarly, in cases of roaming or international roaming, the provision of the service will be undertaken in accordance with agreements between the established operators in the Bolivarian Republic of Venezuela and the foreign operators. • Article 5. Available roaming services - In the service contracts, telecommunication service operators must specify the specific services or features available for users while roaming. • Article 6. Information regarding prices and rates - Every mobile telecommunication service operator must establish information services that make precise, clear and accurate information on current prices and rates for roaming available to customers free of charge and readily available in the specific area of service, through suitable means of information sources. Moreover, the users will be able to access these said information services from their mobile handsets at no cost,

Source: Conatel

Figure 100 – MERCOSUR Resolution No. 19, 2001

Roaming regulation:
MERCOSUR Resolution No. 19, 2001

Countries	Argentina Brazil Paraguay Uruguay
Law/ regulation	• MERCOSUR Resolution No. 19, 2001
Field of action	• International roaming agreements • Radio frequency interference in border zones
Principal regulation	• Obligation for the operator to inform those subscribers who solicit roaming services of rates…operational procedures and customer service numbers for roaming services; and to grant visiting users the same quality of service provided to its own users • Obligation to subjugate international roaming agreements to examination by national regulators • Recommendation of Network Identification Codes (MIN y IMSI) and the implementation of anti-fraud procedures • Determination of coordination procedures to avoid interference in border zones
Excerpt from law	• "Mobile station identification: Mobile services operators that provide international roaming services are recommended to gradually migrate their mobile network identification systems to the plan established in the ITU's recommendation E.212; from the Mobile Station Identification Number (MIN) to the International Mobile Subscriber Identity (IMSI).“ • Characteristics of the roaming service provisions: - The providers of mobile services will be responsible for informing the conditions of international roaming services to the users who request said services. That information must at least include rates, operative processes and the customer service numbers of the visited operator - The quality of service provided to the Visiting User can not be inferior to the service provided to its own users - It is recommended to the Operators from the Member States to agree on international roaming services, implement operational systems and fraud-control procedures, and to establish respective responsibilities within that agreement. - Each time mobile service operators sign an international roaming agreement, they must present within the next 30 working days, a copy of that agreement to their Administration, who will have 30 working days to make any necessary changes. If in that period there are no observations presented by Administration, the agreement will be registered automatically. • "To adopt the “Procedures Manual for the Coordination of frequencies in the 800 MHz Mobile Band Field Service", which appears as Annex II and part of the present resolution."

Source: MERCOSUR

Figure 101 – 2004, Law No. 25,891

Fraud Regulation: 2004, Law No. 25,891

Country	Argentina
Law/ Regulation	• 2004, Law No 25,891 (known as the “Blumberg Law”)
Field of action	• Fraud
Principal regulation	• Mandate for the daily exchange of the registration of all robbed, stolen or lost terminals/handsets provided by clients. • Creation of the National Public Register of Members and Client Services Mobile Communications • Criminalization of the act of subscription fraud or cloning
Excerpt from law	• “Art. 3 – The holders of Mobile communications services (SCM) licensees must establish and exchange among them and with the National Communications Commission (CNC) on a daily basis the registration of robbed, stolen, or lost handsets/terminals that they are informed of by their clients; deny service to anyone that requests service of handsets/terminals that are included in the established registry or database; that is created for this purpose; provide mechanisms for providing in immediate form, at any time and any day of the year, without charge to the Government, the information contained in this registry upon requirement by the judicial power and/or the public office, in conformity with Law 25,873. • Art 7 - Create, the National Public Registry of Users and Clients of Mobile Communications Services, within the field of action of the National Communications Commission (CNC). The registry will include personal data, civil status and address information from users and clients, and also contain records of firm sentences for fraudulent acts, if any. This registry will be constantly updated with information of new subscriptions and subscription cancellations for each kind of service. • Art 10 - Punishment by imprisonment of one (1) month to six (6) years to anyone who alters, replaces, clones or in any way modifies the number or electronic serial code of a telecommunications line, or mechanical serial code of a handset/terminal or of a Subscriber Identity Module (SIM) for the user, or any technology in the future replacing those in handsets/terminals that use these mechanisms; in a way that can create detriments either to the titular or user of the handset/terminal or to third parties. • Art 11 – Punishment by imprisonment of one (1) month to six (6) years to anyone who alters, replaces, duplicates or otherwise modifies any component of a telephone card, or by any means complies with the codes of allotment of such service, for the purpose of profiting illegally from the credit issued by a licensee of mobile communication services (SCM). • Art 12 – Punishment of imprisonment of six (6) months to three (3) years for those who, knowing its unlawful origin, acquires by any means or uses the handsets/terminals, Subscriber Identity Modules (telephony cards), or the technology that will replace them in the future."

Source: Senate and Chamber of Deputies (Argentina)

Figure 102 – 2005, Anatel Resolution No. 410

Fraud Regulation:
2005, Anatel Resolution No. 410

Country	Brazil
Law/ regulation	• July 2005, Anatel Resolution No. 410 – General Regulation of Interconnection
Field of action	• Fraud
Principal regulation	• Obligation to define anti-fraud procedures in interconnection contracts
Excerpt from law	• "Art 42. The interconnection agreement shall include: (...) IX - treatment of the fraudulent calls, especially aspects of clearing and coordinated action for the prevention and control of fraud ;(....)"

Source: MERCOSUR

Figure 103 – 2001, External Joint Circular No. 011

Fraud Regulation:
2001, External Joint Circular No. 011

Country	Colombia
Law/ regulation	• 2001, External Joint Circular No. 011 from the Superintendent of Industry and Commerce
Field of action	• Fraud
Principal regulation	• Obligation to define anti-fraud policies for mobile and fixed-line operators
Excerpt from law	• “Operators must have an anti-fraud policy and therefore, need to adopt protective mechanisms to prevent damage and insecurity of their respective networks. • For this purpose, TPBC and mobile operators must make a diagnosis of anti-fraud policies and mechanisms, as well as the security of their networks (...) • The operator must hold a "fraud commitment" with the respective supervisory authority to establish, implement or adapt their anti-fraud mechanisms to ensure the adequate and appropriate protection of their lines. "

Source: Mercosur

Figure 104 – 2007, Resolution CRT No. 1732

Fraud Regulation:
2007, Resolution CRT No. 1732

Country	Colombia
Law/ regulation	• 2007, Resolution No. 1732
Field of action	• Fraud
Principal regulation	• User obligations: to make rational use of existing networks, terminal equipment and telecommunication services. • When users bring Petitions, Complaints and Appeals (PQR) that may be related to suspected fraud, operators must take action to identify the causes that originated the PQR. • If the operator discontinues the service and the user fraudulently reconnects, the solidarity has then been broken with respect to administrative sanctions for irregularities or fraud, if any, without harming the obligation to pay for services consumed during the fraudulent reconnection period • Operators should: - Adopt mechanisms for the handling of confidential user data for purposes of telecommunications fraud prevention and control - Secure handling of confidential information. - Make use of the appropriated technological tools for preventing fraud, and make periodic follow ups of the mechanisms adopted within their networks. Mobile service operators must run a database with the information of the handsets/terminals that have been reported as missing, stolen or de-activated due to fraud or for not paying any bill received after the initial sale.
Excerpt from law	• “Article 23. Data and information security. Telecommunications operators will adopt mechanisms for guaranteeing the confidential handling of subscriber and/or user data, that can only be exchanged with other operators for fraud prevention and control, as well as for fulfilling any regulatory obligations that it demands. Moreover, they must guarantee the confidential handling of information sent in the communications that make use of their networks. • Article 40. Fraud prevention. Telecommunications operators must use proper technological tools for preventing acts of fraud, and make a periodic follow-up of the mechanisms adopted within their networks for those purposes. This information will have to be available for consultation by the CRT and inspection, surveillance and auditing authorities. • In any case, when the users present a PQR that might be connected to presumed acts of fraud, the operators will have to take all necessary actions to identify the causes that originated that requirement, and in case there is anything that is unclear, they must present physical proof to the petitioner for the reasons as to why they cannot proceed with the petition.

Source: CRT

Figure 105 – 1997, Resolution CRT No. 087

Fraud Regulation:
1997, Resolution CRT No. 087

Country	Colombia
Law/ regulation	• 1997, Resolution CRT No. 087
Field of action	• Fraud
Principal regulation	• To allow operators to exchange information about subscribers and users to prevent and control fraud
Excerpt from law	• "ARTICLE 7.1.2. INVIOLABILITY OF COMMUNICATIONS. - Telecommunications operators should take all safety measures required for ensuring the inviolability of communications and personal data of subscribers and / or users. The confidentiality of telecommunications extends to voice communications, data, images and sounds or unauthorized use or disclosure of the existence or content of communications. - Unless an order is issued by a competent authority, telecom operators may not permit, by act or omission, or violation, the interception of communications that pass through their own networks. If the violation comes from a third party, the telecommunications service operator must take immediate steps to cease the conduct and report the alleged violation to the competent authorities. - For the purposes of telecommunications fraud prevention and control, operators may exchange information about subscribers and users. "

Source: Mercosur

Annexes

- Map of operators and technologies
- International roaming regulatory framework
- **Roaming agreements**
- Inter-operator tariffs
- Applicable taxes for international roaming
- Regional tax agreements
- Border zones
- List of acronyms
- List of figures
- Bibliography and information sources

Figure 106 – South American roaming initiative Argentina

South American roaming initiative: Argentina

2007, Postpaid retail rates, USD/minute, Taxes not-included

Roaming rates	BO	BR	CL	CO	EC	GY	PY	PE	SU	UY	VE
Incoming calls	min - max	min - max	min – max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max
Claro	n.a.	0.24	2.83	2.89	4.62	w/o service	0.69 - 1.67	5.64	w/o service	0.40	2.77
Telecom Personal	4.20	4.20	4.20	4.50	4.50	w/o service	4.20	4.50	w/o service	2.50	4.50
Movistar	1.99	1.99	1.99	1.99	1.99	w/o service	1.99	1.99	w/o service	0.35	1.99
Outgoing local calls											
Claro	0.77	0.79 - 0.94	0.62 - 0.84	0.55 - 1.01	1.02	w/o service	0.66 - 0.97	0.66	w/o service	0.35 - 0.40	0.95
Telecom Personal	1.60	1.60	1.60	2.50	2.50	w/o service	1.60	2.50	w/o service	0.50	2.50
Movistar	1.99	1.99	1.99	1.99	1.99	w/o service	1.99	1.99	w/o service	0.35	1.99
Intl. outgoing call to country of origen											
Claro	2.52	1.56 - 1.87	2.83	2.34	3.60	w/o service	1.32 - 2.99	2.82	w/o service	0.40	2.77
Telecom Personal	1.60	1.60	1.60	2.50	2.50	w/o service	1.60	2.50	w/o service	0.50	2.50
Movistar	1.99	1.99	1.99	1.99	1.99	w/o service	1.99	1.99	w/o service	0.35	1.99
Intl. outgoing call to other country											
Claro	0.70	0.70	0.70	0.70	0.70	w/o service	0.70	0.70	w/o service	0.70	2.77
Telecom Personal	3.50	3.50	3.50	3.50	3.50	w/o service	3.50	3.50	w/o service	2.00	3.50
Movistar	1.99	1.99	1.99	1.99	1.99	w/o service	1.99	1.99	w/o service	0.35	1.99

Source: Operator web sites, Work team analysis

Figure 107 – South American roaming initiative: Argentina (cont.)

South American roaming initiative: Argentina (cont.)

