IIRSA

BID

Regional Study of the South American Roaming Services Market

Stage II: Lessons learned internationally
Final Report

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www.iirsa.org/roaming.asp

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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 improve 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 II of this report consists of a comparative analysis of the South American market with the situation in other regions of the world, divided into two chapters showing initiatives and experiences at international level, and analyzing their relevance and viability of implementation in the South American market

- Chapter I identifies the various stages of international roaming for Europe, Africa, the Middle East, and Asia-Pacific, with analysis of:
  - Socioeconomic status
  - The mobile telecommunications market environment
  - Regulatory environment
  - Roaming market
  - Roaming regulation initiatives
  - Regional alliances
  - Technical initiatives
  - Tax analysis

- Chapter II has a comparison between the South American market and the best practices from international experience, with the goal of establishing international roaming initiatives that are relevant, or replicable in South America, with the identification of:
  - Key success factors of the roaming initiatives in the examined regions
  - Degree of applicability to the South American context

Executive summary

Chapter I

The first chapter of this document analyses 3 international roaming markets (Europe, Africa and the Middle East, and Asia-Pacific), whose experiences are relevant to the South American case. The analysis includes the socioeconomic context, the telecommunications market, regulation and roaming alliances for each case.

Europe

In Europe, the greatest advances in roaming regulation have occurred within the framework of the European Union (EU), a common market comprising 27 countries, and accounting for 60% of the total population and 85% of total GDP in the region. Europe has a developed economy, with a PPP (purchasing power) adjusted per capita GDP of USD 22,000 (2007), while the European Union, with several of the more developed economies, has a higher per capita GDP of around USD 32,000.

The European mobile telecommunications sector is considered a mature market with high average revenue per user (ARPU). Penetration of the mobile market is over 100%, with an ARPU reaching USD 27 per month, which represents 3% of disposable income in the economy. In recent years, the largest mobile market development was in the prepaid segment, which has grown 20% annually and reached 68% of total subscriptions in 2007. Moreover, all handsets in Europe are compatible with the main technology, GSM, given that 90% of handsets have the technology and the remaining 10% have UMTS, the third generation successor to GSM.

The European Commission (EC) is the agency responsible for regulating the telecommunications market at the regional level, with power to define and implement common laws and regulations within the EU. Within the EC, the respective national telecommunications regulators are part of the European Regulatory Group (ERG), which among other things, studies European international roaming in detail and coordinates the application of market regulations.

Executive summary (cont.)

Roaming service is highly popular in Europe. European travelers use roaming services in 41% of all trips taken, resulting in 173 million trips using roaming per year. As a result, revenue from European travelers using roaming (outbound) is significantly high, and was estimated at USD 14.8 billion in 2008

In analyzing the regulatory initiatives in Europe, it is important to consider that the region has strong incentives to promote intra-regional roaming, given the high incidence of travel in the region. In this context, the EU regulation EC717/2007 is very important, as it defines maximum wholesale and retail rates for international roaming between member countries.

This regulation is the result of successive initiatives and studies by the EC on transparency, perception of service by clients and pricing:

- Initially, the EC sought to increase transparency of the roaming market with a web site comparing operator roaming rates in various countries within the region. The site was not effective, however, given its limited coverage of countries and outdated information. The initiative did provoke a reaction by an industry organization, the GSMA, who in response, launched a similar web site with complete and updated rates.

- Furthermore, in order to understand user perception, the EC carried out a survey on European roaming, which revealed that many travelers do not use the service due to its high prices

- The EC also conducted a survey of roaming rates, noting that they were significantly higher than domestic rates and that this disparity was not based on actual costs

Executive summary (cont.)

From these findings, the EC considered various alternatives to reduce roaming rates in the region, looking to simultaneously determine retail and wholesale rates, with the aim of encouraging the development of the service, increase transparency and avoid "price squeezing" (ie, operators who seek to harm other smaller operators by offering their services at below cost). Finally, the EC decided to regulate wholesale and retail rates through the creation of the Eurotariff, which had full compliance among operators, including some cases of pricing below the set cap. Users have benefited from significant price reductions in the order of 40% to 60% on international roaming calls within the EU. Rates to destinations outside Europe remain high, however, at around three times more expensive than intra-regional. Finally, the EC717/2007 regulation also provides analysis and subsequent regulation of SMS and data roaming fees. This analysis is still ongoing, and it is expected that the EU will impose wholesale and retail rates for SMS roaming, and will define transparency measures for data roaming.

Europe has two interesting operator alliances, which offer attractive roaming rates and services beyond those required by regulation. The FreeMove alliance is led by 3 large European groups (Orange, T-Mobile and TIM), with coverage in 27 countries (25 in Europe and 2 in the Americas) and offers services targeted at data roaming for corporate clients. FreeMove does not have a joint pricing policy, and each participant operator offers its individual roaming rates to its clients. The Vodafone alliance is comprised of 22 subsidiary and affiliate operators, and a further 42 partners in countries where it does not have an actual presence. Within this alliance, Vodafone offers an attractive range of roaming services for voice and data for both individual and corporate clients, and within the Vodafone Passport service, offers roaming rates at the same cost as a local call plus a fixed charge for connection of between € 0.75 and € 2.00, depending on the country of origin.

Executive summary (cont.)

In summary, the European experience is a very interesting case study given the high degree of development of the roaming market in the region. EU regulatory initiatives had a strong impact, as much as on service tariffs as for the insights gained from analysis of roaming supply and demand. It is important, however, to emphasize that these initiatives were commissioned by the EC, which has a power of enforcement that does not exist in the regional entities of other regions. Europe, however, has also shown development of very positive initiatives by operators, both in response to regulatory pressures (eg. web site for comparison of rates), and in creating competitive advantages (eg. roaming alliances) in a market where roaming traffic is extremely important given the amount of intra-regional travel. For comparative purposes, it is necessary to understand that these initiatives were launched in a particular context that is very different to that of South America, one that is mature and highly competitive, with great potential for roaming given the amount of international travel by users and high levels of ARPU, and especially with very active regional regulators with enforcement authority.

Executive summary (cont.)

Africa and the Middle East

In Africa and the Middle East various international roaming initiatives have been put forth at the regulatory level and by the operators. Although both regions are different in socioeconomic terms, it is relevant to consider them together in this study given the ties between the two at the socio-political and mobile market level. Several countries in Africa and the Middle East are grouped in pan-regional organizations like the League of Arab States and the Arab Regulators Network (AREGNET). Moreover, the mobile markets of both regions are relatively integrated, with several of the largest mobile operators in Africa and the Middle East serving customers in both regions (eg. Zain, Etisalat).

Similar to South America, both regions have a high concentration of population and GDP per country. Additionally, Africa and the Middle East are quite different from each other in terms of PPP adjusted per capita GDP, given that Africa has levels close to USD 5,000 while the Middle East has levels near USD 10,000.

In both regions, the mobile market has grown strongly in recent years, with growth rates of 40-50% annually. The African market is still developing, with a penetration of 29%, while the Middle East has shown more advanced development, with a mobile penetration of 61%. In both regions, the growth of mobile lines has been driven by prepaid services, which account for 95% of total lines in Africa and 69% in the Middle East.

In terms of average revenue per user (ARPU), there is a clear disparity between the two regions, with Africa having a monthly ARPU of USD 13 versus almost USD 28 in the Middle East. In both regions, these values represent a high percentage of disposable income, around 7% in both cases. Finally, GSM is the dominant technology used in Africa (97% of handsets) and in the Middle East (94% of handsets).

In terms of regulation, the main national regulatory association in both regions is AREGNET, which includes 19 Arab countries in the Middle East and Africa, with a working group specializing on international roaming. While in Africa there are other regional telecommunications regulation associations, the participation in international roaming by these associations has been very limited.

Executive summary (cont.)

Regarding roaming services, it is estimated that as an aggregate of Africa and the Middle East, travelers use roaming services in 55-60% of total travel in the region, resulting in 26 million trips per year using roaming. Of the roaming trips, most are by leisure travelers (individuals) who account for 67% of the total. This behavior is significantly different from that shown in the other regions where business roamers (corporate) are the majority. In terms of revenue, the roaming market for both regions was estimated to reach USD 2.3 billion in 2008 (outbound), with 75% from the Middle East and the remaining 25% from Africa.

Africa and the Middle East are making some efforts to encourage intra-regional roaming, although in absolute terms, domestic travel within these regions is not as significant as in Europe. Africans account for 38% of total travel in Africa (equivalent to 2% of the total population), while Middle Eastern travelers represent 35% of total travel in the Middle East (equivalent to 9% of the total population). In both cases, the values are well below the European level, with European travelers representing 88% of total travel in Europe (equivalent to 42% of the total population).

In roaming regulation, AREGNET has made the most significant advances in the region. In 2005, the association formed a working group specializing on international roaming rates in the League of Arab States (in the Middle East and North Africa). In 2006, as a first step, the group conducted a survey on the rates charged for roaming between Arab countries and concluded that they were excessive and not very transparent. From these results, in 2007, the GSMA Arab World created a web site to compare rates among Arab countries, similar to that implemented a year earlier in the EU by the GSMA Europe. Considering that the actions by the operators were insufficient in tackling the problems of roaming in the region, in 2008, AREGNET defined a price capping proposal for wholesale and retail voice roaming rates, in line with the Eurotariff defined by the European Commission. In practice, the AREGNET proposal faces serious implementation problems, since it requires coordination among member countries, and most importantly, AREGNET does not have the same regional enforcement capacity as the European Commission. This point is important for South America, where the absence of a regional regulatory structure also makes the definition of coordinated regulation and consensus difficult. For this reason, AREGNET initially implemented its recommendations among a smaller group of the Gulf Cooperation Council countries, and then gradually expanded the regulation to the rest of the Arab countries.

Executive summary (cont.)

The Middle East has three operator alliances offering attractive roaming rates and services without the need for regulation: One Network, Kama Kawaida and Etisalat. The One Network alliance was the first to develop in the region and currently comprises 15 subsidiaries of the Zain group in Africa and the Middle East. Launched in 2006, this alliance differentiated itself by offering roaming rates equal to local rates for calls and messaging between member operators. In addition, One Network offers prepaid roaming in all alliance countries, and offers the possibility of purchasing credit in the visited country. The creation of the One Network alliance had a significant impact on the positioning of Zain in the region. Moreover, it required the active participation of governments to remove duty barriers, facilitate foreign investment, and allow open access to international links.

The other two alliances in the region emerged largely in response to One Network, and offer similar services. Kama Kawada, launched in 2007, is an alliance between independent operators in 5 Eastern African countries. Etisalat, launched in 2008, is an alliance formed by three subsidiaries in the Middle East and North Africa from the UAE* Etisalat group. Both alliances focus their offer on the provision of roaming rates equal to local rates for calls and messaging between member operators. Due to their recent formation, these alliances are still in the process of expansion and service development, so it is not yet clear what the degree of success in competition against One Network will be.

In summary, Africa and the Middle East show important similarities to South America. In all cases, intra-regional travel represents less than 10% of the population, and in particular, Africa and South America have very low ARPU levels. AREGNET's regional regulatory initiatives face similar coordination problems as is the case for CITEL and Regulatel, and for this reason it will be important to follow the progress of these initiatives to evaluate alternatives for generating industry incentives in the absence of regional enforcement capabilities. Unlike South America, in Africa and the Middle East there have been very positive initiatives by operators, both in response to regulatory pressures (eg. web site that compares rates) and to obtain competitive advantages (eg. roaming alliances). In particular, the case of Zain and its One Network alliance in Africa and the Middle East should be of special interest to South America, given its relatively low ARPU (USD16), and its ability to develop a competitive offer that has been very attractive to its predominantly prepaid customer base (97% of total). In any case, the conditions, processes and technical developments specific to One Network should be analyzed in detail to consider its implementation feasibility in South America.

* United Arab Emirates

Executive summary (cont.)

Asia-Pacific

The Asia-Pacific (AP) region provides fewer advances in roaming compared to Europe, Africa and Middle East. Asia-Pacific has important socioeconomic contrasts among its countries, given the weight of China and India in the region, accounting for 67% of the total population and 35% of regional GDP, and the high degree of development in Japan, which accounts for 34% of regional GDP, and only 4% of the population. Taking into account these differences, income is relatively low, with an average per capita GDP of USD 8,000.

The mobile market in Asia-Pacific is rapidly expanding, with a penetration of 27% and recent growth rates of 26%. Prepaid service was the largest driver of development, growing at 39% annually and accounting for 69% of all lines by 2007. The region has a low average revenue per user (ARPU), at around USD 15 monthly in 2007, impacted more by the Chinese (USD 12) and Indian (USD 10) markets than by the Japanese (USD 52), South Korean (USD 45) and Australian (USD 43) markets. In terms of mobile technology, GSM is dominant in the region, used in 80% of handsets in December 2007.

In terms of regulation, there are three major associations who bring together the national regulators to coordinate regulation and accelerate the development of telecommunications. So far, however, none of these associations has had an important impact on international roaming, limiting themselves to defining technical standards and declaring intentions to increase roaming coverage. This lack of initiatives to promote roaming is very striking when considering the importance of intra-regional travel in Asia-Pacific; Asians account for 87% of total travel in the region (equivalent to 6% of the total population).

The Asia-Pacific international roaming market is moderately developed, and AP travelers use roaming services in 30-35% of all trips made, resulting in 73 million trips per year using roaming, 64% of which by business travelers (corporate) and 36% by leisure travelers (individuals). As a result, revenue from Asians travelers using roaming (outbound) reached USD 3.9 billion in 2008.

Executive summary (cont.)

In the absence of regional regulation, operators within the region have formed three international roaming alliances: Bridge, Conexus and AMI. The Bridge alliance is led by Singtel and spans 11 countries with 207 million subscribers. Bridge has a complete offering for both individual and corporate segments, with reduced rates for calls and messages, and flat-rate plans for data. The Conexus alliance is a competitive response to the Bridge alliance, and covers 11 countries with 190 million subscribers, and has an offer focused more on the corporate segment. The AMI alliance was the first in the region but is now in decline, and covers only 6 countries and 77 million subscribers; its gradual decline has been caused by the lack of an attractive and differentiated combined offer (given that each operator has its own offer) that is limited to offering discounted roaming rates on associate networks in the visited country.

In conclusion, the Asia-Pacific experience provides an enriched vision for South America when analyzing the development of international roaming alliances in the absence of regulatory pressures, and its experience could be useful to South American operators. In particular, the Bridge alliance should be investigated further due to the ability of its lead operator, Singtel, to coordinate the other alliance operators and structure attractive and innovative offers.

Executive summary (cont.)

Chapter II

Chapter II of this paper analyzes the success stories of international roaming, considering socioeconomic, regulatory and mobile roaming market aspects from each case. From this analysis initiatives will be identified with the greatest potential and applicability to South America.

Comparison of the examined regions vs. South America

In relative terms, South America has some unique socioeconomic, market, and telecommunications regulation level conditions. There also exist parallels, however, with other regions, especially Africa and the Middle East.

PPP adjusted per capita GDP in South America, at USD 10,400, is similar to the Middle East (USD 9,600), higher than Africa (USD 5,300), but well below Europe (USD 21,900).

In terms of tourism in South America, the proportion of intra-regional travel vs. total population is the lowest among all examined regions at 2%, similar to the 3% shown in Africa, but well below the 6% in Asia-Pacific, 9% in the Middle East and 42% in Europe.

Executive summary (cont.)

The South American mobile market is only half as developed as the other regions, presenting a medium to high penetration level and intermediate growth rates. In contrast, the European market is already fully mature, and the other regions (Asia-Pacific, Africa and the Middle East) are still in full development, with lower mobile penetration levels and high growth rates. In South America, prepaid service is very important, and covers 85% of total lines, comparable only to Africa, where 95% of subscribers are prepaid. In the other regions the proportion of prepaid, while significant, is less than 70% of the total. In terms of mobile ARPU, South America has one of the lowest levels among the regions studied (USD 14.1 per month), comparable to Africa (USD 13.2 per month) and Asia-Pacific (14.8 USD) but with less dispersion than the latter. In contrast, the Middle East and Europe have much higher ARPU levels, at USD 27.8 and USD 26.9, respectively. Finally, in terms of technological standards, South America has the lowest coordination of GSM technology, although it has already been established as the dominant technology, used in 83% of handsets in the region.

It is evident, as much in South America as in Asia-Pacific, Middle East and Africa, that regulatory coordination between countries is a clear challenge to actually carry out regional roaming initiatives.

When comparing roaming travel in South America vs. in other regions, the proportion of South American roaming to total travel is very low, at around 20%. In the other regions this ratio is always over 30%, and in the case of Africa and the Middle East as a whole, reaches 60%. Moreover, the South American roaming ARPU appears unusually high compared to other regions, and is partly explained by high roaming rates and the high component of business travelers using roaming in South America, who account for 85-90% of total roaming usage vs. 67% in Europe, 64% in Asia-Pacific and 33% in Africa and the Middle East.

Executive summary (cont.)

Key success factors of initiatives in other regions and their applicability in South America

To encourage further development of the roaming market in South America, the various regional roaming initiatives in Europe, Africa, the Middle East and Asia-Pacific are presented. 26 initiatives for international roaming are identified, and can be grouped into four types:

- Regulatory (5 initiatives)
- Informative (4 initiatives)
- Roaming alliances (8 initiatives)
- Technical and industry innovation (9 initiatives)

Regulatory initiatives are comprised of regional regulations on tariffs, services, and transparency, and of industry self-regulation initiatives. Informative initiatives providing rate comparisons are carried out by both regulators and industry associations. In the roaming alliances, various operators offer differentiated roaming rates and services. In technical and industry innovations, there are initiatives that focus on fraud, improving service quality and operational efficiency. In these initiatives, six types of stakeholders were identified: regional regulators, national regulators, industry associations, operator groups, individual operators and service providers.

To analyze the impact of the distinct initiatives presented, potential impact was evaluated in three main areas: pricing, service and transparency.

- In regulatory initiatives, it became clear that the biggest impact is in terms of pricing transparency, with the Eurotariff having a strong impact on price reductions. AREGNET sought to achieve a similar impact on price reductions, but the results are still not clear.

Executive summary (cont.)

- In informative initiatives providing rate comparisons, the biggest impact was also in greater price transparency, with the more effective initiatives led by industry associations (GSMA Europe, GSMA Arab World)

- The greatest impact from roaming alliance initiatives is in both services and pricing, mainly by large business groups (eg. Zain and Vodafone). The case of Zain and its One Network alliance in Africa and the Middle East should be of special interest to South America, given its relatively low ARPU (USD16), and ability to develop a competitive offer that has been very attractive to its predominantly prepaid customer base (97% of total).

- Regarding technical and industry innovation initiatives, the biggest impact is in service, in terms of safety (eg. Near Real Time Data Exchange), availability (eg. Open Connectivity), and quality (eg. Global Roaming Quality).

Considering the impact of the different initiatives analyzed, one can extract the following key success factors for each type of initiative:

- Regarding regulatory initiatives, the regulator's enforcement capacity was crucial in the European case to facilitate the coordination of the Eurotariff among the different countries, allow for its uniform implementation, and achieve an effective tariff reduction. The impact on transparency was realized through a detailed understanding of the user and the awareness of the situation by all industry stakeholders (ie, associations, operators)

- In informative initiatives providing rate comparisons, the active role of industry associations was key to ensure proper updating of rates and completeness of information. The threat of regulation was relevant to these initiatives, leading operator associations to create web sites with information on regional rates.

Executive summary (cont.)

- In the roaming alliance initiatives, the key success factor was strong leadership by a group of operators to facilitate the coordination of the various national operators and generate more aggressive price offerings. In particular, ownership of different operators by a single business group was important in the case in Africa.

- In technical and industry initiatives, the active coordination of operator associations was the key success factor. It is also important, however, to analyze these initiatives based on their payback and economic and financial attractiveness.

In all cases analyzed, the most common key success factor was the ability of the initiative leader to lead or coordinate the other stakeholders.

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Study of the European market: Executive summary

Socio-economic situation

- Europe covers 47 countries, 27 of which belong to the European Union, which accounts for 60% of the population and 85% of GDP in the region
- The six countries with the highest GDP (Germany, UK, France, Italy, Spain and Russia) account for 68% of total GDP, and 51% of the total population in the region
- The region has high levels of per capita GDP compared to South America (USD 22,000 vs. USD 10,000), with the higher levels coming from EU countries
- The European population has a greater component of adults over 30 compared to South America (62% vs. 47%), a trend that is more pronounced in EU countries
- Intra-regional travel in Europe is significantly high, representing 42% of the total population

Telecom-munications market

- Mobile market characteristics:
  - The European telecommunications market is mature, with mobile penetration exceeding 100%
  - The biggest market development has been in the prepaid segment ,which has recently been growing by 20%, reaching 68% of total subscriptions by 2007
  - The European ARPU has reduced slightly in recent years, by 3% annually, attributable to the appreciation of the Euro against the USD
  - GSM is the dominant technology in Europe with 90% of the total, and its third generation successor (UMTS) has also been growing strongly (10% of total lines by 2007)
- Mobile market regulation:
  - The European Commission is an institution of the EU countries that defines the common laws and regulations that affect, among others, the telecommunications sector
  - Through the ERG, national regulators within the EU study European international roaming in detail and coordinate the enforcement of community regulations

Study of the European market: Executive summary (cont.)

Roaming market

- European travelers take 173M trips using roaming service per year, which represents 41% of the total trips in the region
- The rates for inter-regional calls are three times more expensive than intra-regional, largely as a consequence of the Eurotariff regulation...
- ...while SMS rates, not regulated by the Eurotariff, are only 30% higher for inter-regional calls
- Roaming revenue from Europeans while traveling (outbound) reached USD 14.8 billion in 2008, with ~95% being generated in Western Europe

Eurotariff regulation

- The EC717/2007 regulation defined maximum wholesale and retail prices for international roaming calls in Europe...
- ...and also defined complementary rules to ensure these benefits for European subscribers
- The development of European roaming regulation was a complex process that took several years of discussions and public consultations
  - The first attempt by the EC to increase transparency was to create a web site in 2005 comparing roaming rates...
  - ... in response, the GSMA launched a web site with more complete and updated pricing information to show users the more economical alternatives for roaming
  - Meanwhile, in February 2006, the European Commission conducted a survey on European roaming, which revealed that many travelers do not use the service due to its high prices
  - Analysis by the EC revealed that rates for outgoing roaming calls were significantly higher than domestic rates, and were not based on actual costs
  - The same pattern of excessively high rates was also shown for calls received in roaming
  - From this evidence, the European Commission considered various alternatives before deciding to intervene on pricing,...
  - ...aiming to simultaneously determine wholesale and retail rates, thus facilitating implementation and avoiding "price squeezing" (anti-competitive activity, where an operator seek to harm smaller operators by offering service at below cost)

Study of the European market: Executive summary (cont.)

Eurotariff regulations (cont.)

- Finally, in June 2006 the European Commission decided to regulate wholesale and retail rates, seeking to generate the best benefits for users in terms of potential savings
  - The regulations were met with full compliance regarding implementation, with several cases of rates below the cap set by the Eurotariff
  - European users have benefited from significant price reductions (40-60%) for international roaming calls within the European Union
  - The price reduction for roaming services within the EU was partially offset by rate increases for other regions
- Article 11 of EC regulation 717/2007 defines that in 2008, data and SMS roaming will be analyzed and will consider additional regulations if necessary ...
- ... and it is expected that the European Commission will propose:
  - Regulation of wholesale and retail rates for SMS roaming services
  - Transparency for data roaming

Alliances

- The FreeMove alliance is led by 3 major European groups (Orange, T-Mobile and TIM), and operates in 27 countries (25 in Europe and 2 in the Americas) ...
  - ... with a range of roaming services focused on multinational corporate clients, although it also offered some attractive rates for individuals prior to the launch of the Eurotariff
- The Vodafone group formed a roaming alliance among its 22 subsidiary and affiliate operators ...
  - ...incorporating a further 42 partners in countries where operators it does not have an actual presence, doubling coverage in terms of subscribers reached
  - Vodafone offers a wide range of voice and data roaming services for both individual and corporate segments

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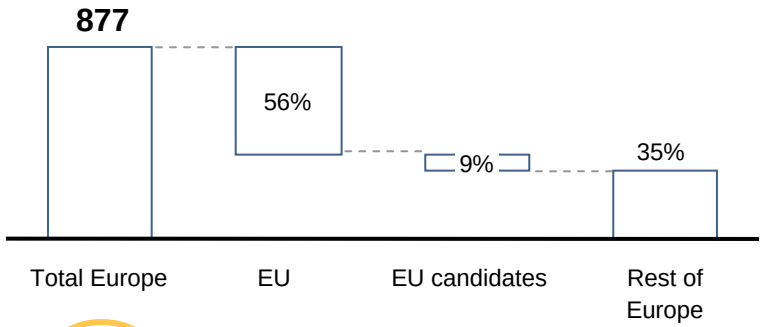
Figure 1 - Analysis of population and nominal GDP in Europe

Europe covers 47 countries, 27 of which belong to the European Union and account for 60% of the population and 85% of GDP in the region