2007, Postpaid retail rates, USD, Taxes not-included

Roaming rates	**BO**	**BR**	**CL**	**CO**	**EC**	**GY**	**PY**	**PE**	**SU**	**UY**	**VE**
Incoming text message	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max
Claro	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o service	w/o charge	w/o charge	w/o service	0.40	w/o charge
Telecom Personal	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o service	w/o charge	w/o charge	w/o service	w/o charge	w/o charge
Movistar	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o service	w/o charge	w/o charge	w/o service	w/o charge	w/o charge
Outgoing text message											
Claro	0.26	0.29 - 0.30	0.20 - 0.25	0.55	0.72	w/o service	0.18 - 0.26	0.18	w/o service	0.05	0.41
Telecom Personal	0.50	0.50	0.50	0.75	0.75	w/o service	0.50	0.75	w/o service	0.35	0.75
Movistar	0.29	0.29	0.29	0.29	0.29	w/o service	0.29	0.29	w/o service	0.05	0.29
Multimedia messaging (USD / MB)											
Claro	w/o service	w/o charge	w/o service	w/o service	w/o charge	w/o service	n.a.	n.a.	w/o service	n.a.	n.a.
Telecom Personal	0.75	0.75	0.75	0.90	0.90	w/o service	0.75	0.90	w/o service	0.40	0.90
Movistar	w/o service	w/o charge	w/o charge	w/o charge	w/o charge	w/o service	w/o charge	w/o charge	w/o service	w/o charge	w/o charge
Data (USD / MB)											
Claro	n.a.	11.7	n.a.	n.a.	w/o charge	w/o service	n.a.	n.a.	w/o service	n.a.	n.a.
Telecom Personal	8.00	8.00	8.00	10.00	10.00	w/o service	8.00	10.00	w/o service	3.50	10.00
Movistar	n.a.	9.90	9.90	9.90	9.90	w/o service	9.90	9.90	w/o service	3.50	n.a.

Note: The n.a. tariff information was not provided by the operator through the consulted channels (web site and call center)

Source: Operator web sites, GSM World, Work team analysis

Figure 108 – South American roaming initiative: Bolivia

South American roaming initiative: Bolivia

2007, Postpaid retail rates, USD/minute, Taxes not-included

Roaming rates	**AR**	**BR**	**CL**	**CO**	**EC**	**GY**	**PY**	**PE**	**SU**	**UY**	**VE**
Incoming call	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max
Nuevatel	1.38 - 1.41	0.48 - 1.65	0.48	1.87	1.64	n.a.	0.48 - 1.23	1.23	n.a.	0.48 - 1.52	0.48
Entel	0.79 - 0.82	0.00 - 1.06	w/o charge	0.90 - 1.02	1.02	w/o service	w/o charge	0.66	w/o service	0.00 - 0.72	w/o charge
Tigo	0.99	0.87	w/o charge	0.96	1.38	n.a.	0.80	0.78	n.a.	0.00 - 1.06	n.a.
Outgoing local call											
Nuevatel	0.90 - 0.93	0.68 - 3.43	0.71 - 2.00	1.41	1.16	n.a.	0.78 - 1.10	0.75	n.a.	1.04 - 1.28	1.04
Entel	0.60 - 0.79	0.55 - 0.84	0.55 - 0.84	0.60 - 0.90	0.60 - 0.90	w/o service	0.55 - 0.97	0.66	w/o service	0.55 - 0.89	0.60
Tigo*	0.99	1.13	0.75	0.96	1.25 - 1.38	n.a.	0.80	0.78	n.a.	1.06 - 1.38	n.a.
Intl. outgoing call to country of origen											
Nuevatel	1.96 - 2.22	2.00 - 4.40	3.37 - 3.40	4.65	2.58	n.a.	1.90 - 3.33	3.22	n.a.	1.40	2.69
Entel	1.50 - 1.88	0.17 - 3.71	1.10 - 2.95	1.10 - 2.38	3.60	w/o service	1.10 - 2.72	2.82	w/o service	1.10 - 1.22	1.50
Tigo*	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Intl. outgoing call to other country											
Nuevatel	1.93 - 3.82	1.98 - 4.40	2.74 - 3.40	4.65	2.58	n.a.	1.90 - 3.46	3.14 - 3.22	n.a.	1.22 - 1.45	2.45 - 4.69
Entel	1.50 - 1.88	0.17 - 3.71	1.10 - 2.95	1.10 - 2.38	3.60	w/o service	1.10 - 2.72	2.82	w/o service	1.10 - 1.22	1.50
Tigo*	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

* Taxes included

Note: The n.a. tariff information was not provided by the operator through the consulted channels (web site and call center)

Source: Operator web sites, Work team analysis

Figure 109 - South American roaming initiative: Bolivia (cont.)

South American roaming initiative: Bolivia (cont.)

2007, Postpaid retail rates, USD, Taxes not-included

Roaming rates	AR	BR	CL	CO	EC	GY	PY	PE	SU	UY	VE
Incoming text message	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max
Nuevatel	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	n.a.	w/o charge	w/o charge	n.a.	w/o charge	w/o charge
Entel	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o service	w/o charge	w/o charge	w/o service	w/o charge	w/o charge
Tigo*	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	n.a.	w/o charge	w/o charge	n.a.	w/o charge	w/o charge
Outgoing text message											
Nuevatel	0.33 - 0.34	0.33 - 2.00	0.27 - 0.29	0.58	0.48	n.a.	0.30 - 0.34	0.21	n.a.	0.34	0.47
Entel	0.29	0.22 - 1.06	0.18 - 0.24	0.18 - 0.42	n.a.	w/o service	0.18 - 0.30	0.18	w/o service	0.18 - 0.30	0.22
Tigo*	0.37	0.44	0.30 - 0.33	0.35	0.36	n.a.	0.32	0.22	n.a.	0.22 - 0.36	n.a.
Multimedia messaging (USD / MB)											
Nuevatel	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service
Entel	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service
Tigo*	14.60	17.40	w/o service	w/o service	w/o service	w/o service	9.57	w/o service	w/o service	w/o service	w/o service
Data (USD / MB)											
Nuevatel	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service
Entel	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service
Tigo*	14.60	17.40	w/o service	w/o service	w/o service	w/o service	9.57	w/o service	w/o service	w/o service	w/o service

* Taxes included

Note: The n.a. tariff information was not provided by the operator through the consulted channels (web site and call center)

Source: Operator web sites, Work team analysis

Figure 110 – South American roaming initiative: Brazil

South American roaming initiative: Brazil

2007, Postpaid retail rates, USD/minute, Taxes included

Roaming rates	AR	BO	CL	CO	EC	GY	PY	PE	SU	UY	VE
Incoming call	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max
Claro	2.30 - 2.99	2.89	2.30 - 2.62	2.57	2.57	2.89	2.30 - 2.62	2.57	w/o agreement	2.30 - 2.62	2.89
TIM	2.19 - 2.66	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19
Vivo	1.29 - 2.01	2.51	2.01	2.51	2.51	2.51	2.01	2.51	2.51	2.51	2.51
Oi	2.63 - 3.07	2.13	1.58	5.72 - 5.84	6.87	w/o agreement	3.71	3.37	2.67	1.44 - 3.20	3.79 - 4.26
Outgoing local call											
Claro	1.69 - 2.04	2.04	1.69 - 2.04	1.69	1.69	2.04	1.69 - 2.04	1.69	w/o agreement	1.69 - 2.04	2.04
TIM	1.69 - 2.66	1.69 - 2.19	1.69 - 2.19	1.69 - 2.19	2.19	2.19	1.69 - 2.19	2.19	2.19	1.69 - 2.19	1.69 - 2.19
Vivo	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	0.71 - 1.29
Oi	1.55 - 2.00	1.71 - 1.88	1.52 - 2.06	2.20 - 2.32	4.89	w/o agreement	3.89	1.35	4.21	1.76 - 4.34	2.03 - 2.49
Intl. outgoing call to country of origen											
Claro	3.57 - 5.35	5.10	3.57 - 5.10	3.57	3.57	5.10	3.57 - 5.10	3.57	w/o agreement	3.57 - 5.10	5.10
TIM	3.69 - 5.85	3.69 - 4.69	3.69 - 4.69	3.69 - 4.69	4.69	4.69	3.69 - 4.69	4.69	4.69	3.69 - 4.69	3.69 - 4.69
Vivo	3.29	3.29	3.29	3.29	3.29	3.29	3.29	3.29	3.29	3.29	3.29
Oi	2.06 - 3.76	3.61 - 5.43	7.22 - 7.28	3.67 - 5.60	17.25	w/o agreement	6.91	5.78	11.28	2.14 - 5.14	5.31 - 5.78
Intl. outgoing call to other country											
Claro	3.57 - 5.35	5.10	3.57 - 5.10	3.57	3.57	5.10	3.57 - 5.10	3.57	w/o agreement	3.57 - 5.10	5.10
TIM	3.69 - 5.85	3.69 - 4.69	3.69 - 4.69	3.69 - 4.69	4.69	4.69	3.69 - 4.69	4.69	4.69	3.69 - 4.69	3.69 - 4.69
Vivo	4.29	4.29	4.29	4.29	4.29	4.29	4.29	4.29	4.29	4.29	4.29
Oi	2.06 - 3.76	3.61 - 5.43	7.22 - 7.28	3.67 - 5.60	17.25	w/o agreement	6.91	5.78	11.28	2.14 - 5.14	5.31 - 5.78

Note: The n.a. tariff information was not provided by the operator through the consulted channels (web site and call center)

Source: Operator web sites, Work team analysis

Figure 111 - South American roaming initiative: Brazil (cont.)

South American roaming initiative: Brazil (cont.)

2007, Postpaid retail rates, USD, Taxes included

Roaming rates	**AR**	**BO**	**CL**	**CO**	**EC**	**GY**	**PY**	**PE**	**SU**	**UY**	**VE**
Incoming text message	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max
Claro	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o agreem.	w/o charge	w/o charge
TIM	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge
Vivo	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge
Oi	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o agreem.	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge
Outgoing text message											
Claro	0.47 - 0.50	0.47	0.47	0.47	0.47	0.47	0.47	0.47	w/o agreem.	0.47	0.47
TIM	0.79 - 1.18	0.79 - 1.09	0.79 - 1.09	0.79 - 1.09	1.09	1.09	0.79 - 1.09	1.09	1.09	0.79 - 1.09	0.79 - 1.09
Vivo	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71
Oi	0.79 - 1.09	0.81 - 0.85	0.79 - 0.82	0.94 - 1.24	2.22	w/o agreem.	1.00	0.97	1.98	0.94 - 1.64	1.09 - 1.52
Multimedia messaging (USD / MB)											
Claro	14.20 - 54.43	54.43	14.20 - 54.43	14.20	14.20	w/o service	14.20 - 54.43	14.20	w/o agreem.	14.20 - 54.43	54.43
TIM	22.53	22.53	22.53	22.53	22.53	w/o service	22.53	22.53	w/o service	22.53	22.53
Vivo	20.22	20.22	20.22	20.22	20.22	w/o service	20.22	20.22	w/o service	20.22	20.22
Oi	29.6	414.2	118.3	295.8	w/o service	w/o agreem.	w/o service	w/o service	4.7	w/o service	w/o service
Data (USD / MB)											
Claro	14.20 - 54.43	54.43	14.20 - 54.43	14.20	14.20	w/o service	14.20 - 54.43	14.20	w/o agreem.	14.20 - 54.43	54.43
TIM	22.53	22.53	22.53	22.53	22.53	w/o service	22.53	22.53	w/o service	22.53	22.53
Vivo	20.22	20.22	20.22	20.22	20.22	w/o service	20.22	20.22	w/o service	20.22	20.22
Oi	29.6	414.2	118.3	295.8	w/o service	w/o agreem.	w/o service	w/o service	4.7	w/o service	w/o service