Number of member countries

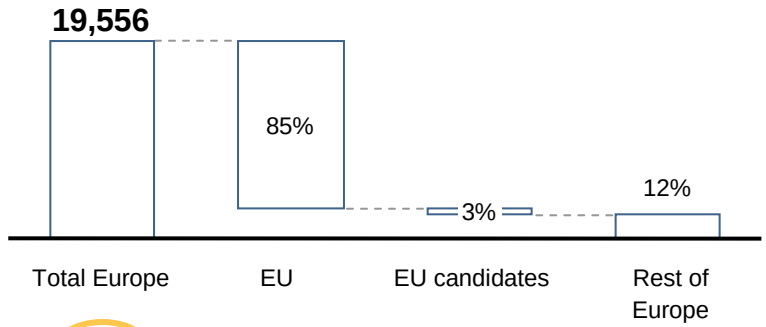
Population

2007, Millions of people



Nominal GDP*

2007, USD billions



% Worldwide

16%

56%

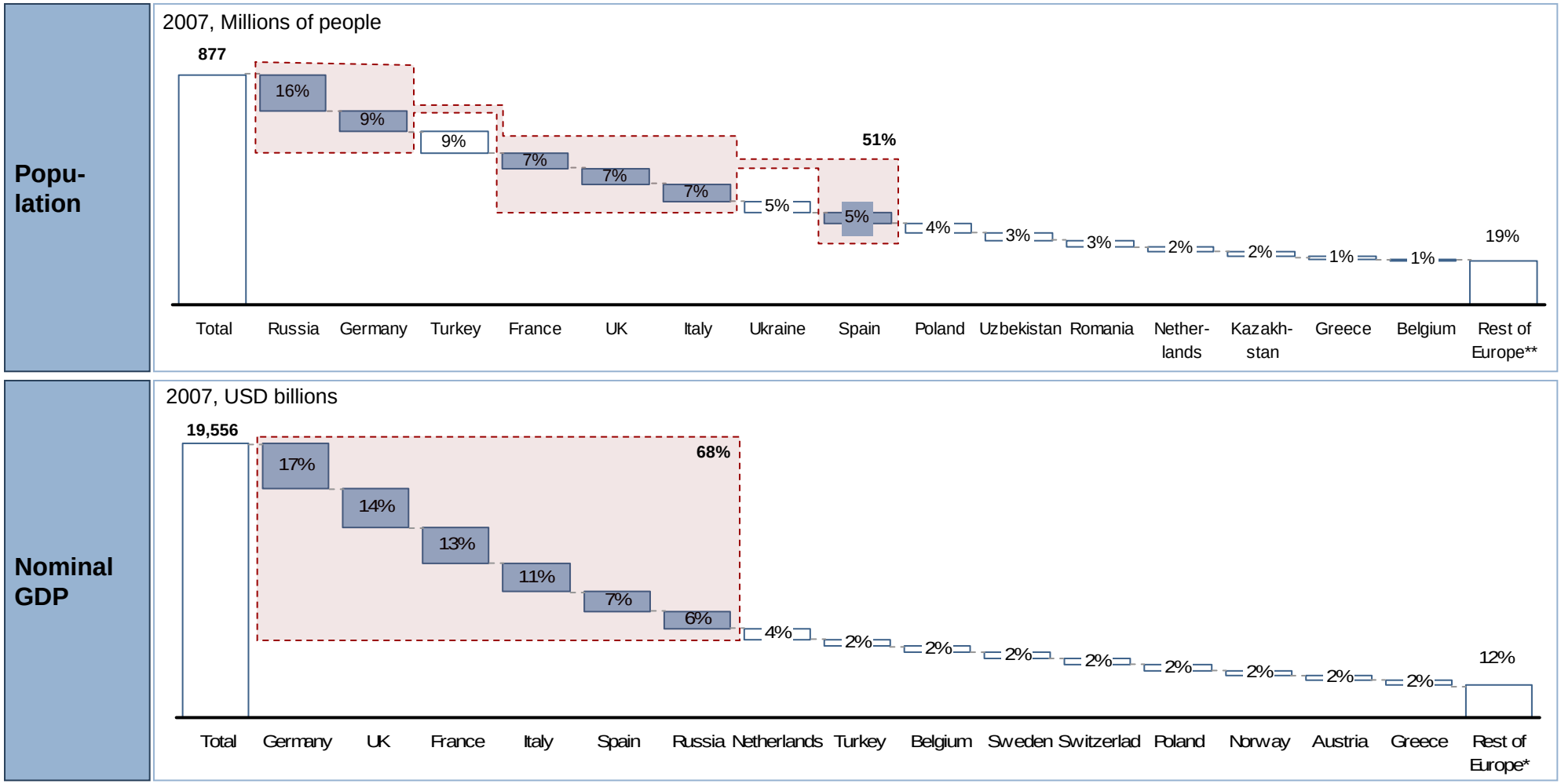
	European Union (EU)			EU candidates	Rest of Europe	
Countries	• Germany	• Belgium	• Finland	• Croatia	• Albania	• Serbia
	• France	• Portugal	• Ireland	• Macedonia	• Armenia	• Switzerland
	• UK	• Czech R.	• Lithuania	• Turkey	• Azerbaijan	• Ukraine
	• Italy	• Hungary	• Latvia		• Belarus	• Tajikistan
	• Spain	• Sweden	• Slovenia		• Bosnia	• Kyrgyzstan
	• Poland	• Austria	• Estonia		• Georgia	• Turkmenistan
	• Romania	• Bulgaria	• Cyprus		• Moldova	• Uzbekistan
	• Netherlands	• Denmark	• Luxembourg		• Norway	• Kazakhstan
	• Greece	• Slovakia	• Malta		• Russia	
	27			3	17	

* Gross Domestic Product

Source: European Union web site, IMF, Work team analysis

Figure 2 - Population and nominal GDP by country, as a proportion of the European region

The six countries with the highest GDP (Germany, UK, France, Italy, Spain and Russia) account for 68% of total GDP and 51% of the population of the region



* Denmark, Ireland, Finland, Portugal, Czech R., Romania, Hungary, Ukraine, Kazakhstan, Slovakia, Croatia, Luxembourg, Slovenia, Serbia, Bulgaria, Belarus, Lithuania, Azerbaijan, Latvia, Turkmenistan, Estonia, Cyprus, Uzbekistan, Bosnia and Herzegovina, Albania, Georgia, Armenia, Macedonia, Malta, Moldova, Kyrgyzstan, Tajikistan

** Portugal, Czech R., Hungary, Belarus, Sweden, Azerbaijan, Austria, Bulgaria, Serbia, Switzerland, Tajikistan, Denmark, Slovakia, Kyrgyzstan, Finland, Turkmenistan, Norway, Croatia, Georgia, Ireland, Bosnia and Herzegovina, Armenia, Lithuania, Moldova, Albania, Latvia, Macedonia, Slovenia, Estonia, Cyprus, Luxembourg, Malta

Source: IMF, World Economic Outlook Database, October 2007

Figure 3 - Evolution of PPP adjusted per capita GDP in Europe and country ranking for 2007

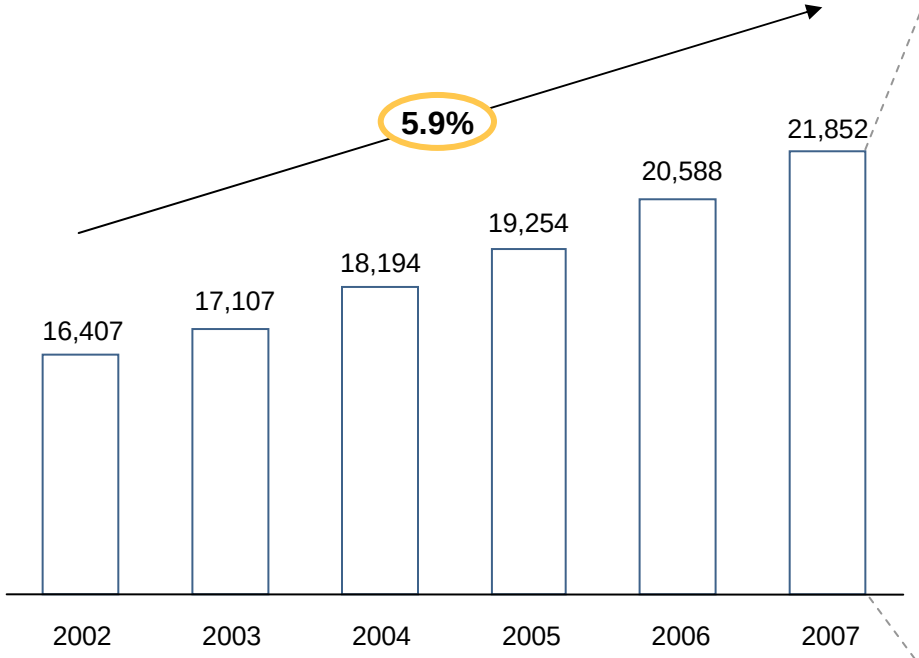
The region has high levels of per capita GDP compared to South America (USD 22,000 vs. USD 10,000), with the higher levels coming from EU countries

2007

CAGR** 02-07

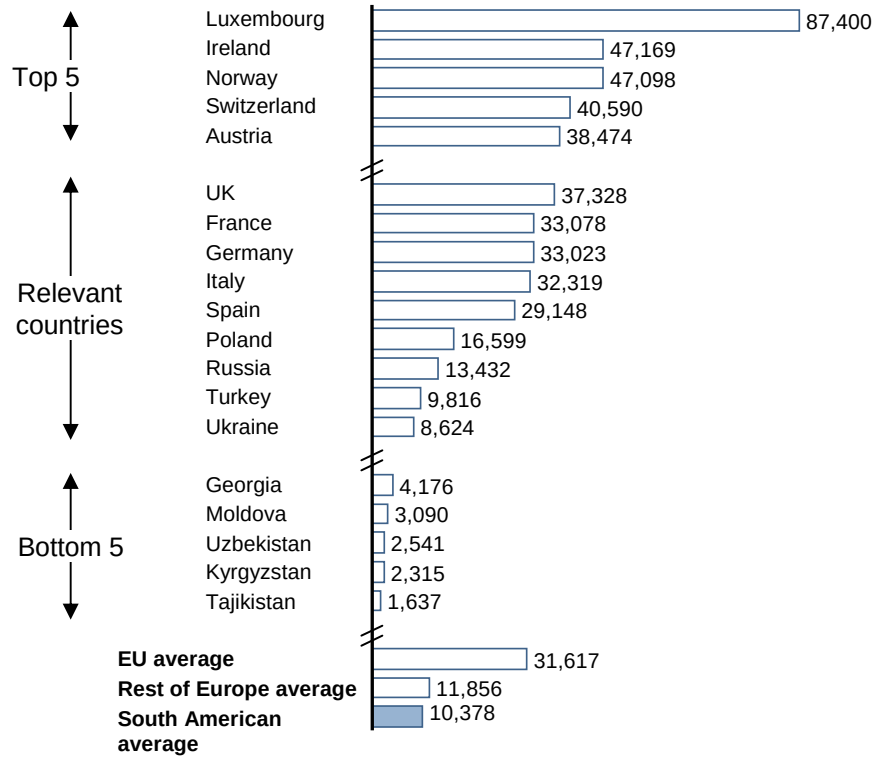
PPP* adjusted per capita GDP in Europe

Nominal USD



Country ranking, Europe

2007, Nominal USD

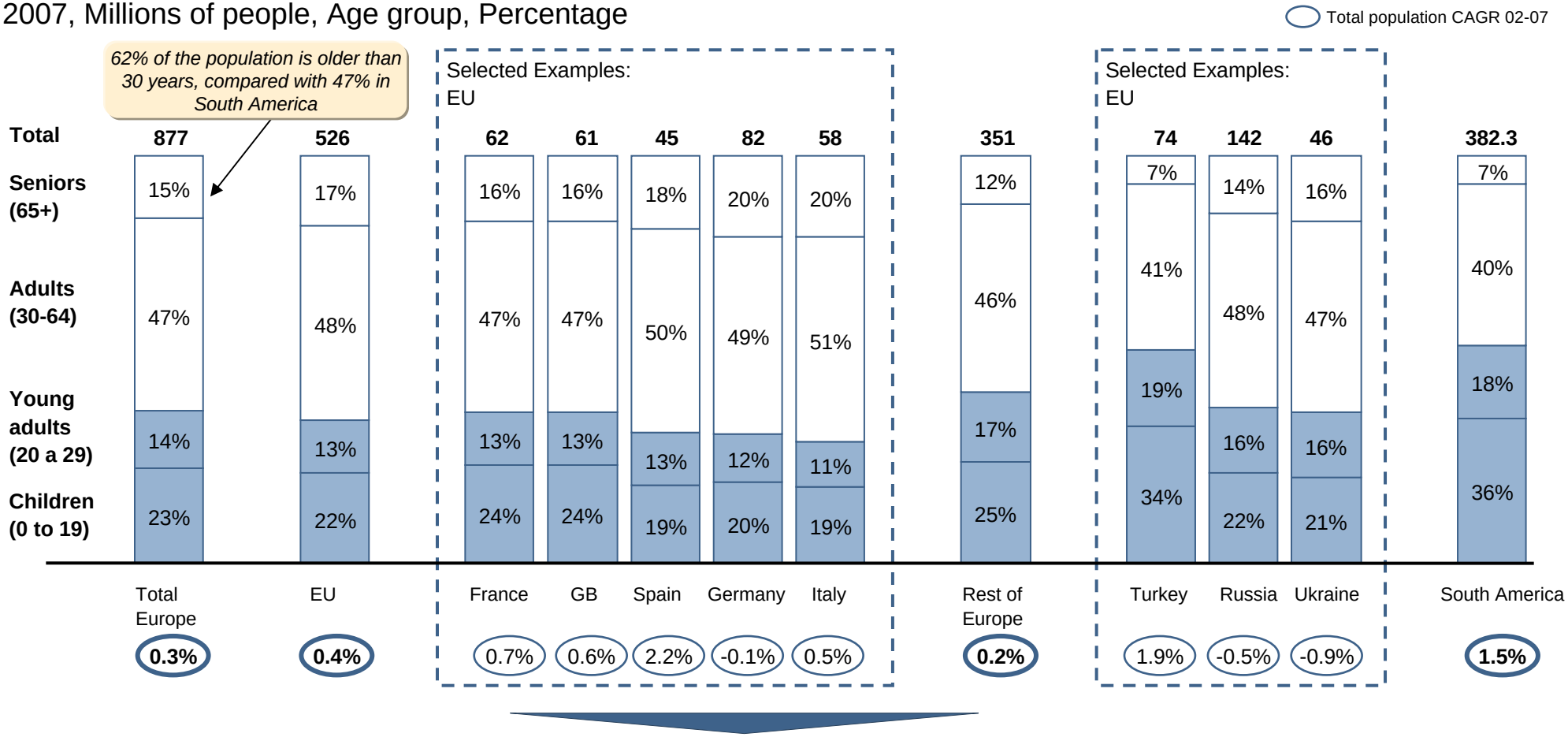


* Purchasing power parity
** Compound Annual Growth Rate
Source: IMF, Work team analysis

Figure 4 - Analysis of population by age for Europe and selected countries

The European population has a greater component of adults over 30 compared to South America (62% vs. 47%), and this observation is even more pronounced in EU countries

2007, Millions of people, Age group, Percentage



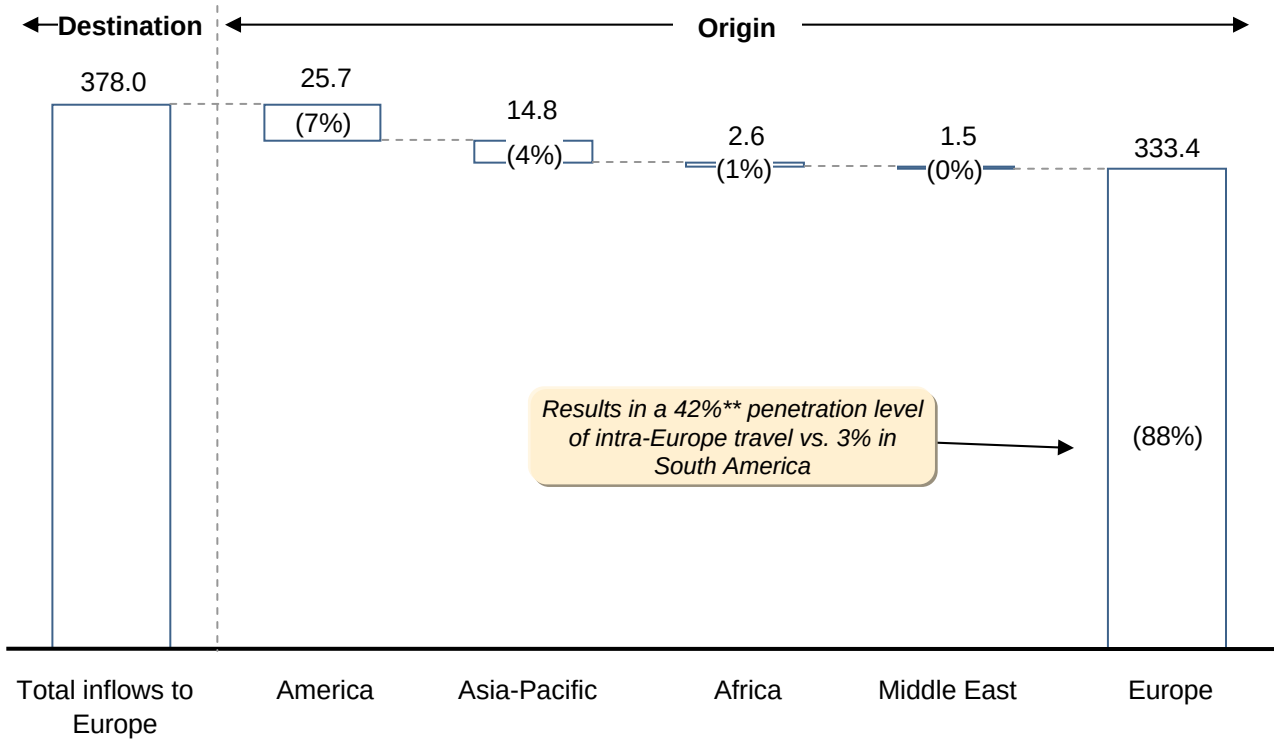
In general, Europe has low population growth rates, and adults and seniors will continue to comprise an even larger share of the total population in the coming years

Source: EIU, Agency for National Statistics, Work team analysis

Figure 5 - Analysis of travel inflows to Europe, by region of origin

Intra-regional travel* to Europe is significantly high, with trips made by 40% of the total population

2006, Millions of travelers per year



88% of tourist traffic in Europe is intra-regional

* Annual visits to countries within the region
** Percentage of intra-regional travel over population in the region
Source: WTO, Work team analysis

Document contents

- **Chapter I: Study of international roaming markets**
  - **Europe**
    - . Socioeconomic situation
    - . **Mobile telecommunications market**
    - . Roaming market
    - . Eurotariff regulation
    - . Regional alliances
  - Africa and the Middle East
  - Asia-Pacific
  - Analysis of inter-operator roaming tariffs
  - Technology
  - Tax issues

- Chapter II: Comparison of the international and South American context

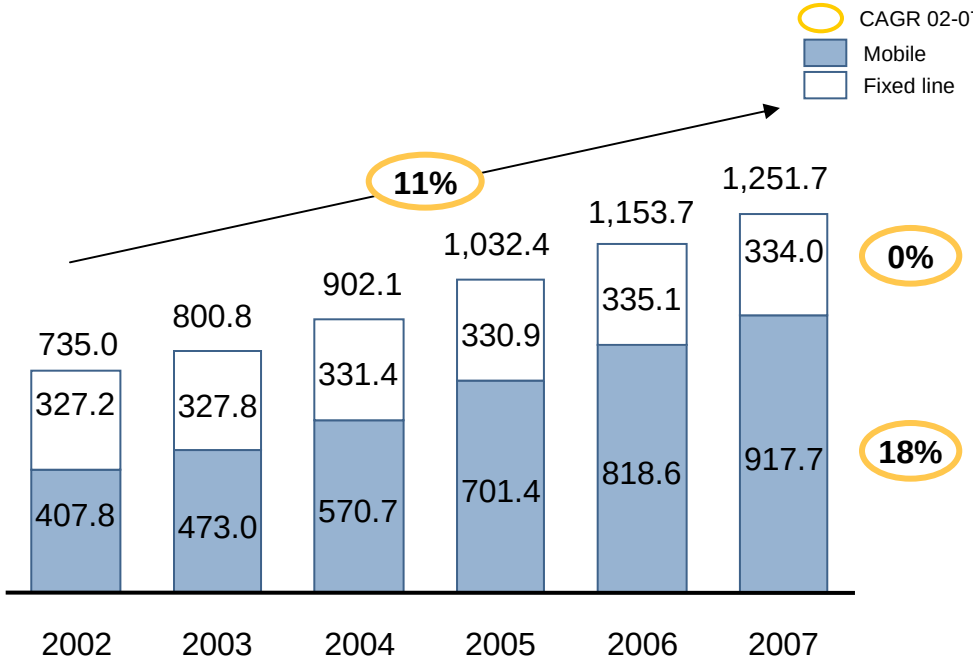
- Annexes

Figure 6 - Analysis of the evolution of fixed line and mobile subscriptions in Europe

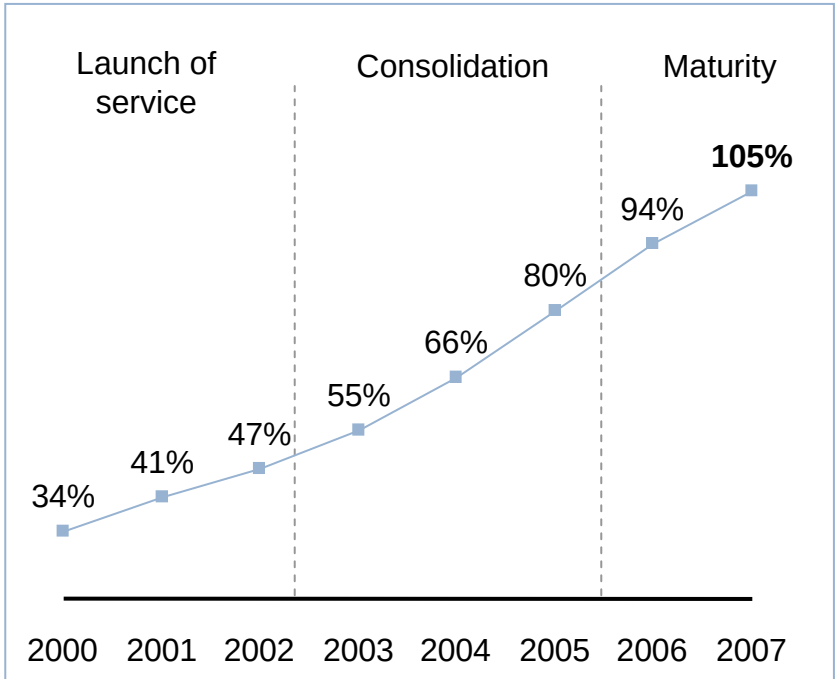
The European telecommunications market is mature, with mobile penetration exceeding 100%

Millions of subscriptions, Percentage

Evolution of the European mobile market



Mobile penetration*



- In Europe, the mobile market represents 73% of subscriptions, with an annual growth rate of 18%
- Mobile service penetration is 5% greater than the population of the region

*Mobile subscriptions over total population

Source: ITU, IMF

Figure 7 - Breakdown of mobile subscriptions in Europe, by type of service and country ranking

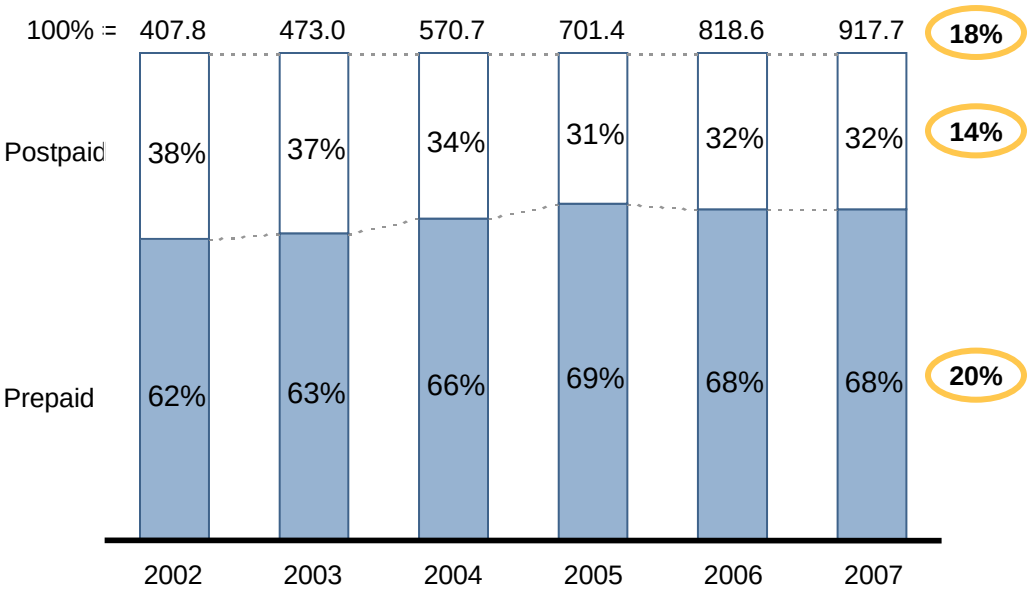
The biggest market development has been in prepaid, which has grown 20% in recent years, reaching 68% of total subscriptions in 2007