Note: The n.a. tariff information was not provided by the operator through the consulted channels (web site and call center)
Source: Operator web sites, Work team analysis

South American roaming initiative: Chile

2007, Postpaid retail rates, USD/minute, Taxes included

Roaming rates	AR	BO	BR	CO	EC	GY	PY	PE	SU	UY	VE
Incoming call	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max
Movistar	1.70	1.70 - 2.38	1.70	1.70 - 2.38	1.70 - 2.38	2.38	2.38	1.70 - 2.38	2.38	1.70 - 2.38	1.70 - 2.38
Entel	1.50 - 1.79	1.50 - 1.79	1.50 - 1.79	1.50 - 1.79	3.21	w/o agreem.	1.50 - 1.79	1.79	w/o agreem.	1.50 - 1.79	1.50 - 1.79
Claro	1.70 - 2.00	2.00	1.70	1.70 - 2.00	1.70	2.00	1.70	1.70	2.00	1.70	w/o agreem.
Outgoing local call											
Movistar	1.70 - 2.38	1.70 - 2.38	1.70	1.70 - 2.38	1.70 - 2.38	2.38	2.38	1.70 - 2.38	2.38	1.70 - 2.38	1.70 - 2.38
Entel	1.00 - 1.43	1.00 - 1.43	1.00 - 1.43	1.00 - 1.43	1.90	w/o agreem.	1.00 - 1.43	1.43	w/o agreem.	1.00 - 1.43	1.00 - 1.43
Claro	1.07 - 1.50	1.09 - 1.50	1.07	1.07 - 1.50	1.07	1.54	1.33	1.07	1.50	1.07	w/o agreem.
Intl. outgoing call to country of origen											
Movistar	1.70 - 2.38	1.70 - 2.38	1.70	1.70 - 2.38	1.70 - 2.38	2.38	2.38	1.70 - 2.38	2.38	1.70 - 2.38	1.70 - 2.38
Entel	2.00 - 2.32	2.00 - 2.32	2.00 - 2.32	2.00 - 2.32	2.00 - 2.32	w/o agreem.	2.00 - 2.32	2.32	w/o agreem.	2.00 - 2.32	2.00 - 2.32
Claro	2.00 - 2.50	2.30	2.00	2.00 - 2.50	2.00	2.30	2.50	2.00	2.99	2.00	w/o agreem.
Intl. outgoing call to other country											
Movistar	1.70 - 2.38	1.70 - 2.38	1.70	1.70 - 2.38	1.70 - 2.38	2.38	2.38	1.70 - 2.38	2.38	1.70 - 2.38	1.70 - 2.38
Entel	2.00 - 2.32	2.00 - 2.32	2.00 - 2.32	2.00 - 2.32	2.00 - 2.32	w/o agreem.	2.00 - 2.32	2.32	w/o agreem.	2.00 - 2.32	2.00 - 2.32
Claro	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	w/o agreem.

Note: The n.a. tariff information was not provided by the operator through the consulted channels (web site and call center)
Source: Operator web sites, Work team analysis

Figure 113 - South American roaming initiative: Chile (cont.)

South American roaming initiative: Chile (cont.)

2007, Postpaid retail rates, USD, Taxes included

Roaming rates	AR	BO	BR	CO	EC	GY	PY	PE	SU	UY	VE
Incoming text message	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max
Movistar	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge
Entel	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o agreem.	w/o charge	w/o charge	w/o agreem.	w/o charge	w/o charge
Claro	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o agreem.
Outgoing text message											
Movistar	0.05 - 0.48	0.05 - 0.48	0.05	0.05 - 0.48	0.05 - 0.48	0.48	0.48	0.05 - 0.48	0.48	0.05 - 0.48	0.05 - 0.48
Entel	0.30 - 0.43	0.30 - 0.43	0.30 - 0.43	0.30 - 0.43	0.43	w/o agreem.	0.30 - 0.43	0.43	n.a.	0.30 - 0.43	0.30 - 0.43
Claro	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	w/o agreem.
Multimedia messaging (USD / MB)											
Movistar	13.09	w/o service	13.09	13.09	13.09	w/o service	w/o service	13.09	w/o service	13.09	13.09
Entel	11.20 - 13.50	11.20 - 13.50	11.20 - 13.50	11.20 - 13.50	17.00	w/o agreem.	11.20 - 13.50	13.50	w/o agreem.	11.20 - 13.50	11.20 - 13.50
Claro	10.00	w/o service	10.00	w/o service	10.00	w/o service	10.00	10.00	w/o service	10.00	w/o agreem.
Data (USD / MB)											
Movistar	13.09	w/o service	13.09	13.09	13.09	w/o service	w/o service	13.09	w/o service	13.09	13.09
Entel	11.20 - 13.50	11.20 - 13.50	11.20 - 13.50	11.20 - 13.50	17.00	w/o agreem.	11.20 - 13.50	13.50	w/o agreem.	11.20 - 13.50	11.20 - 13.50
Claro	10.00	w/o service	10.00	w/o service	10.00	w/o service	10.00	10.00	w/o service	10.00	w/o agreem.

Note: The n.a. tariff information was not provided by the operator through the consulted channels (web site and call center)

Source: Operator web sites, Work team analysis

Figure 114 – South American roaming initiative: Colombia

South American roaming initiative: Colombia

2007, Postpaid retail rates, USD/minute, Taxes included

Roaming rates	AR	BO	BR	CL	EC	GY	PY	PE	SU	UY	VE
Incoming call	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max
Movistar	1.69	1.69	1.69	1.69	1.69	w/o agreem.	1.69	1.69	w/o agreem.	1.69	1.69
Comcel	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	w/o agreem.	1.55	1.55
Tigo	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Outgoing local call											
Movistar	1.69	1.69	1.69	1.69	1.69	w/o agreem.	1.69	1.69	w/o agreem.	1.69	1.69
Comcel	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	w/o agreem.	1.55	1.55
Tigo	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Intl. outgoing call to country of origen											
Movistar	1.69	3.49	3.49	1.69	1.69	w/o agreem.	3.49	1.69	w/o agreem.	1.69	1.69
Comcel	3.34	3.34	3.34	3.34	3.34	3.34	3.34	3.34	w/o agreem.	3.34	3.34
Tigo	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Intl. outgoing call to other country											
Movistar	1.69	3.49	3.49	1.69	1.69	w/o agreem.	3.49	1.69	w/o agreem.	1.69	1.69
Comcel	3.34	3.34	3.34	3.34	3.34	3.34	3.34	3.34	w/o agreem.	3.34	3.34
Tigo	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Note: The n.a. tariff information was not provided by the operator through the consulted channels (web site and call center)
Source: Operator web sites, Work team analysis

Figure 115 - South American roaming initiative: Colombia (cont.)

South American roaming initiative: Colombia (cont.)

2007, Postpaid retail rates, USD, Taxes included

Roaming rates	AR	BO	BR	CL	EC	GY	PY	PE	SU	UY	VE
Incoming text message	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max
Movistar	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o agreem.	w/o charge	w/o charge	w/o agreem.	w/o charge	w/o charge
Comcel	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	w/o agreem.	0.36	0.36
Tigo	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Outgoing text message											
Movistar	0.38	0.65	0.65	0.38	0.38	w/o agreem.	0.65	0.38	w/o agreem.	0.38	0.38
Comcel	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	w/o agreem.	0.59	0.59
Tigo	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Multimedia messaging (USD / MB)											
Movistar	6.48	6.48	6.48	6.48	6.48	w/o agreem.	6.48	6.48	w/o agreem.	6.48	6.48
Comcel	42.00	42.00	42.00	42.00	42.00	42.00	42.00	42.00	w/o agreem.	42.00	42.00
Tigo	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Data (USD / MB)											
Movistar	6.48	6.48	6.48	6.48	6.48	w/o agreem.	6.48	6.48	w/o agreem.	6.48	6.48
Comcel	42.00	42.00	42.00	42.00	42.00	42.00	42.00	42.00	w/o agreem.	42.00	42.00
Tigo	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Note: The n.a. tariff information was not provided by the operator through the consulted channels (web site and call center)
Source: Operator web sites, Work team analysis

Figure 116 – South American roaming initiative: Ecuador

South American roaming initiative: Ecuador

2007, Postpaid retail rates, USD/minute, Taxes included

Roaming rates	AR	BO	BR	CL	CO	GY	PY	PE	SU	UY	VE
Incoming call	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max
Porta	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55
Movistar	0.85 - 1.35	1.35	0.85 - 1.35	0.85 - 1.35	1.35	1.35	1.35	0.85 - 1.35	w/o agreem.	0.85 - 1.35	1.35
Alegro	1.57	1.57	1.57	1.57	1.57	w/o agreem.	1.57	1.57	w/o agreem.	1.57	1.57
Outgoing local call											
Porta	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55
Movistar	0.75 - 1.35	1.35	0.75 - 1.35	0.75 - 1.35	1.35	1.35	1.35	0.75 - 1.35	w/o agreem.	0.85 - 1.35	1.35
Alegro	1.57	1.57	1.57	1.57	1.57	w/o agreem.	1.57	1.57	w/o agreem.	1.57	1.57
Intl. outgoing call to country of origen											
Porta	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99
Movistar	1.20 - 1.75	1.75	1.20 - 1.75	1.20 - 1.75	1.75	1.75	1.75	1.20 - 1.75	w/o agreem.	1.20 - 1.75	1.75
Alegro	3.43	3.43	3.43	3.43	3.43	w/o agreem.	3.43	3.43	w/o agreem.	3.43	3.43
Intl. outgoing call to other country											
Porta	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99
Movistar	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	w/o agreem.	1.90	1.90
Alegro	3.43	3.43	3.43	3.43	3.43	w/o agreem.	3.43	3.43	w/o agreem.	3.43	3.43

Source: Operator web sites, Work team analysis

Figure 117 - South American roaming initiative: Ecuador (cont.)

South American roaming initiative: Ecuador (cont.)

2007, Postpaid retail rates, USD, Taxes included

Roaming rates	AR	BO	BR	CL	CO	GY	PY	PE	SU	UY	VE
Incoming text message	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max
Porta	0.00 - 0.25	0.25	0.00 - 0.25	0.00 - 0.25	w/o charge	0.25	0.00 - 0.25	w/o charge	0.25	0.00 - 0.25	0.25
Movistar	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o agreem.	w/o charge	w/o charge
Alegro	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o agreem.	w/o charge	w/o charge	w/o agreem.	w/o charge	w/o charge
Outgoing text message											
Porta	0.30 - 0.40	0.40	0.30 - 0.40	0.30 - 0.40	0.30	0.40	0.30 - 0.40	0.30	0.40	0.30 - 0.40	0.40
Movistar	0.25 - 0.35	0.35	0.25 - 0.35	0.25 - 0.35	0.35	0.35	0.35	0.25 - 0.35	w/o agreem.	0.25 - 0.35	0.35
Alegro	0.12	0.12	0.12	0.12	0.12	w/o agreem.	0.12	0.12	w/o agreem.	0.12	0.12
Multimedia messaging (USD / MB)											
Porta	25.00	w/o service	25.00	25.00	25.00	w/o service	25.00	25.00	w/o service	25.00	25.00
Movistar	20.00	w/o service	20.00	20.00	20.00	w/o service	20.00	20.00	w/o agreem.	20.00	20.00
Alegro	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service
Data (USD / MB)											
Porta	25.00	w/o service	25.00	25.00	25.00	w/o service	25.00	25.00	w/o service	25.00	25.00
Movistar	20.00	w/o service	20.00	20.00	20.00	w/o service	20.00	20.00	w/o agreem.	20.00	20.00
Alegro	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service

Source: Operator web sites, Work team analysis

Figure 118 - South American roaming initiative: Guyana

South American roaming initiative: Guyana

2007, Postpaid retail rates, USD/minute, Taxes included

Roaming rates	AR	BO	BR	CL	CO	EC	PY	PE	SU	UY	VE
Incoming call	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max
Digicel	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29
GT&T	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Outgoing local call											
Digicel	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29
GT&T	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Intl. outgoing call to country of origen											
Digicel	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29
GT&T	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Intl. outgoing call to other country											
Digicel	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29
GT&T	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Note: The n.a. tariff information was not provided by the operator through the consulted channels (web site and call center)
Source: Operator web sites, GSM World, Work team analysis

Figure 119 - South American roaming initiative: Guyana (cont.)