Millions of subscriptions, Percentage

CAGR 02-07

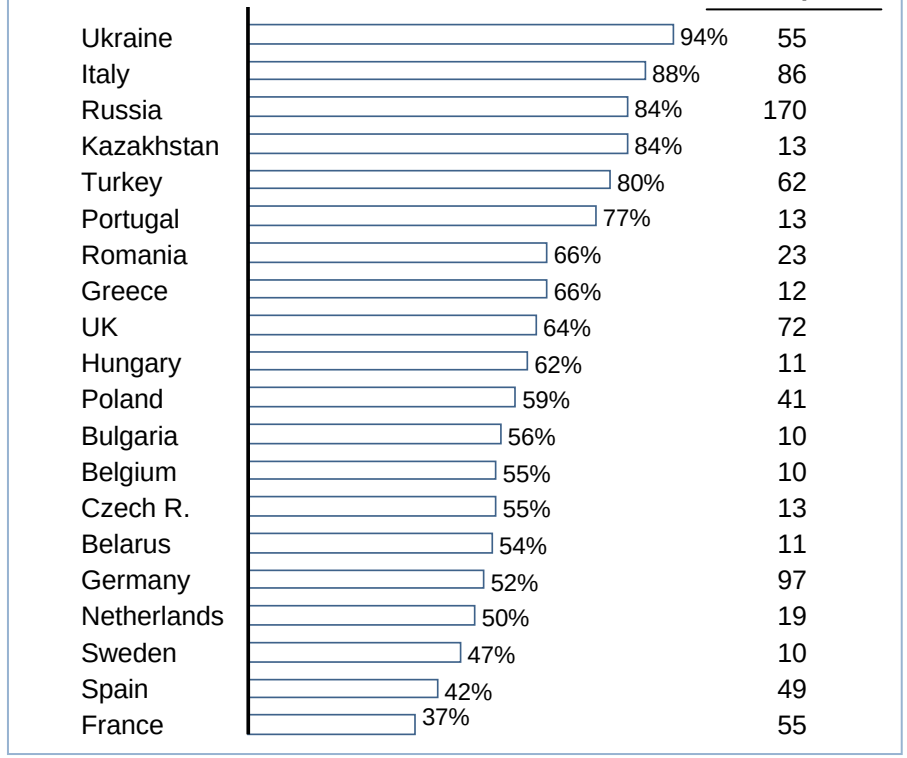
Breakdown of mobile subscriptions in Europe, by type of service

Percentage, Millions of subscriptions



Percentage of prepaid, by country (Top 20*)

2007, Percentage, Millions of subscriptions



*Selected according to their subscriber base

Source: Yankee Group, ITU, WCIS, Work team analysis

IMOBIX | VALUE PARTNERS

IIRSA BID

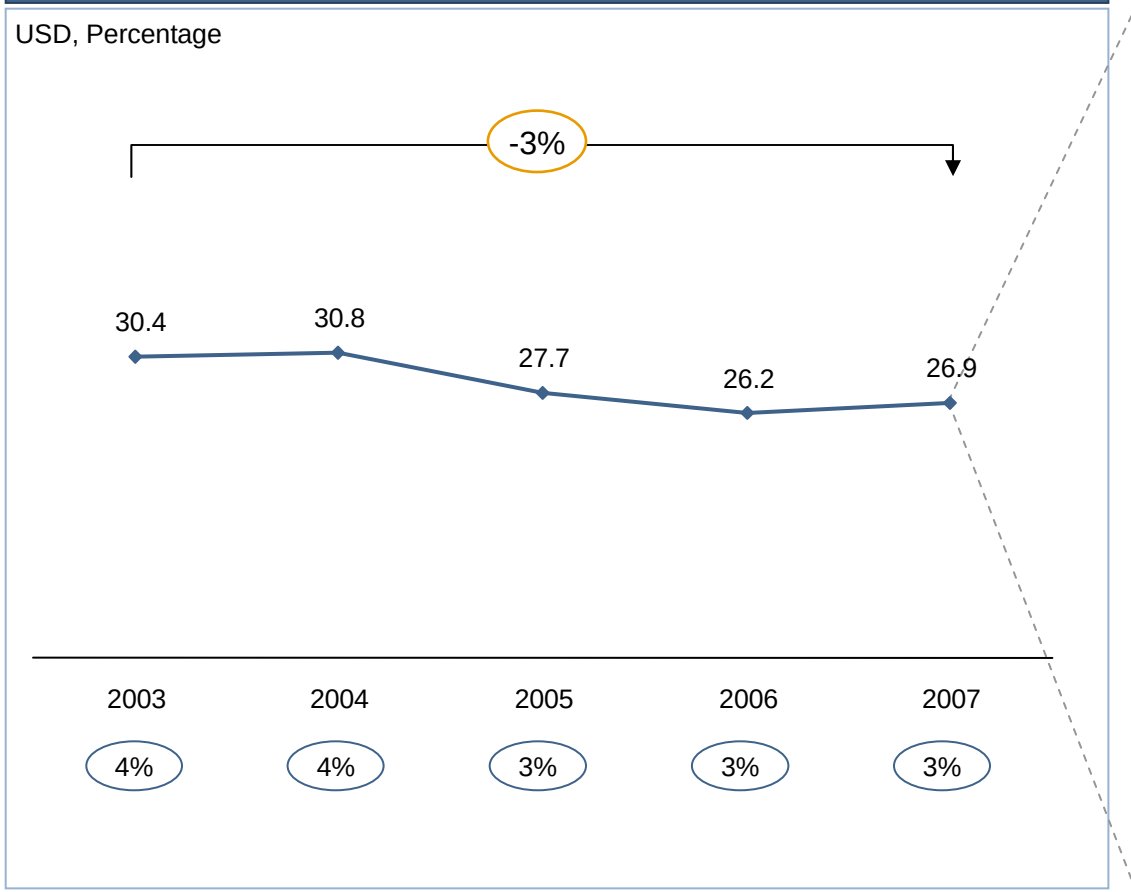
Figure 8 - Evolution of ARPU for mobile services in Europe and country ranking, in USD

The European ARPU has been decreasing slightly in recent years, at 3% annually, mainly due to the appreciation of the Euro against the USD

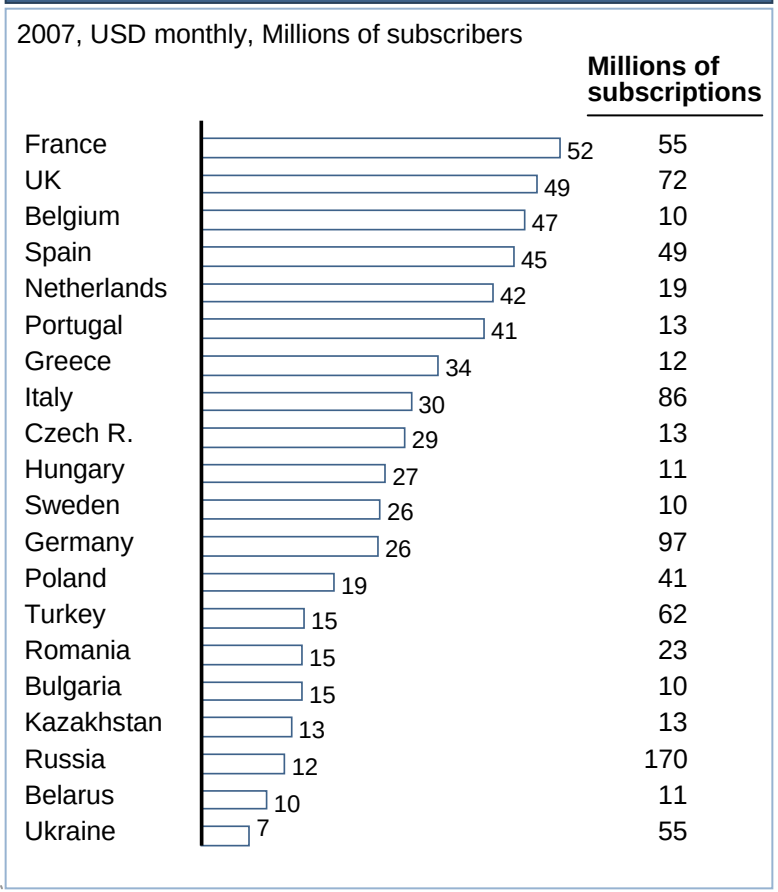
USD, Percentage

% Disposable income**
CAGR

Evolution of ARPU* for mobile services in Europe



Detail of mobile ARPU, by country (Top 20***)



* Weighted average of subscriptions by country
** Adjusted PPP
*** Selected according to their subscriber base
Source: Yankee Group, Work team analysis

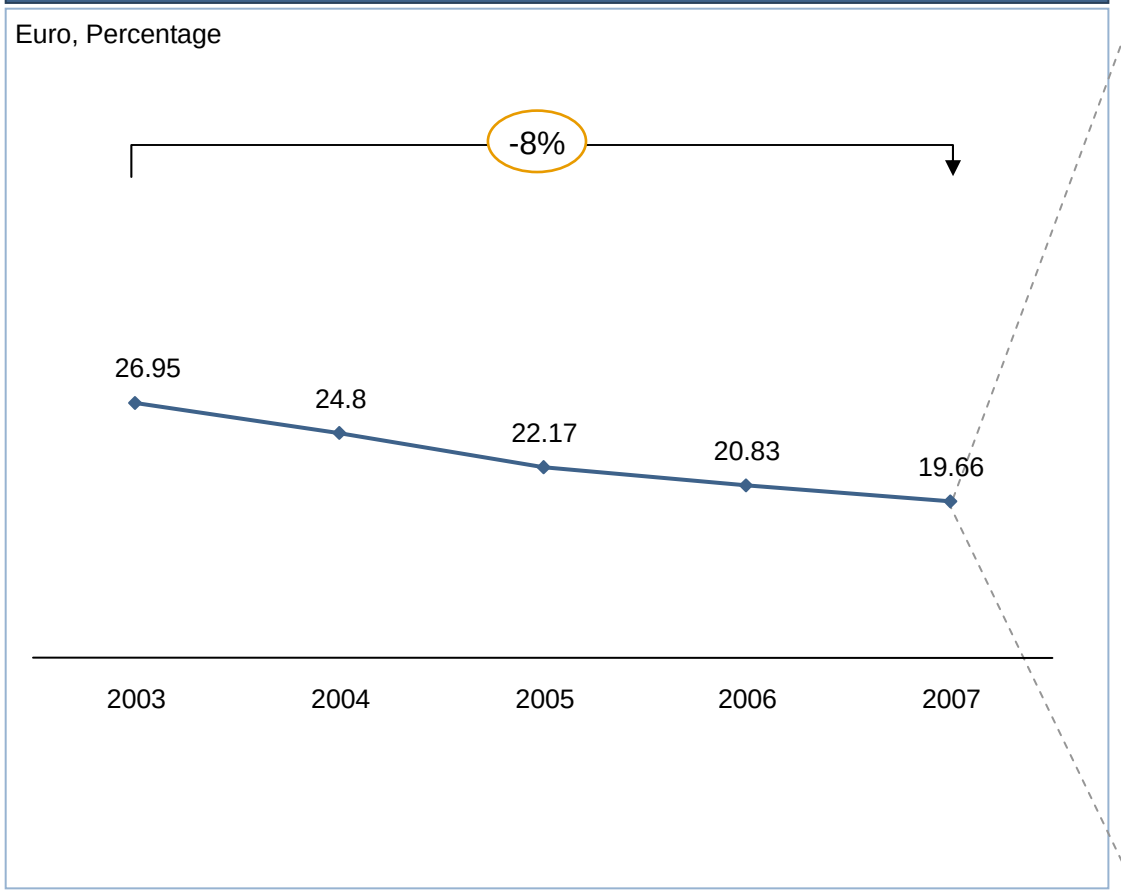
Figure 9 - Evolution of ARPU for mobile services in Europe and country ranking, in Euros

In Euros, the European ARPU has fallen by 8% annually in recent years

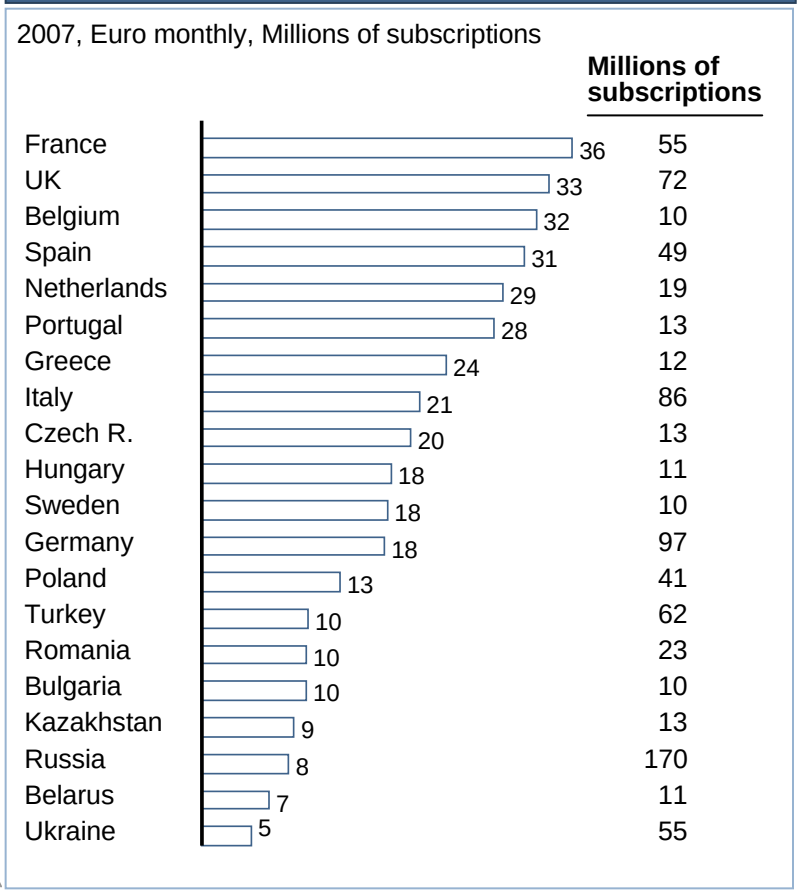
Euro, Percentage

CAGR 03-07

Evolution of ARPU* for mobile services in Europe



Details of the mobile ARPU, by country (Top 20 **)



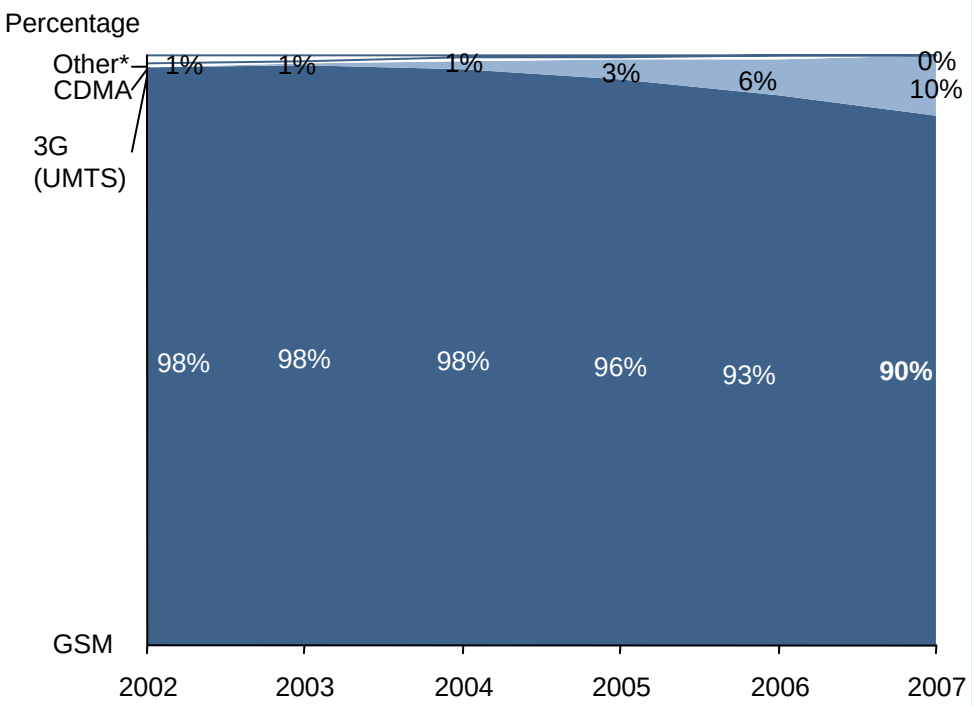
* Weighted average of subscriptions by country
** Selected according to their subscriber base
Source: Yankee Group, Work team analysis

Figure 10 - Technology track in Europe and technological breakdown by country

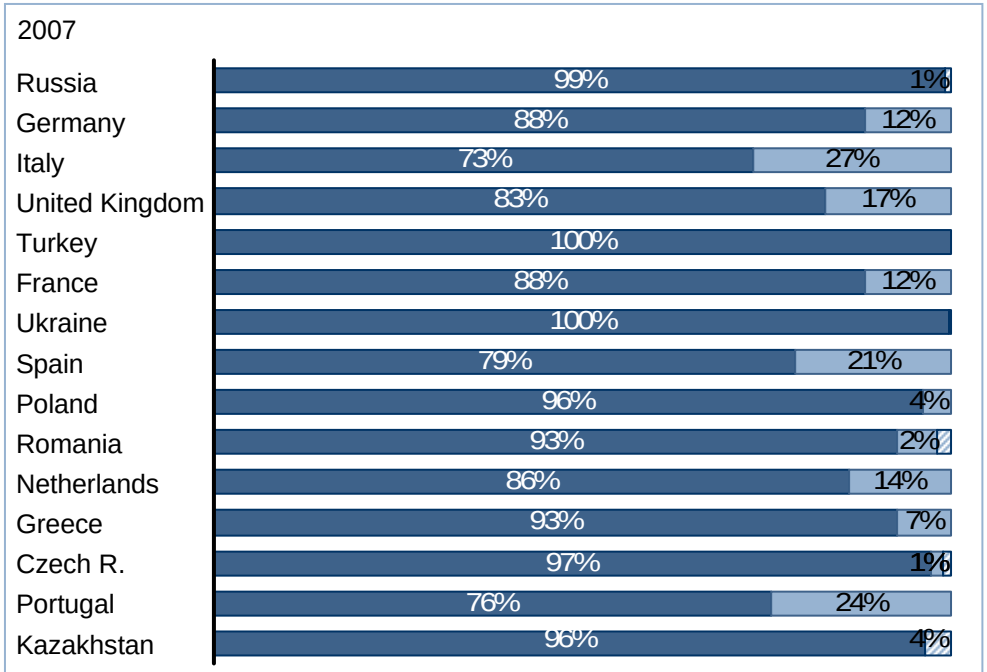
GSM is the dominant technology in Europe, with 90% of the total, and its third generation successor (UMTS) has also been growing strongly (10% of total lines by 2007)

Percentage

Technology track in Europe



Technology breakdown, by country (Top 15 **)



Third generation technology is growing strongly in the region, mainly in the more developed EU countries (eg. UK, France, Italy, Germany, Spain)

* US-TDMA, IDEN, NMT and TACS
** Selected according to their subscriber base
Source: Informa, WCIS, Work team analysis

Figure 11 - Main regional telecommunications regulation associations in Europe

The European Commission is an institution of the EU countries that defines the common laws and regulations that affect, among others, the telecommunications sector

European Union member countries

Germany	Estonia	Luxembourg
Austria	Finland	Malta
Belgium	France	The Netherlands
Bulgaria	Greece	Poland
Cyprus	Hungary	Portugal
Denmark	Ireland	Czech R.
Slovakia	Italy	Romania
Slovenia	Latvia	Sweden
Spain	Lithuania	United Kingdom

Main institutions involved in European telecommunications regulation

European Parliament

- Legislative:
  - Consists of 785 members...
  - ...elected every 5 years
- Prepares and approves legislation
- Power to dismiss the European Commission

European Commission

- Legislative and regulatory:
  - Consists of 26 members and a president...
  - ..nominated every 5 years
  - Independent of national governments
- Develops proposals for European legislation
- Manages policy implementation and use of EU funds
- Has authority to prosecute in court those who violate the community laws

Body with main role in developing the Eurotariff (regulation on international roaming in Europe)

Source: European Union

Through the ERG*, national regulators within the EU study European international roaming in detail and coordinate enforcement

Creation and training	• Established in 2002 by the European Commission with Decision 2002/627/EC • Composed of national telecommunications regulatory authority representatives of the 27 member countries and observers from EU candidate countries • Independent of governments and national regulatory authorities
Attributes	• Provides adequate mechanisms to encourage cooperation and coordination among national regulatory authorities for: - Development of the European market for networks and electronic communications services - Consistent application of regulatory directives in the European member states
Main international roaming activities	• Support the development of the Eurotariff through market research, including: - *ERG Common Position on the Coordinated Analysis of the Markets for Wholesale International Roaming* (May 2005) - *Report on Transparency Measures on International Retail Roaming Rates* (October 2005) - *ERG International Roaming Benchmark Data Report* (August 2008) • Represent the views of national regulators: - Coordinate among the nations to apply the regulatory decisions regarding the Eurotariff - Recommend SMS roaming rate regulation and more transparency in data roaming services

* European Regulation Group

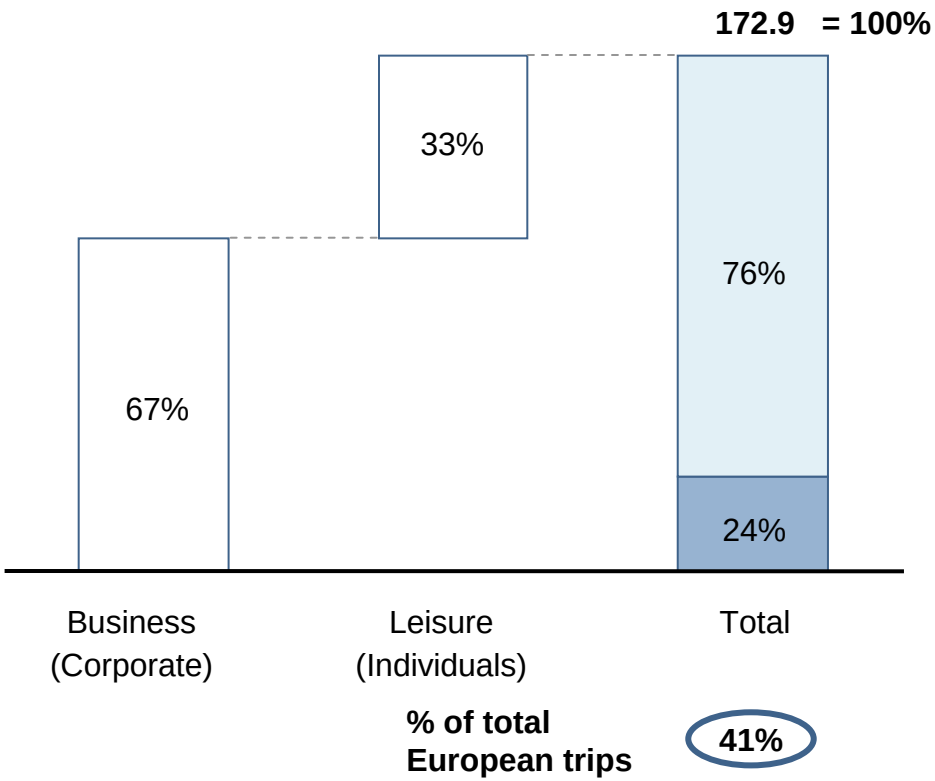
Source: ERG web site

Document contents

Figure 12 - Analysis of travel using roaming in Europe

European travelers utilize roaming services on 173M trips per year, which represents 41% of all trips in the region

2008, Millions of European travelers using outbound roaming, Percentage



- Europe is the region with the largest proportion of travelers using roaming over total travel
- The users are mostly business travelers, with two thirds of the total, vs. one third from leisure travelers
- Most roaming use comes from Western Europe, with 76% of total

* Includes Andorra, Austria, Belgium, Cyprus, Denmark, Faroe I., Finland, France, Germany, Gibraltar, Greece, Greenland, Guernsey, Iceland, Ireland, I. of Man, Israel, Italy, Jersey, Liechtenstein, Luxembourg, Malta, Monaco, The Netherlands, Norway, Portugal, Spain, Sweden and Switzerland

** Includes Albania, Armenia, Azerbaijan, Belarus, Bosnia Herzegovina, Bulgaria, Croatia, Czech R., Estonia, Georgia, Hungary, Kazakhstan, Kyrgyzstan, Kosovo, Latvia, Lithuania, Macedonia, Moldova, Montenegro, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, Tajikistan, Turkmenistan, Ukraine, Uzbekistan