South American roaming initiative: Guyana (cont.)

2007, Postpaid retail rates, USD, Taxes included

Roaming rates	AR	BO	BR	CL	CO	EC	PY	PE	SU	UY	VE
Incoming text message	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max
Digicel	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge
GT&T	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Outgoing text message											
Digicel	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
GT&T	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Multimedia messaging (USD / MB)											
Digicel	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service
GT&T	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Data (USD / MB)											
Digicel	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service
GT&T	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Note: The n.a. tariff information was not provided by the operator through the consulted channels (web site and call center)

Source: Operator web sites, GSM World, Work team analysis

Figure 120 - South American roaming initiative: Paraguay

South American roaming initiative: Paraguay

2007, Postpaid retail rates, USD/minute, Taxes included

Roaming rates	AR	BO	BR	CL	CO	EC	GY	PE	SU	UY	VE
Incoming call	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max
VOX	0.66	0.66	0.66	0.66	0.83	0.83	w/o agreem.	0.83	w/o agreem.	0.66	0.83
Claro	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Tigo	0.94 - 1.18	1.23	0.45 - 1.11	0.68	1.55	1.61	w/o agreem.	1.05	w/o agreem.	0.45 - 1.24	1.67 - 1.75
Núcleo	1.05 - 1.29	0.67	0.32 - 1.40	0.32 - 0.465	0.465 - 1.80	1.61 - 1.82	w/o agreem.	1.15 - 1.33	w/o agreem.	0.32 - 0.71	0.46
Outgoing local call											
VOX	0.80	0.67	1.13	0.74	1.07	0.90	w/o agreem.	0.59	w/o agreem.	0.98	1.04
Claro	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Tigo	0.49 - 0.73	0.83	0.73 - 0.86	0.58	0.86	0.94	w/o agreem.	0.60	w/o agreem.	0.97 - 1.00	0.98 - 1.08
Núcleo	0.95 - 1.05	0.88 - 0.94	0.95 - 1.47	0.79 - 0.90	0.90 - 1.34	1.16 - 1.27	w/o agreem.	0.83 - 0.81	w/o agreem.	1.06 -1.09	1.09
Intl. outgoing call to country of origen											
VOX	1.71	2.21	2.29	2.61	3.57	3.16	w/o agreem.	2.47	w/o agreem.	1.07	2.57
Claro	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Tigo	1.34 - 1.75	1.27	1.43 - 1.72	2.73	2.18	3.30	w/o agreem.	2.55	w/o agreem.	1.00 - 1.09	2.49 - 2.67
Núcleo	1.09 - 1.95	1.73 - 1.76	1.65 - 2.78	0.95 - 1.76	0.95 - 3.52	1.83 - 3.52	w/o agreem.	1.76 - 2.58	w/o agreem.	1.21 - 1.41	1.76
Intl. outgoing call to other country											
VOX	3.96	2.32	3.87	2.72	3.75	3.31	w/o agreem.	2.59	w/o agreem.	1.46	3.81
Claro	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Tigo	1.35 - 3.00	1.27	1.60 - 1.72	2.60 - 2.73	2.18	3.3	w/o agreem.	2.55	w/o agreem.	0.96 - 1.21	1.97 - 3.80
Núcleo	1.09 - 3.28	1.73 - 2.53	1.65 - 2.78	2.82 - 3.44	2.07 - 3.52	1.62 - 3.52	w/o agreem.	2.58 2.81	w/o agreem.	1.20 - 1.45	1.95 - 3.52

Note: The n.a. tariff information was not provided by the operator through the consulted channels (web site and call center)
Source: Operator web sites, Work team analysis

Figure 121 - South American roaming initiative: Paraguay (cont.)

South American roaming initiative: Paraguay (cont.)

2007, Postpaid retail rates, USD, Taxes included

Roaming rates	AR	BO	BR	CL	CO	EC	GY	PE	SU	UY	VE
Incoming text message	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max
VOX	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o agreement	w/o charge	w/o agreem.	w/o charge	w/o charge
Claro	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Tigo	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o agreement	w/o charge	w/o agreem.	w/o charge	w/o charge
Núcleo	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o agreement	w/o charge	w/o agreem.	w/o charge	w/o charge
Outgoing text message											
VOX	0.29	0.24	0.69	0.28	0.27	0.38	w/o agreem.	0.16	w/o agreem.	0.28	0.38
Claro	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Tigo	0.25 - 0.27	0.32	0.26 - 0.33	0.24	0.31	0.39	w/o agreem.	0.34	w/o agreem.	0.16 - 0.28	0.42 - 0.57
Núcleo	0.31 - 0.46	0.29 - 0.30	0.31 - 0.78	0.28 - 0.48	0.24 - 0.48	0.26 - 0.43	w/o agreem.	0.21	w/o agreem.	0.21 - 0.32	0.42
Multimedia messaging (USD / MB)											
VOX	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o agreem.	w/o service	w/o agreem.	w/o service	w/o service
Claro	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Tigo	7.86 - 14.00	650**	11.00	10.70	w/o service	w/o service	w/o agreem.	w/o service	w/o agreem.	11.00 - 13.00	w/o service
Núcleo	6.65 - 10.56	6.65 - 7.06	10.15 - 15.56	15.15 - 15.56	15.15 - 15.56	15.15 - 15.56	w/o agreem.	15.15 - 15.56	w/o agreem.	10.45 - 10.86	w/o service
Data (USD / MB)											
VOX	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o agreement	w/o service	w/o agreem.	w/o service	w/o service
Claro	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Tigo	7.86 - 14.00	650*	11.00	10.70	w/o service	w/o service	w/o agreem.	w/o service	w/o agreem.	11.00 - 13.00	w/o service
Núcleo	6.65 - 10.56	6.65 - 7.06	10.15 - 15.56	15.15 - 15.56	15.15 - 15.56	15.15 - 15.56	w/o agreem.	15.15 - 15.56	w/o agreem.	10.45 - 10.86	w/o service

* Tigo Paraguay and Tigo Bolivia Agreement

Note: The n.a. tariff information was not provided by the operator through the consulted channels (web site and call center)

Source: Operator web sites, Work team analysis

Figure 122 – South American roaming initiative: Peru

South American roaming initiative: Peru

2007, Postpaid retail rates, USD/minute, Taxes included

Roaming rates	AR	BO	BR	CL	CO	EC	GY	PY	SU	UY	VE
Incoming call	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max
Movistar	2.86	2.86	2.86	2.86	2.86	2.86	2.86	2.86	2.86	2.86	2.86
Claro	4.54	4.54	4.54	4.54	4.54	4.54	4.54	4.54	4.54	4.54	4.54
Outgoing local call											
Movistar	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36
Claro	2.91 - 6.86	2.57 - 2.90	2.99 - 7.04	2.37 - 2.72	2.99 - 4.62	3.85	2.63	3.09 - 4.04	2.45 - 3.72	3.62 - 4.22	3.60 - 4.43
Intl. outgoing call to country of origen											
Movistar*	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36
Claro	4.11 - 9.65	4.67 - 8.39	6.57 - 14.37	9.07 - 11.33	7.21 - 15.40	13.60	7.89	4.99 - 11.77	7.35 - 10.11	4.63 - 6.35	10.06 - 10.27
Intl. outgoing call to other country											
Movistar*	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36
Claro	4.11 - 9.65	4.67 - 8.39	6.57 - 14.37	9.07 - 11.33	7.21 - 15.40	13.60	7.89	4.99 - 11.77	7.35 - 10.11	4.63 - 6.35	10.06 - 10.27

* Rates must add in NLD/ILD costs from the visited network operator, not available for Movistar Peru

Source: Operator web sites, Work team analysis

Figure 123 –South American roaming initiative: Peru (cont.)

South American roaming initiative: Peru (cont.)

2007, Postpaid retail rates, USD, Taxes included

Roaming rates	AR	BO	BR	CL	CO	EC	GY	PY	SU	UY	VE
Incoming text message	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max
Movistar	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge
Claro	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge
Outgoing text message											
Movistar	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
Claro	0.92 - 5.14	0.93 - 1.00	1.09 - 4.11	0.91 - 1.35	1.09 - 1.90	1.59	1.84	0.70 - 0.90	1.59 - 1.71	1.13 - 1.39	1.56 - 2.35
Multimedia messaging (USD / MB)											
Movistar	13.00	w/o service	13.00	13.00	13.00	13.00	w/o service	13.00	w/o service	13.00	13.00
Claro	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service
Data (USD / MB)											
Movistar	13.00	w/o service	13.00	13.00	13.00	13.00	w/o service	13.00	w/o service	13.00	13.00
Claro	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service

Source: Operator web sites, Work team analysis

Figure 124 – South American roaming initiative: Suriname

South American roaming initiative: Suriname

2007, Postpaid retail rates, USD/minute, Taxes included

Roaming rates	AR	BO	BR	CL	CO	EC	GY	PY	PE	UY	VE
Incoming call	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max
Digicel*	w/o agreem.	w/o agreem.	1.49	1.49	1.49	w/o agreem.	0.69	w/o agreem.	1.49	w/o agreem.	w/o agreem.
Telesur**	w/o agreem.	w/o agreem.	1.95	w/o agreem.	w/o agreem.	w/o agreem.	1.95	w/o agreem.	w/o agreem.	w/o agreem.	w/o agreem.
Outgoing local call											
Digicel*	w/o agreem.	w/o agreem.	1.49	1.49	1.49	w/o agreem.	0.49	w/o agreem.	1.49	w/o agreem.	w/o agreem.
Telesur**	w/o agreem.	w/o agreem.	1.98	w/o agreem.	w/o agreem.	w/o agreem.	1.98	w/o agreem.	w/o agreem.	w/o agreem.	w/o agreem.
Intl. outgoing call to country of origen											
Digicel*	w/o agreem.	w/o agreem.	2.39	2.39	2.39	w/o agreem.	1.79	w/o agreem.	2.39	w/o agreem.	w/o agreem.
Telesur**	w/o agreem.	w/o agreem.	2.85	w/o agreem.	w/o agreem.	w/o agreem.	2.85	w/o agreem.	w/o agreem.	w/o agreem.	w/o agreem.
Intl. outgoing call to other country											
Digicel*	w/o agreem.	w/o agreem.	2.39	2.39	2.39	w/o agreem.	1.79	w/o agreem.	2.39	w/o agreem.	w/o agreem.
Telesur**	w/o agreem.	w/o agreem.	3.50	w/o agreem.	w/o agreem.	w/o agreem.	3.50	w/o agreem.	w/o agreem.	w/o agreem.	w/o agreem.

* Agreement only with Brazil, Chile, Colombia, Guyana and Peru

** Agreement only with Brazil and Guyana

Source: Operator web sites, GSM World, Work team analysis

Figure 125 – South American roaming initiative: Suriname (cont.)

South American roaming initiative: Suriname (cont.)

2007, Postpaid retail rates, USD, Taxes included

Roaming rates	AR	BO	BR	CL	CO	EC	GY	PY	PE	UY	VE
Incoming text message	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max
Digicel*	w/o agreem.	w/o agreem.	w/o charge	w/o charge	w/o charge	w/o agreem.	w/o charge	w/o agreem.	w/o agreem.	w/o agreem.	w/o agreem.
Telesur **	w/o agreem.	w/o agreem.	w/o charge	w/o agreem.	w/o agreem.	w/o agreem.	w/o charge	w/o agreem.	w/o agreem.	w/o agreem.	w/o agreem.
Outgoing text message											
Digicel*	w/o agreem.	w/o agreem.	0.30	0.30	0.30	w/o agreem.	w/o service	w/o agreem.	w/o agreem.	w/o agreem.	w/o agreem.
Telesur**	w/o agreem.	w/o agreem.	0.44	w/o agreem.	w/o agreem.	w/o agreem.	w/o service	w/o agreem.	w/o agreem.	w/o agreem.	w/o agreem.
Multimedia messaging (USD / MB)											
Digicel*	w/o agreem.	w/o agreem.	w/o service	w/o service	w/o service	w/o agreem.	w/o service	w/o agreem.	w/o agreem.	w/o agreem.	w/o agreem.
Telesur**	w/o agreem.	w/o agreem.	w/o service	w/o agreem.	w/o agreem.	w/o agreem.	w/o service	w/o agreem.	w/o agreem.	w/o agreem.	w/o agreem.
Data (USD / MB)											
Digicel*	w/o agreem.	w/o agreem.	w/o service	w/o service	w/o service	w/o agreem.	w/o service	w/o agreem.	w/o agreem.	w/o agreem.	w/o agreem.
Telesur**	w/o agreem.	w/o agreem.	w/o service	w/o agreem.	w/o agreem.	w/o agreem.	w/o service	w/o agreem.	w/o agreem.	w/o agreem.	w/o agreem.

* Agreement only with Brazil, Chile, Colombia, Guyana and Peru

** Agreement only with Brazil and Guyana

Source: Operator web sites, GSM World, Work team analysis

Figure 126 –South American roaming initiative: Uruguay

South American roaming initiative: Uruguay

2007, Postpaid retail rates, USD/minute, Taxes included

Roaming rates	AR	BO	BR	CL	CO	EC	GY	PY	PE	SU	VE
Incoming call	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max
Ancel	2.63 - 4.69	0.82 - 2.05	1.52 - 4.08	1.10 - 7.32	1.75 - 4.82	4.25	w/o agreem.	1.54 - 3.65	3.30 - 3.50	w/o agreem.	1.40 - 3.62
Claro*	0.35	1.30	0.24 - 1.87	2.83	3.43	n.a.**	w/o agreem.	0.70 - 1.98	3.48	w/o agreem.	3.70
Movistar	2.35	2.50	2.00 - 2.50	2.00 - 2.50	2.00 - 2.50	2.00 - 2.50	2.50	2.50	2.00 - 2.50	2.50	2.00 - 2.50
Outgoing local call											
Ancel	0.34 - 0.96	0.65 - 0.82	0.65 - 1.60	0.65 - 0.90	0.65 - 1.22	1.05	w/o agreem.	0.58 - 1.10	0.75	w/o agreem.	0.70
Claro*	0.40	0.71 - 0.77	0.79 - 0.94	0.62 - 0.84	0.55 - 1.01	n.a.**	w/o agreem.	0.40 - 0.97	0.66	w/o agreem.	1.17
Movistar	0.35	0.94	0.51 - 0.94	0.51 - 0.94	0.51 - 0.94	0.51 - 0.94	0.94	0.94	0.51 - 0.94	0.94	0.51 - 0.94
Intl. outgoing call to country of origen											
Ancel	0.55 - 1.81	1.10 - 1.51	1.10 - 3.06	1.10 - 2.66	1.10 - 3.60	3.20	w/o agreem.	1.00 - 2.70	2.55	w/o agreem.	1.40
Claro*	0.35	1.30 - 2.52	1.56 - 1.87	1.75	2.89	n.a.**	w/o agreem.	0.70 - 1.67	2.82	w/o agreem.	2.53
Movistar	0.35	2.50	0.86 - 2.50	0.86 - 2.50	0.86 - 2.50	0.86 - 2.50	2.50	2.50	0.86 - 2.50	2.50	0.86 - 2.50
Intl. outgoing call to other country											
Ancel	1.60 - 3.73	1.20 - 2.05	1.50 - 3.06	1.20 - 7.32	1.20 - 3.60	3.20	w/o agreem.	1.40 - 2.90	2.55 - 2.75	w/o agreem.	2.16 - 3.62
Claro*	0.65 - 0.73	1.30	1.56 - 1.87	1.75	2.38	n.a.**	w/o agreem.	0.65 - 1.90	2.82	w/o agreem.	2.82
Movistar	2.00	2.50	2.00 - 2.50	2.00 - 2.50	2.00 - 2.50	2.00 - 2.50	2.50	2.50	2.00 - 2.50	2.50	2.00 - 2.50

* Prices do not include VAT

** Rates must add in NLD/ILD costs from the visited operator, not available for Movistar Peru

Source: Operator web sites. Work team analysis

Figure 127 – South American roaming initiative: Uruguay (cont.)

South American roaming initiative: Uruguay (cont.)

2007, Postpaid retail rates, USD, Taxes included

Roaming rates	**AR**	**BO**	**BR**	**CL**	**CO**	**EC**	**GY**	**PY**	**PE**	**SU**	**VE**
Incoming text message	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max
Ancel	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o agreem.	w/o charge	w/o charge	w/o agreem.	w/o charge
Claro*	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	n.a.**	w/o agreem.	w/o charge	w/o charge	w/o agreem.	w/o charge
Movistar	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge
Outgoing text message											
Ancel	0.11 - 0.44	0.21 - 0.28	0.16 - 0.88	0.21 - 0.27	0.21 - 0.47	0.41	w/o agreem.	0.13 - 0.31	0.21	w/o agreem.	0.24 - 0.36
Claro*	0.05	0.26	0.29 - 0.36	0.25	0.55	n.a.**	w/o agreem.	0.05 - 0.26	0.18	w/o agreem.	0.62
Movistar	0.05	0.36	0.15 - 0.36	0.15 - 0.36	0.15 - 0.36	0.15 - 0.36	0.36	0.36	0.15 - 0.36	0.36	0.15 - 0.36
Multimedia messaging (USD / MB)											
Ancel	2.40 - 14.10	w/o service	6.20 - 13.21	7.12 - 32.00	19.40	w/o service	w/o agreem.	8.50 - 14.29	w/o service	w/o agreem.	w/o service
Claro*	w/o service	w/o service	w/o charge	w/o service	w/o service	n.a.**	w/o agreem.	w/o service	w/o service	w/o agreem.	w/o service
Movistar	w/o charge	15.00	0.00 - 15.00	0.00 - 15.00	0.00 - 15.00	0.00 - 15.00	15.00	15.00	0.00 - 15.00	15.00	0.00 - 15.00
Data (USD / MB)											
Ancel	2.40 - 14.10	w/o service	6.20 - 13.21	7.12 - 32.00	19.40	w/o service	w/o agreem.	8.50 - 14.29	w/o service	w/o agreem.	w/o service
Claro*	w/o service	w/o service	w/o charge	w/o service	w/o service	n.a.**	w/o agreem.	w/o service	w/o service	w/o agreem.	w/o service
Movistar	3.00	15.00	4.00 - 15.00	4.00 - 15.00	4.00 - 15.00	4.00 - 15.00	15.00	15.00	4.00 - 15.00	15.00	4.00 - 15.00

* Prices do not include VAT

** Rates must add in NLD/ILD costs from the visited operator, not available for Movistar Peru

Source: Operator web sites, Work team analysis

Figure 128 – South American roaming initiative: Venezuela

South American roaming initiative: Venezuela

2007, Postpaid retail rates, USD/minute, Taxes not-included

Roaming rates	AR	BO	BR	CL	CO	EC	GY	PY	PE	SU	UY
Incoming call	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max	min - max
Movilnet	0.92	0.92	0.92	0.92	0.79	0.96	0.92	0.92	0.86	0.92	0.92
Movistar	1.17	1.21	1.45	0.56	1.52	1.91	n.a.*	0.93	1.45	n.a.*	1.91
Digitel	1.22	1.42	1.63	0.66	1.83	2.19	w/o agreem.	0.66	1.63	2.19	2.19
Outgoing local call											
Movilnet	1.00	1.00	1.00	1.00	0.87	1.04	1.00	1.00	0.94	1.00	1.00
Movistar	1.21	1.45	1.31	1.58	1.63	1.58	n.a.*	1.21	1.21	n.a.*	2.18
Digitel	1.17	1.63	1.22	1.88	1.88	2.85	w/o agreem.	1.22	1.07	2.85	2.85
Intl. outgoing call to country of origen											
Movilnet	1.00	1.00	1.00	1.00	0.87	1.04	1.00	1.00	0.94	1.00	1.00
Movistar	4.49	3.97	5.04	5.23	4.43	4.43	n.a.*	3.64	5.04	n.a.*	5.95
Digitel	5.14	4.43	4.78	5.44	4.99	9.31	w/o agreem.	3.41	4.78	9.31	9.31
Intl. outgoing call to other country											
Movilnet	1.00	1.00	1.00	1.00	0.87	1.04	1.00	1.00	0.94	1.00	1.00
Movistar	4.49	3.97	5.04	5.23	4.43	4.43	n.a.*	3.64	5.04	n.a.*	5.95
Digitel	5.14	4.43	4.78	5.44	4.99	9.31	w/o agreem.	3.41	4.78	9.31	9.31

* Rates must add in NLD/ILD costs from the visited operator, not available for Movistar Peru

Source: Operator web sites, Work team analysis

Figure 129 - South American roaming initiative: Venezuela (cont.)

South American roaming initiative: Venezuela (cont.)