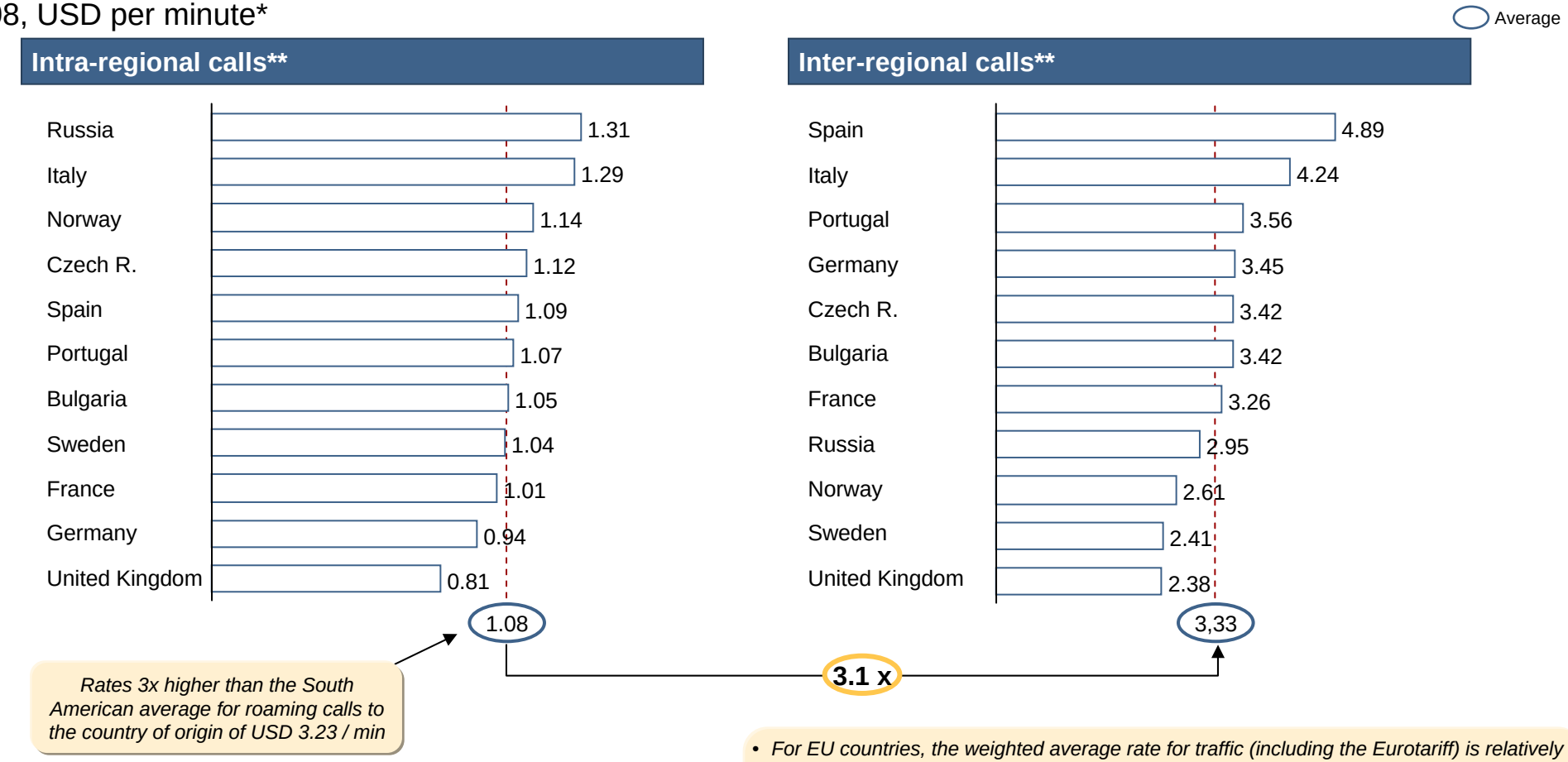
Source: Informa, WTO, Work team analysis

Figure 13 - Comparison of inter-operator tariffs for intra-regional and inter-regional calls in Europe

The rates for inter-regional calls are three times more expensive than intra-regional, largely as a consequence of the Eurotariff regulation...

NON-EXHAUSTIVE

2008, USD per minute*



- *For EU countries, the weighted average rate for traffic (including the Eurotariff) is relatively low, as outlined by the ERG for the first quarter 2008:*
  - *USD 0.66/min (€ 0.44/min) for intra-regional calls*
  - *USD 1.98/min (€ 1.32/min) for inter-regional calls*
- *Despite the distinct values, the rate is still ~3x more for inter-regional vs. intra-regional calls*

*Net of taxes

**For postpaid basic roaming services (not necessarily Eurotariff), without considering special packages, but including set-up fees for calls of more than 5 minutes

Note 1: Intra-regional calls are those between the countries listed in the chart

Note2: Russia and Norway did not fully implement the Eurotariff in 2008

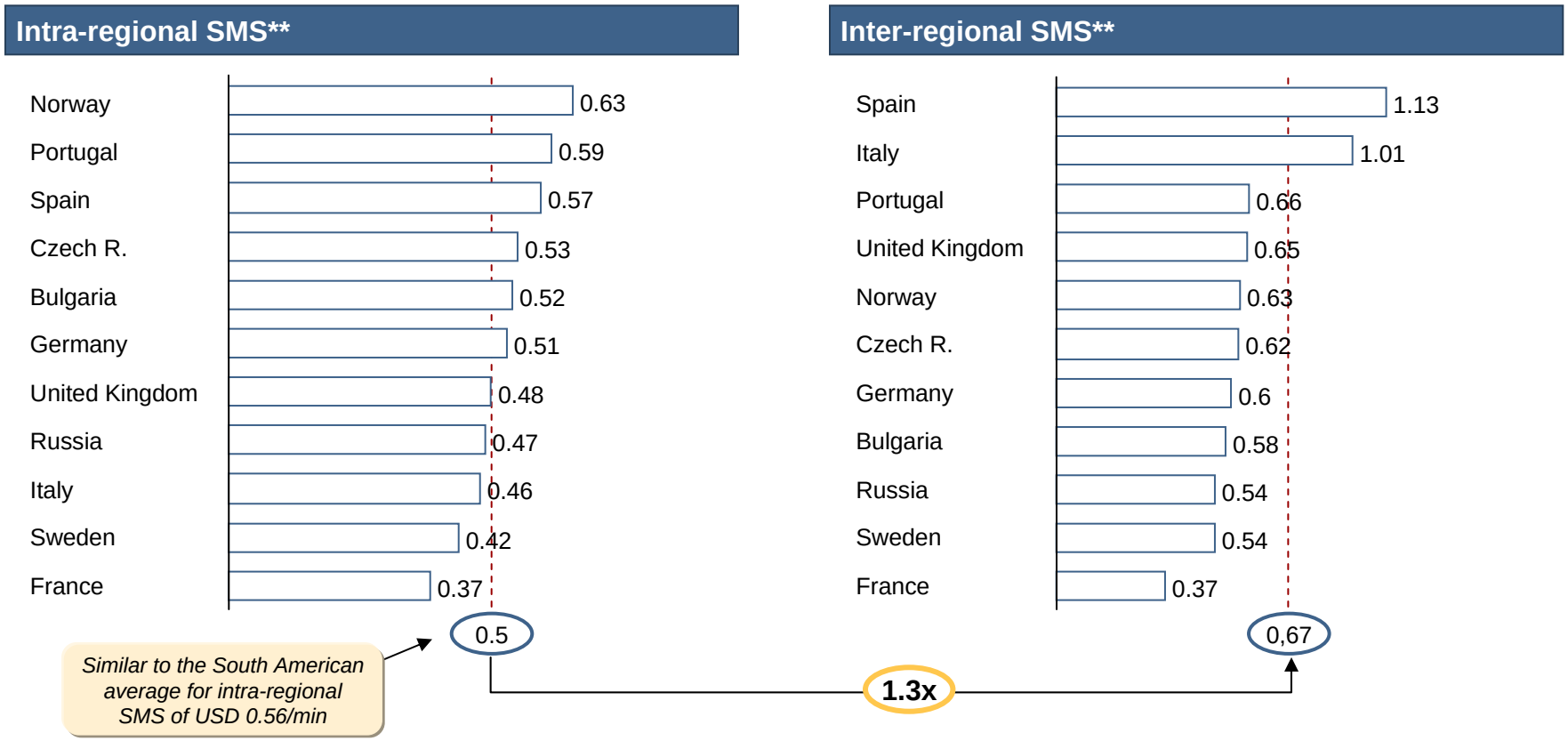
Source: Informa, ERG International Roaming Report

Figure 14 - Comparison of rates for intra-regional and inter-regional SMS in Europe

...while SMS rates, not regulated by the Eurotariff, are only 30% higher for inter-regional calls

NON-EXHAUSTIVE

2Q08, USD per message*



*Net of taxes

**For postpaid basic roaming services (not necessarily Eurotariff), without considering special packages

Note 1: Intra-regional SMS are those between the countries listed in the chart

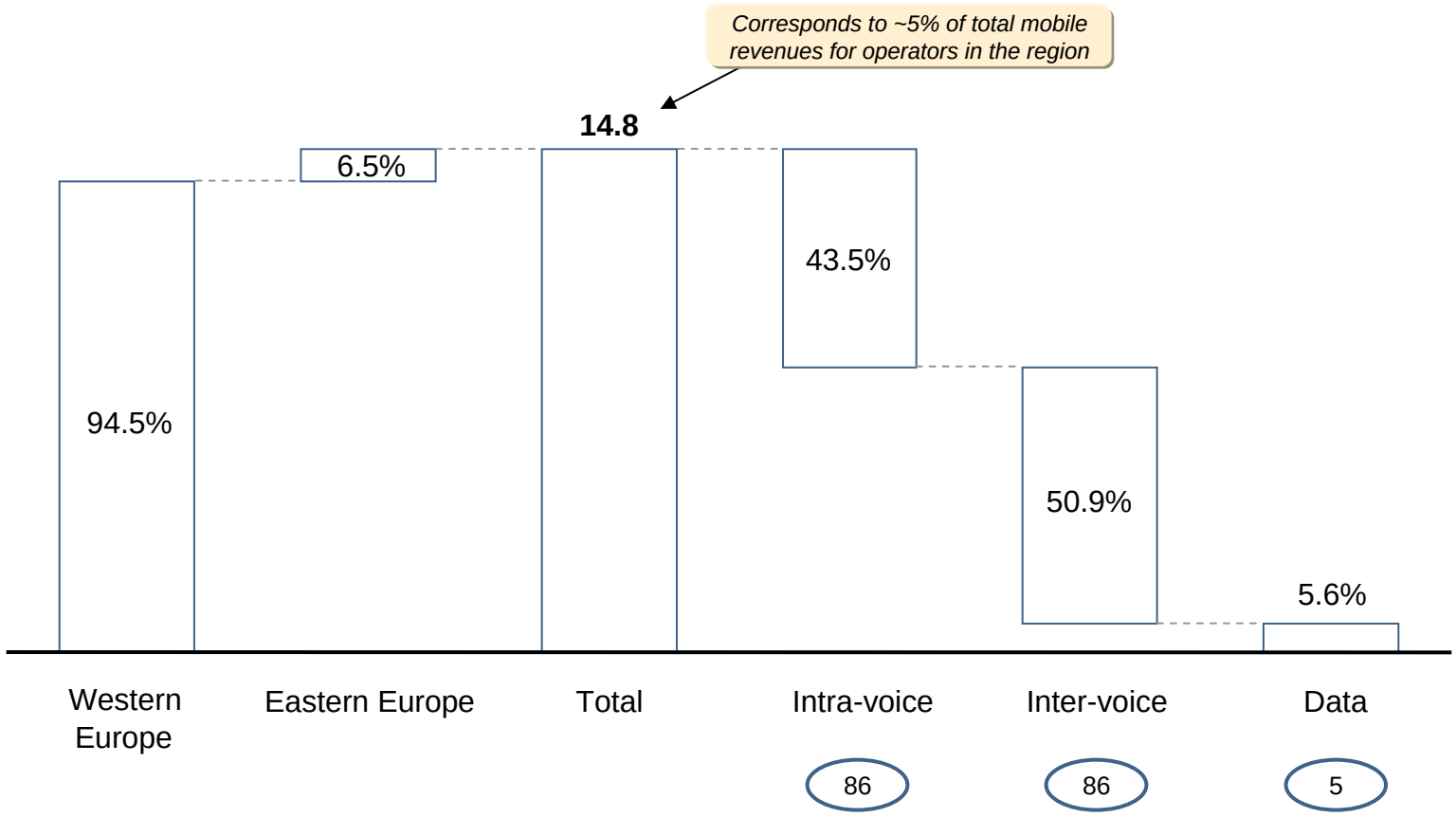
Note2: Russia and Norway did not fully implement the Eurotariff in 2008

Source: Informa

Figure 15 - Revenue from roaming travelers in Europe, by type of service

Roaming revenue from Europeans while traveling (outbound) reached USD 14.8 billion, with ~95% being generated in Western Europe

2008 USD billions, USD per trip



Note: The analysis considers the outbound roaming market (retail revenue), which includes the mark-up to final consumers (avoiding double counting of potential inbound wholesale revenues)
Source: Informa, Work team analysis