2007, Postpaid retail rates, USD, Taxes not-included

Roaming rates	AR	BO	BR	CL	CO	EC	GY	PY	PE	SU	UY
Incoming text message	min - max	min - max	min - max	min - max	min - max	min – max	min - max	min - max	min - max	min - max	min - max
Movilnet	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	n.a.*	w/o charge	w/o charge	n.a.*	w/o charge	w/o charge
Movistar	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	n.a.*	w/o charge	w/o charge	n.a.*	w/o charge	w/o charge
Digitel	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	w/o agreem.	w/o charge	n.a.*	w/o charge	w/o charge
Outgoing text message											
Movilnet	w/o charge	w/o charge	w/o charge	w/o charge	w/o charge	n.a.*	w/o charge	w/o charge	n.a.*	w/o charge	w/o charge
Movistar	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56
Digitel	1.22	1.22	1.22	1.22	1.22	1.22	w/o agreem.	1.22	1.22	1.22	1.22
Multimedia messaging (USD / MB)											
Movilnet	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service
Movistar	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service
Digitel	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o agreem.	w/o service	w/o service	w/o service	w/o service
Data (USD / MB)											
Movilnet	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service
Movistar	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service
Digitel	w/o service	w/o service	w/o service	w/o service	w/o service	w/o service	w/o agreem.	w/o service	w/o service	w/o service	w/o service

* Rates must add in NLD/ILD costs from the visited operator, not available for Movistar Peru

Source: Operator web sites. Work team analysis

Annexes

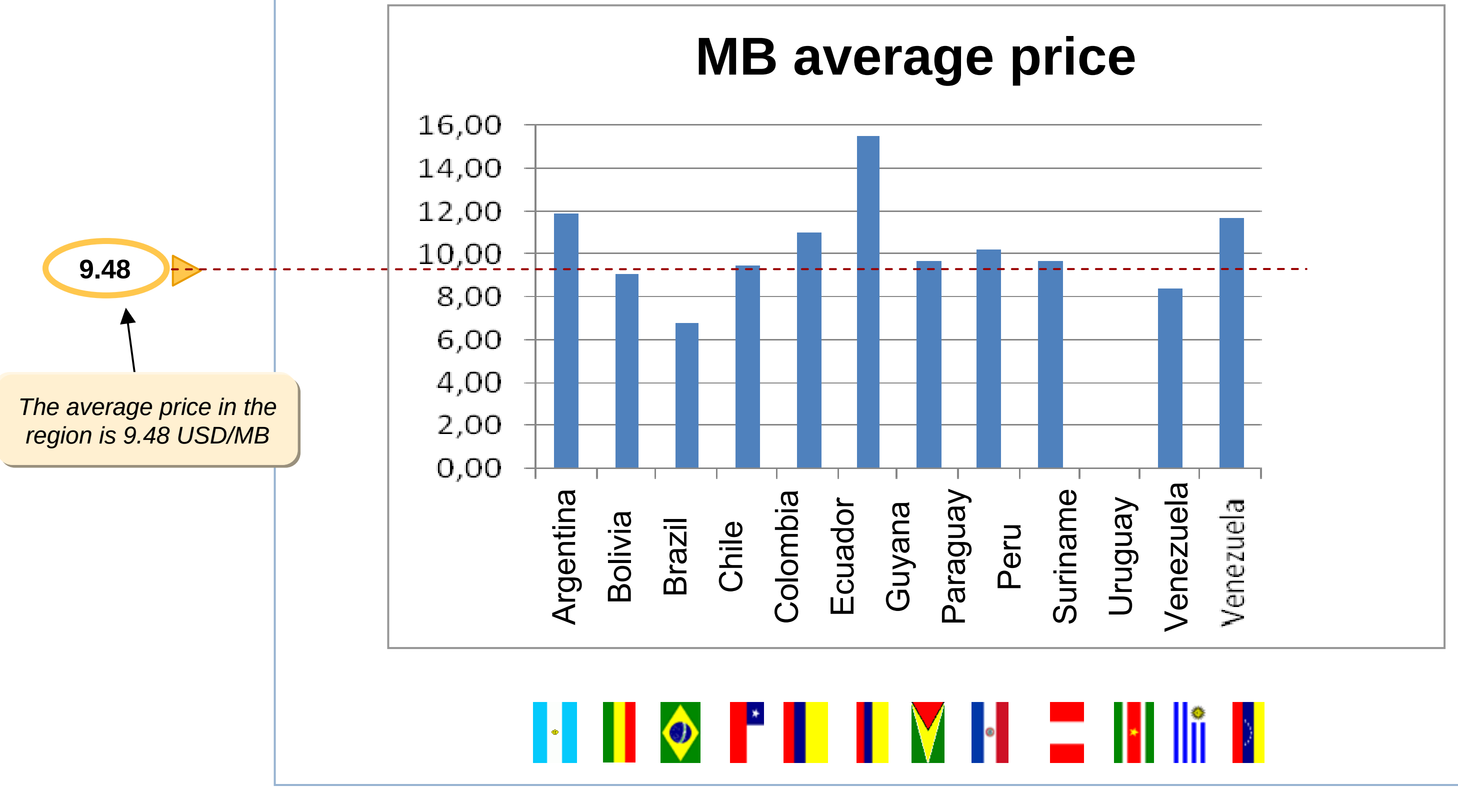
- Map of operators and technologies
- International roaming regulatory framework
- Roaming agreements
- **Inter-operator tariffs**
- Applicable taxes for international roaming
- Regional tax agreements
- Border zones
- List of acronyms
- List of figures
- Bibliography and information sources

Figure 130 – South American inter-operator tariffs for data services

South American inter-operator tariffs for data services

Incoming roaming price per MB for South America (non-preferential tariffs)

2007, USD per MB, Taxes not-included



The average price in the region is 9.48 USD/MB

- Data is charged per KB in the region, using a fixed price method per MB with increases per KB increments that vary between 1 KB and 100 KB.

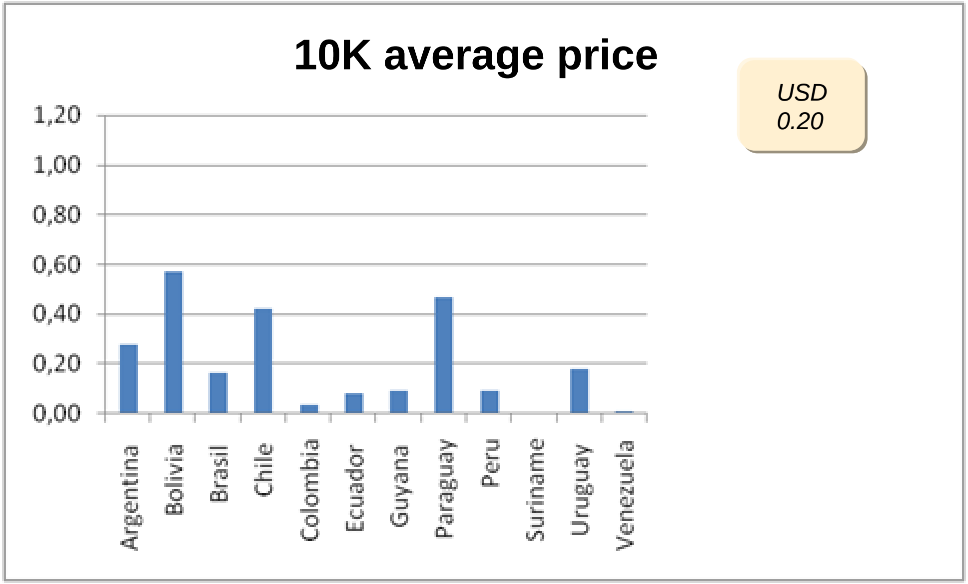
Source: Imobix analysis

Figure 131 - South American inter-operator tariffs for data services (cont.)

South American inter-operator tariffs for data services (cont.)

Incoming data roaming price for South America (non-preferential tariffs)

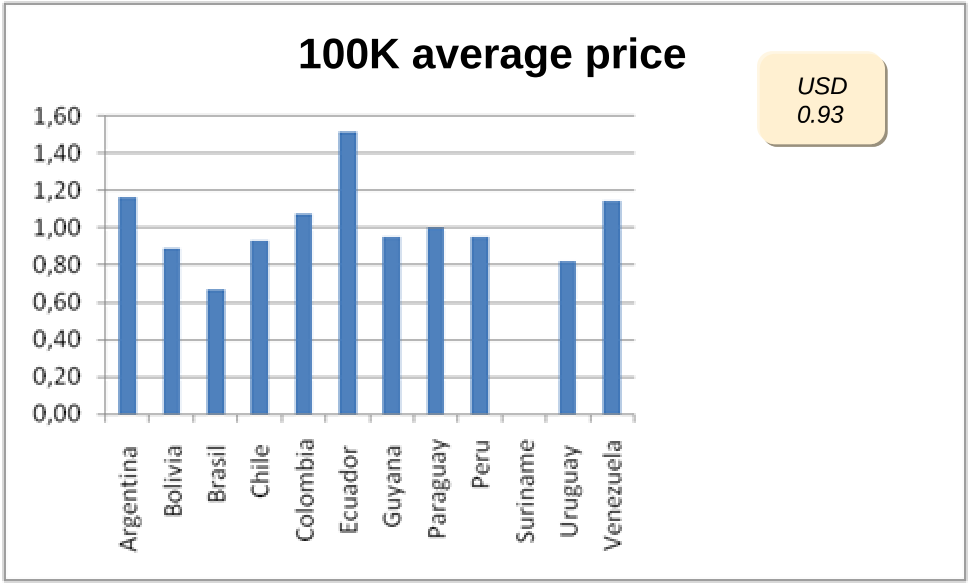
Cost per 10K



10K average price

USD 0.20

Cost per 100K



100K average price

USD 0.93

- As a function of the level used, the cost per unit is less for larger volumes.
- As evidenced from the charts, values differ greatly in each country and between regions.

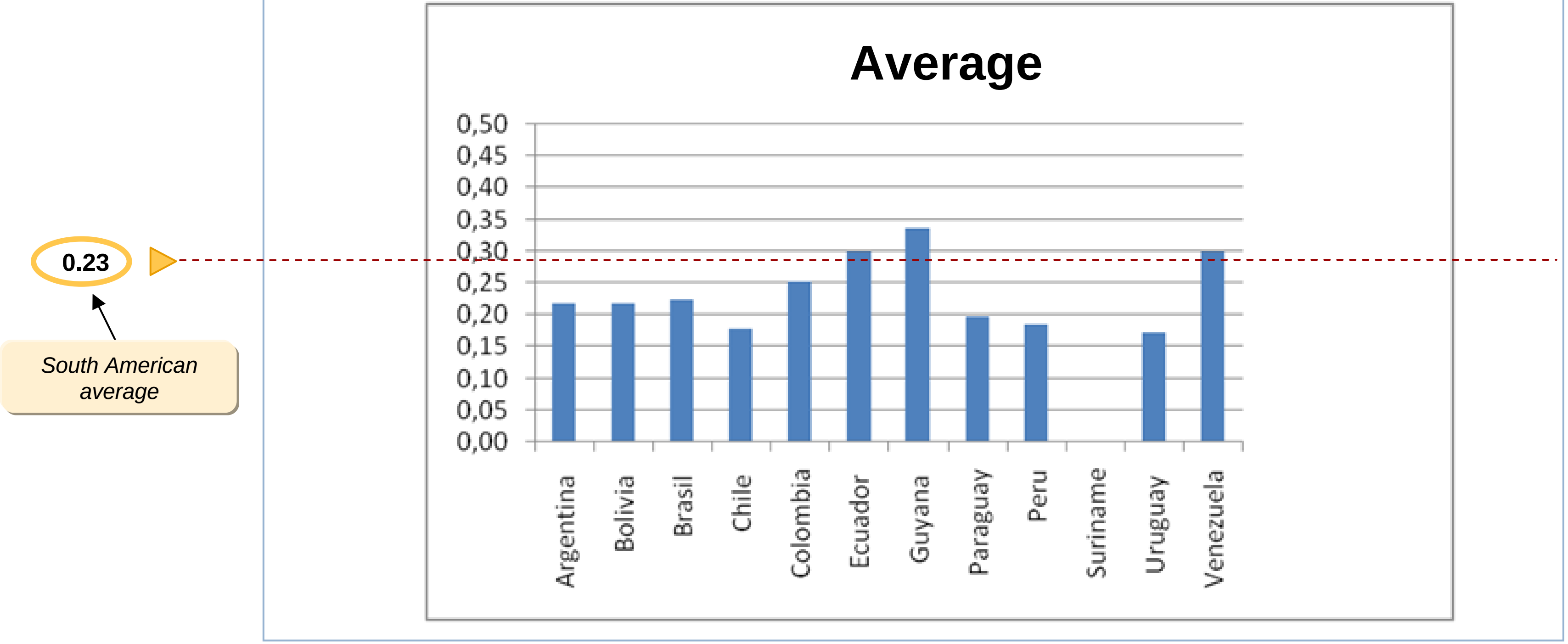
Source: Imobix analysis

Figure 132 – South American inter-operator tariffs for messaging

South American inter-operator tariffs for messaging

Price USD/minute: South America

April – September 2007, USD per SMS, Taxes not-included



- SMS tariffs on average are ~USD 0.23, with the exception of some Brazilian operators

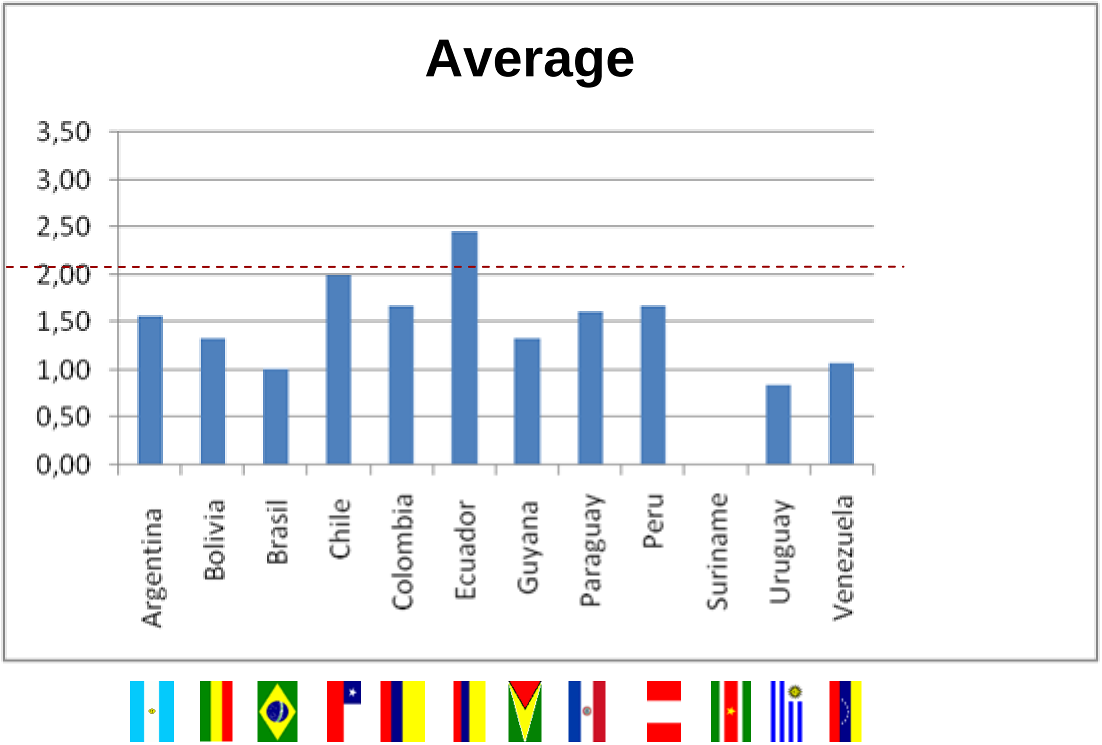
Source: Imobix analysis

Figure 133 – South American inter-operator tariffs for voice service

South American inter-operator tariffs for voice service

Average price for calls to other countries in the region

2007, USD/minute, Taxes not-included



1.51

Regional voice call tariffs are around USD 1.51

Source Imobix analysis

Annexes

- Map of operators and technologies
- International roaming regulatory framework
- Roaming agreements
- Inter-operator tariffs
- **Applicable taxes for international roaming**
- Regional tax agreements
- Border zones
- List of acronyms
- List of figures
- Bibliography and information sources

Figure 134 - Taxes: Argentina

Taxes: Argentina

Tax	Type	Jurisdiction	Rate	Applicable services			Important considerations
				Telecom	Mobile	Roaming	
VAT – Value Added Tax	Indirect	Federal	21% & 27%	✓	✓	✓	• A rate of 27% applies to mobile services, as long as the user is a large taxpayer or single system taxpayer • Roaming is not contemplated by VAT law. The current position considers a roaming service tax in Argentine of 21%. However, if considered as an export of services, it would not be affected.
II – Internal tax		Federal	4.1667 %	✓	✓	✓	• Regarding voice service, applies to Air Time (not to ILD). There are different criteria among operators regarding the application of this tax
IIB – Gross Income Tax		Provincial/ City of Buenos Aires	4%	✓	✓	✓	• Specific rate depends on each province, but the average is around 4% for telecommunications services
FFSU – Contribution to the fiduciary fund for increased access of service	Regulatory	FFSU	1%	✓	✓	✓	
TCFyV – Control, audit and verification fee		CNC	0.50%	✓	✓	✓	
TR – Usage of radio-electric spectrum fee		CNC	-	✓	✓	✓	• Pays a periodic fee for use of frequency and number of stations with postpaid plans (fee is differentiated by STM/SRMC/PCS service), and for revenue of prepaid services
IG – Income Tax	Direct	Federal	35%	✓	✓	✓	
IGMP - minimum estimated income tax		Federal	1%	✓	✓	✓	

* Other applicable mobile service fees: - Security and hygiene tax (Municipal - varies per locality) / Fee for enabling infrastructure (Municipal and the fee varies by location)

Source: Law 19798 (Law of Telecommunications) - Ordinance 1185-90 - Res SETyC 10/95 - SC Res 4485/99 - Res.SC 810/98 - 767/98 SC Res (Fees) - Decree 764/2000 Annex III (SU) Law No. 20628 - text ordered by Decree No. 649/1997- (gains), Law No. 20631 and 23349 - text ordered by Decree No. 280/97 (VAT) Law No. 24674 (Internal) Web site of the Federal Administration of Public Revenues (www.afip.gov.ar)

Figure 135 - Taxes: Brazil

Taxes: Brazil

Tax	Type	Jurisdiction	Rate	Applicable services			Important considerations
				Telecom	Mobile	Roaming	
PIS – Social Integration Program	Indirect	Federal	0.65%	✓	✓	✓	• Telecommunications is an exception to the general rule of applying a 1.65% rate for PIS and 7.6% rate for COFINS
COFINS – Contribution for the Financing of Social Security		Federal	3%	✓	✓	✓	• Telecommunications is an exception to the general rule of applying a 1.65% rate for PIS and 7.6% rate for COFINS
IPI – Industrialized Products Tax		Federal	-	✓			• Depending on the type of merchandise/do not tax telecommunications services, although it might tax imports of equipment and accessories
ICMS- Tax on the Circulation of Goods, Interstate and Intercity Transportation and Communication Services		State/Federal District	25%	✓	✓	✓	• It is generally applicable to telecommunications companies. Services rendered abroad are exempt
ISS – Services Tax		Municipal	2% to 5%	✓	✓	✓	• This tax is inconsistent and exclusive to ICMS, and vice versa / The rate depends on the municipality where the service provider is located
FUST – Fund for the increased access to telecommunications services	Regulatory	ANATEL	1%	✓	✓	✓	
FUNTEL – Fund for the development of telecommunications		ANATEL	0.50%	✓	✓	✓	
IRPJ – Tax on income of Legal People	Direct	Federal	15%	✓	✓	✓	• General tax fee, plus an additional 10% fee on the taxable income exceeding either R$240,000 per year or R$60,000 per quarter
CSLL – Social contribution of lost profits		Federal	9%	✓	✓	✓	

Sources: Web site, Brazil Ministry of Finance (www.receita.fazenda.gov.br)

Figure 136 - Taxes: Colombia

Taxes: Colombia

Tax	Type	Jurisdiction	Rate	Applicable services			Important considerations
				Telecom	Mobile	Roaming	
VAT – Value Added Tax	Indirect	National	20%	✓	✓	✓	• SMS and GPRS have an applicable rate of 16%
IIC – Industry and commerce tax		Municipal	-	✓	✓	✓	• Tax applies to those who do business or perform services within a municipality, ranging approx. between 0.3% and 1.2% per month
Other rates and contributions	Regulatory	-	-				
Fund for better access to telecommunications services		-	3% to 5%	✓	✓	✓	
IR – Income Tax	Direct	National	35%	✓	✓	✓	
IRE - Tax Remittances		National	-	✓			• Adds a 7% deduction on top of the 35% for Income Tax, resulting in the total fiscal fee of 39.55%. The payment of this tax can be deferred

Source: Estate Tax Decree No. 624 of 30/03/1989 - Law No. 488 of 27/12/2006 of 24/12/98/ Law 1111 - Web: Directorate of National Taxes and Customs (www.dian.gov.co) "Taxation Colombia" - CIAT 2007

Figure 137 - Taxes: Peru

Taxes: Peru

Tax	Type	Jurisdiction	Rate	Applicable services			Important considerations
				Telecom	Mobile	Roaming	
IGV – General Sales Tax	Indirect	National	19%	✓	✓	✓	
Contribution by Monitoring Service	Regulatory	National	0.50%	✓	✓		
Special right assigned to the fund for investment in telecommunications		OSIPTEL	1.00%	✓	✓		
Rate of commercial exploitation of service		OSIPTEL	0.50%	✓	✓		
Fee for use of radio spectrum		OSIPTEL	-	✓	✓		• Fee for use of radio spectrum
IR – Income Tax	Direct	National	30%	✓	✓	✓	• Related to this tax is the level of participation by the company's workers, as they must give a % to its employees

Figure 138 - Taxes: Venezuela

Taxes: Venezuela

Tax	Type	Jurisdiction	Rate	Applicable Taxes			Important considerations
				Telecom	Mobile	Roaming	
VAT – Value Added Tax	Indirect	National	16%	✓	✓	✓	• 9%
Fee for use of radio spectrum	Regulatory	CONATEL/ National	0.50%	✓	✓		
Special contribution to the universal service fund		CONATEL	1%	✓	✓		
Special contribution to the fund for research and development of telecommunications		CONATEL	0.50%	✓	✓		
Special CONATEL contribution		Regulatory	0.50%	✓	✓		• Quarterly Contribution
IR – Income Tax	Direct	National	-	✓	✓	✓	• The applicable rate to entities is progressive based on the number of tax units (tu) of the tax base (15% until 2,000 tu ; 22% from 2,000 to 3,000 tu; 34% for more than 3,000 tu)
IAE - Tax on business assets		National	1%	✓	✓		
IAT – Telecommunications business tax		National	2.30%	✓	✓	✓	

Source: Web Service, National Integrated Customs and Tax Administration (www.seniat.gov.ve) - Law on Income Tax of 30/11/2001 (Official Gazette Extraordinary 5557 of 13/11/2001)- amended the Tax Law Income of 12/09/1999 (Official Gazette Extraordinary 5390 of 22/10/1999) - VAT Act (Official Gazette Extraordinary No. 5601 of 30/08/02) - Law on Tax on business (Gaceta Oficial Extraordinary Number ° 4654, dated 01/12/1993) - Organic Law of Telecommunications - Government Gazette 36970 of 2000 / Decree No. 2493 - Official Gazette No. 37725 of 2003

Annexes

Figure 139 - Regional tax integration initiatives

Regional integration initiatives in South America and possibilities to incorporate roaming and taxation

- The possibilities for reaching multilateral agreements on taxation will be highly correlated with the institutional development of regional integration agreements, due to the increasing need for tax coordination when tax disparities act as barriers to trade and fair competition within the integration block.
- The following are classic models for regional integration*:
  - Free Trade Zone. Elimination of internal tariffs according to the region
  - Customs Union. More common external tariff
  - Factors of Production. Freer movement of production factors
  - Economic Union. Further coordination of economic policies of member countries
  - Economic Integration. More unified economic and social policies. Through a Customs Union an expanded market can be formed in which fair competition between producers and suppliers in different countries for production and foreign investment requires coordination of tax regimes, particularly of indirect taxes. For these taxes it will be vital to not "export" taxes on both goods and services and that imports enter taxed by the same aliquots and conditions of national goods and services.
- The following custom unions* exist in Latin America: Andean Community of Nations (CAN), Caribbean Community (CARICOM), Mercosur and Central American Custom Union (still in formation)**
- Status of Central American economic integration
- CARICOM: Treaty of the Caribbean Community (Treaty of Chaguaramas) on August 1, 1973, which establishes a common external tariff and was revised in 2001, aspects, tariff and tax (double taxation agreement of direct taxes)
- CAN. Cartagena Agreement of 1969. Currently composed of Ecuador, Colombia, Peru and Bolivia. Common External Tariff: Decision 370, 1995
- MERCUSUR: Asuncion treaty of March 26th, 1991, and Decision 22/94 of the Common Market Council (CMC) of MERCOSUR (in Ouro Preto), that created the common external tariff (common trade policy) and exceptions to this rule. Integrated by Argentina, Brazil, Paraguay and Uruguay

** According to "The Theory of Economic Integration, 1961" Bela Balassa*

Source: Institutional web sites of CARICOM, CAN, MERCOSUR, Work team analysis

Figure 140 - VAT coordination of CAN

VAT coordination of the Andean Community

- It is possible to find an initiative that can be considered a significant precedent regarding VAT coordination in the Andean Community, which is in the process of being fully implemented . Ultimately, this agreement constitutes the only reference in the region to coordination or agreement of double taxation with respect to indirect taxes (on consumption).

- In this respect, Article 12 of Decision 599 provides that, in terms of territorial jurisdiction of value added tax rate, telecommunications services, among others, “provided outside and used or exploited by a resident from a Member Country, shall be deemed rendered within the jurisdiction of this country”. Furthermore, Article 13 clearly leaves roaming beyond the concept of an export of services, as in order to access this category it requires: “that the use or operation of the services by the user or beneficiary take place entirely abroad, even if the service was performed inside the exporting country. "

- The application of these provisions would lead roaming services among the countries of the Andean Community to be taxed, only in the country of residence of the consumer. Each case must verify the interpretation of this provision, however, noting that the roaming service is not provided strictly "from outside", but "abroad." The roaming is "used and enjoyed" abroad, but is billed to the customer in the country of origin by the home network. This singular factor highlights the problem of taxation for this telecommunications service, where value-added taxes are based largely on internal revenues of the service.

- The experience of VAT coordination in CAN showed that it is possible in the region to move forward with a coordination agreement within a framework of integration. This agreement, in addition to meeting goals of VAT coordination, encourages fair competition within the Customs Union framework, eliminating or mitigating factors of double taxation. It is a necessary condition to undertake the implied process, however, that countries are willing to relinquish some degree of autonomy regarding fiscal policy or taxation. This was a complex process of study, political awareness and negotiation (1999 to 2004), which is still in an implementation and refinement phase.

Source: Institutional web sites of CARICOM, CAN, MERCOSUR; 2003, A. Barreix and L. Villela, Work team analysis

Figure 141 - MERCOSUR and tax coordination

MERCOSUR and tax coordination

- In 2003, A. Barreix and L. Villela described the **background** and evaluated the potential of MERCOSUR to advance regarding tax coordination. In this regard the following findings have been highlighted as relevant to the purposes of this study:

- **MERCOSUR has not progressed significantly in terms of tax coordination.**

- In comparison to the **European Union experience**, **MERCOSUR** lags **far behind** with regard to macroeconomic coordination, regulation and external trade policy.

- **MERCOSUR agreements do not provide for the transfer of sovereignty**, or the existence of Supranational institutions, which differs from the EU and the CAN, thereby deeming tax coordination mechanisms, which benefit from the existence of such a sovereign community body, unlikely to be successful at the country level.

- **The coordination of indirect taxes** should be directed towards bases and procedures, rather than fees, and based on the principles of transparency and non-discrimination, constituting an institutional environment for dispute resolution and cooperation. It will be a **slow and complex process** in the current circumstances of this initiative for regional integration.

- MERCOSUR records history of specific technical roaming coordination, which represents a valid history/background in terms of the specific regulation, although difficult to replicate for tax coordination. (MERCOSUR / GMC / RES. No. 19/01. Provisions for coordination of international roaming and mobile service frequency in the MERCOSUR).

Source: MERCOSUR, 2003, A. Barreix and L. Villela, Work team analysis

Annexes

- Map of operators and technologies
- International roaming regulatory framework
- Roaming agreements
- Inter-operator tariffs
- Applicable taxes for international roaming
- Regional tax agreements
- **Border zones**
- List of acronyms
- List of figures
- Bibliography and soucre information

Figure 142 – Border zones

Flow of trade in border zones

Year	Trade between Cucuta and San Antonio / Ureña					
	Col– Ven		Ven - Col		Both ways	
	USD 1000s	Tons	USD 1000s	Tons	USD 1000s	Tons
1998	634,962	966,647	563,943	724,362	1,198,905	1,691,009
1999	499,100	788,292	301,815	407,661	800,915	1,195,953
2000	662,999	885,212	335,003	483,136	998,002	1,368,348
2001	790,253	1,176,244	328,262	436,862	1,118515	1,613,106
2002	544,480	895,428	304,634	377,186	849,114	1,272,614
2003	411,183	652,589	265,918	415,788	677,100	1,068,377
2004	916,293	1,109,267	370,684	442,156	1,286,978	1,551,423

Year	Percentage of trade through Cucuta to total bilateral trade between Colombia and Venezuela					
	Col - Ven		Ven - Col		Both ways	
	USD 1000s	Tons	USD 1000s	Tons	USD 1000s	Tons
1998	55.4%	71.8%	43.0%	26.0%	48.8%	40.9%
1999	54.1%	86.0%	34.7%	18.6%	44.7%	38.5%
2000	51.3%	84.7%	35.4%	26.2%	44.6%	47.3%
2001	45.4%	76.4%	41.4%	31.1%	44.1%	54.8%
2002	48.3%	71.9%	38.8%	24.7%	44.4%	46.0%
2003	59.1%	80.2%	36.6%	29.4%	47.6%	47.9%
2004	56.3%	82.2%	34.3%	27.2%	47.5%	52.1%

Flow of trade in border zones (cont.)

Year	Brazil - Paraguay		Paraguay - Brazil		Both ways	
	USD 1000s Fob	Tons	USD 1000s Fob	Tons	USD 1000s Fob	Tons
1998	747,683	585,091	281,953	892,003	1,029,636	1,477,094
1999	539,055	567,209	196,356	820,740	735,411	1,387,949
2000	612,600	620,894	266,540	1,178,593	879,140	1,799,487
2001	544,987	623,642	232,610	1,343,347	777,597	1,966,989
2002	445,769	650,062	256,650	1,490,691	702.419	2,140,754
2003	576,542	711,273	310,800	1,726,922	887,342	2,438,194
2004	710,411	747,143	177,741	789,072	888,152	1,536,215
2005	753,832	665,652	181,342	1,077,372	935,174	1,743,024

Annexes

List of Acronyms

3G:	Third Generation Wireless Technology
ABR:	Brazilian Roaming Association
ABRT:	Brazilian Association of Telecommunications Resources
ADELCO:	Consumer Action Association
AIC:	Implementation Agenda based on Consensus
AMPS:	Advanced Mobile Phone System
ANATEL:	National Telecommunications Agency
AR:	Argentina
ARPU:	Average Revenue Per User
BO:	Bolivia
BR:	Brazil
CAGR:	Compound Annual Growth Rate
CAMEL:	Customized Applications for Mobile Enhanced Logic
CAN:	Andean Community of Nations
CDE:	IIRSA Executive Committee
CDMA:	Code Division Multiple Access
CDR:	Call Detail Records
CL:	Chile
CIA:	Central Intelligence Agency
CITEL:	Inter-American Telecommunication Commission
CNC:	National Communications Commission
CO:	Colombia
CODEDCO:	Consumer Rights Defense Committee of Bolivia
CONATEL:	National Telecommunications Commission
CRT:	Telecommunications Regulation Commission
DGEEC:	General Directorate of Statistics, Surveys and Censuses (Paraguay)
EC:	Ecuador
ECLAC:	Economic Commission for Latin American and the Caribbean

List of Acronyms (cont.)

EIU:	Economist Intelligence Unit
ETSI:	European Telecommunication Standardization Institute
EU:	European Union
GDP:	Gross Domestic Product
GGSN:	Gateway GPRS Support Node
GMSC:	Gateway Mobile Switching Center
GPRS:	General Packet Radio Service
GSM:	Global System for Mobile
GSMA:	GSM Association
GSMLA:	GSM Latin America Association
GTE:	IIRSA Executive Technical Group
GY:	Guyana
HLR:	Home Location Register
HPMN:	Home Public Mobile Network
HUR:	High Usage Reports
IBGE:	Brazilian Institute of Geography and Statistics
IDEN:	Integrated Digital Enhanced Network
IIRSA:	Integration of Regional Infrastructure in South America
IMEI:	International Mobile Equipment Identities
IMF:	International Monetary Fund
IN:	Intelligent Networks
INDEC:	National Institute of Statistics and Consensus,(Argentina)
INDECU:	Consumer Defense and Education Institute
INE:	National Statistics Institute, (Chile)
IOT:	Inter-operator Tariff
IRSF:	International Revenue Share Fraud
IT:	Information Technology
ITU:	International Telecommunication Union

List of Acronyms (cont.)

MERCOSUR:	Southern Common Market
MMS:	Multimedia Message Service
M:	Million
MSC:	Mobile Switching Center
MVNO:	Mobile Virtual Network Operator
N.A.:	Non Applicable
n.a.:	Not available
NRTRDE:	Near-Real-Time Roaming Data Exchange
UN:	United Nations
OSIPTEL:	Private Investment Supervisor Agency for Telecommunications
OTA:	Over the air
Otecel:	Telefónica Móviles (Ecuador)
PE:	Peru
PIN:	Personal Identification Number
PMN:	Preferred Mobile Network
PPP:	Purchasing Power Parity
PY:	Paraguay
PyMEs:	Small and Medium Enterprises
Regulatel:	Latin American Forum of Telecommunications Regulators
SCP:	Service Control Points
SDR:	Special Drawing Rights
SENATEL:	National Telecommunications Secretary
SGSN:	Serving General Packet Radio Service Support Node
SIC:	Superintendent of Secretary and Trade
SIM:	Subscriber Identity Module
Sittel:	Superintendent of Telecommunications
SMS:	Short Message Service

List of Acronyms (cont.)

SOR:	Steering of Traffic
SS7:	Signaling System #7
SU:	Suriname
SUBTEL:	Telecommunications Sub-secretary
TACS:	Total Access Communications System
TAS:	Suriname Telecommunications Authority
TDMA:	Time Division Multiple Access
TSAN:	-
URSEC:	United Communication Service Regulators
U.S.A.:	United States of America
USB:	Universal Serial Bus. Used as a port for connecting devices to a computer
USD:	United States Dollar
USSD:	Unstructured Supplementary Services Data
US-TDMA:	United States TDMA
UY:	Uruguay
VAT:	Value Added Tax
VAS:	Value Added Services
VE:	Venezuela
VLR:	Visitor Location Register
VMSC:	Visited Mobile Switching Center
VoIP:	Voice over Internet Protocol
VPMN:	Visited Public Mobile Network
W-CDMA:	Wideband-Time Division Multiple Access
WCIS:	World Cellular Information Service
WEU:	Western European Union
WTO:	World Tourism Organization

Annexes

List of figures

List of figures (cont.)

List of figures (cont.)

List of figures (cont.)

List of figures (cont.)

List of figures (cont.)

Annexes

- Map of operators and technologies
- International roaming regulatory framework
- Roaming agreements
- Inter-operator tariffs
- Applicable taxes for international roaming
- Regional tax agreements
- Border zones
- List of acronyms
- List of figures
- **Bibliography and information sources**

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