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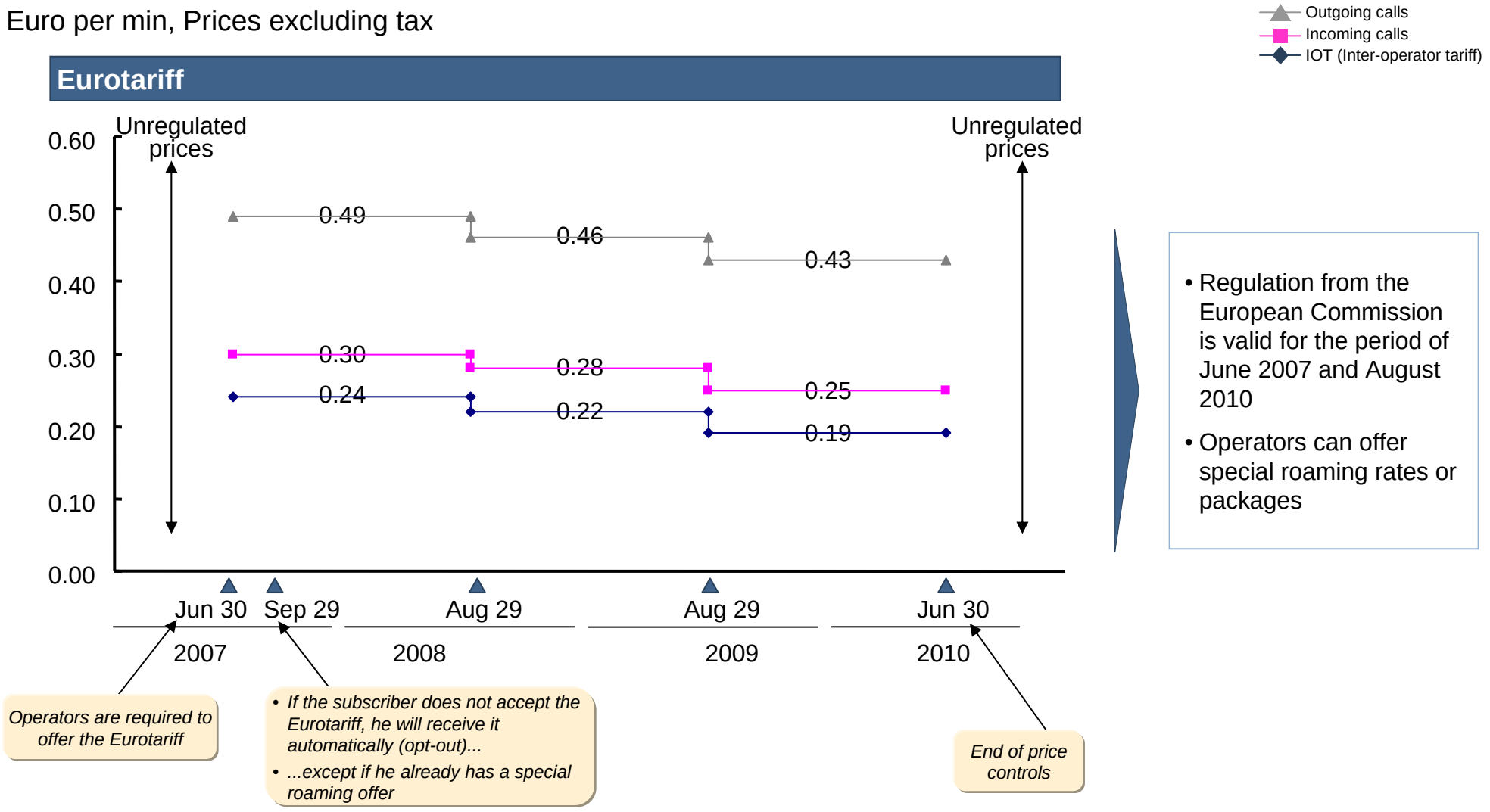
Figure 16 - European tariff structure imposed by the Eurotariff

The EC717/2007 regulation defines the maximum wholesale and retail rates for international roaming calls in Europe...

Euro per min, Prices excluding tax



- Regulation from the European Commission is valid for the period of June 2007 and August 2010
- Operators can offer special roaming rates or packages

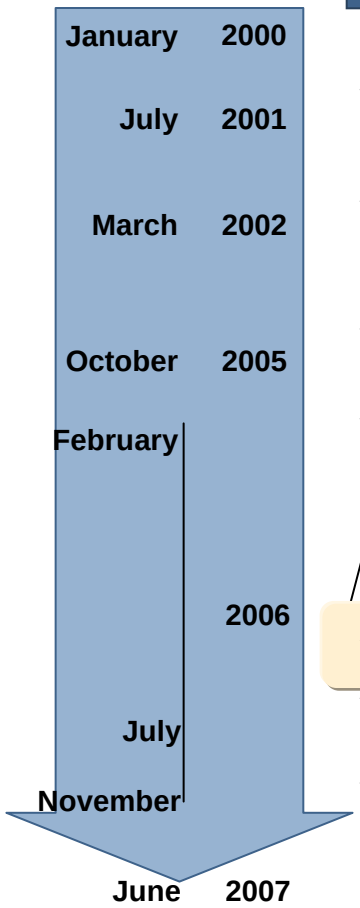
Source: European Commission

...also defining complementary rules to guarantee these benefits for European subscribers

Decisions from the EC 717/2007	Description
Maximum price for outgoing calls	• Outgoing roaming rates the same for local calls, calls to the home country, and calls to other European countries
Not dependent on subscription type	• Pricing limits are equally valid for postpaid and prepaid subscribers
Transparency on applied pricing	• Obligation to send free SMS with the maximum applicable rates when a subscriber visits a European network for roaming calls, specifying rates for: - Outgoing calls - Received calls • Obligation to inform the customer of all rate updates
European geographical coverage	• The regulation applies to all 27 member states and territories including: - French Guiana, Martinique, Guadeloupe and reunion (France) - Canary Islands (Spain) - Azores and Madeira (Portugal)
Responsibility for implementing and executing NRAs*	• National regulatory authorities are responsible for monitoring the wholesale and retail rates and reporting them to the European Commission

* National Regulatory Authority
Source: European Commission

The development of European roaming regulation was a complex process that took several years of discussions and public consultations

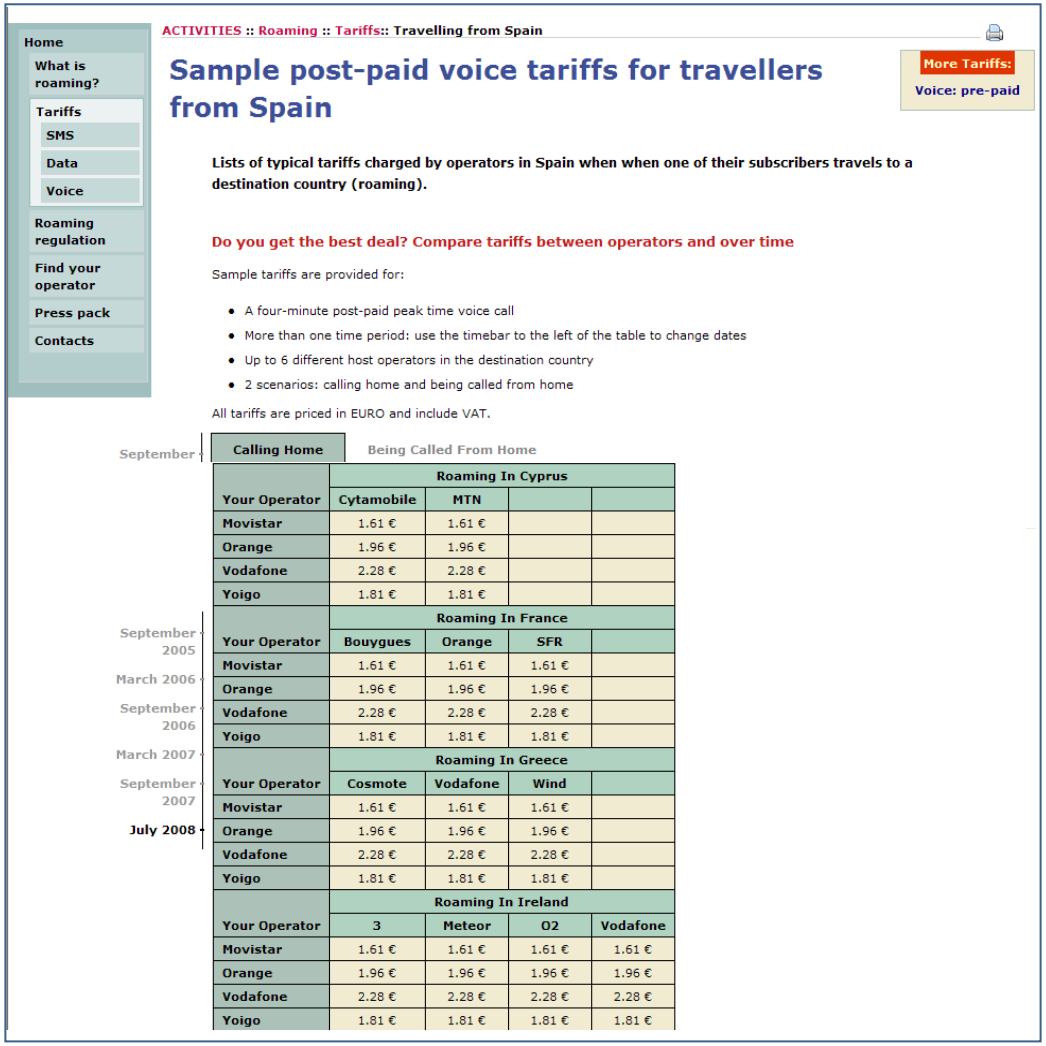


	Description	Important considerations
January 2000	• Sector survey on international roaming with regulators, operators and authorities on competition	• Main findings: excessively high prices, lack of transparency and possible collusion
July 2001	• The EC raided the offices of mobile operators in the UK and Germany, confiscating computers and documents	• The directive on EC competition found insufficient evidence of dominance in international roaming
March 2002	• The European Parliament adopted Directive 2002/21/EC with the definition of relevant markets to be investigated for anti-competitive activity, namely international roaming	• No regulator has determined that any one regulator has a dominant position in international roaming
October 2005	• The EC launched a web site to compare prices for roaming users	• The site helped to confirm that little progress has been made in reducing roaming rates
February 2006	• First round of public consultation on international roaming analysis: - Form of regulation focusing on the wholesale vs. retail level - Regulatory mechanism of price control - Impact (positive/negative) *A second round in April focused on the possibility of roaming rates similar to domestic rates*	• In favor of regulating roaming: - National regulatory authorities - Associations of users and consumers (eg. INTUG BEUC)* - Small mobile operators • Against regulating roaming: - Operator associations (eg, GSMA, ETNO, Bitkom)**
July	• The EC proposes regulation	• Proposed cap for wholesale and retail roaming rates
November	• Eurobarometer survey	• Revealed low use of roaming services due to high prices and helped to support regulation
June 2007	• The European Parliament approved the regulation EC717/2007	

* INTUG (International Telecommunications Users Group), BEUC (Bureau européen des unions de consommateurs)
** GSMA (GSM Association), ETNO (European Telecommunications Network Operators' Association), Bitkom (German e-communications and new media association)
Source: European Commission, GSMA

Figure 17 – Regulatory association initiatives relating to international roaming in Europe

The first attempt by the European Commission to increase transparency was to create a web site that compares roaming rates...



Home
What is roaming?
Tariffs
SMS
Data
Voice
Roaming regulation
Find your operator
Press pack
Contacts

ACTIVITIES :: Roaming :: Tariffs:: Travelling from Spain

Sample post-paid voice tariffs for travellers from Spain

More Tariffs:
Voice: pre-paid

Lists of typical tariffs charged by operators in Spain when when one of their subscribers travels to a destination country (roaming).

Do you get the best deal? Compare tariffs between operators and over time

Sample tariffs are provided for:

- A four-minute post-paid peak time voice call
- More than one time period: use the timebar to the left of the table to change dates
- Up to 6 different host operators in the destination country
- 2 scenarios: calling home and being called from home

All tariffs are priced in EURO and include VAT.

Calling Home | Being Called From Home

	Roaming In Cyprus			
Your Operator	Cytamobile	MTN		
Movistar	1.61 €	1.61 €		
Orange	1.96 €	1.96 €		
Vodafone	2.28 €	2.28 €		
Yoigo	1.81 €	1.81 €		

	Roaming In France			
Your Operator	Bouygues	Orange	SFR	
Movistar	1.61 €	1.61 €	1.61 €	
Orange	1.96 €	1.96 €	1.96 €	
Vodafone	2.28 €	2.28 €	2.28 €	
Yoigo	1.81 €	1.81 €	1.81 €	

	Roaming In Greece			
Your Operator	Cosmote	Vodafone	Wind	
Movistar	1.61 €	1.61 €	1.61 €	
Orange	1.96 €	1.96 €	1.96 €	
Vodafone	2.28 €	2.28 €	2.28 €	
Yoigo	1.81 €	1.81 €	1.81 €	

	Roaming In Ireland			
Your Operator	3	Meteor	O2	Vodafone
Movistar	1.61 €	1.61 €	1.61 €	1.61 €
Orange	1.96 €	1.96 €	1.96 €	1.96 €
Vodafone	2.28 €	2.28 €	2.28 €	2.28 €
Yoigo	1.81 €	1.81 €	1.81 €	1.81 €

September
September 2005
March 2006
September 2006
March 2007
September 2007
July 2008

- The site, created in October 2005, aims to be a guide for European citizens
- The database is limited:
  - Destination country data is not exhaustive (does not show the full list of European Union countries)
  - Prices are basic rates, ie. promotions or plans with special discounts not included in site
  - Updated every six months
- The site also provides direct links to web pages of European roaming operators

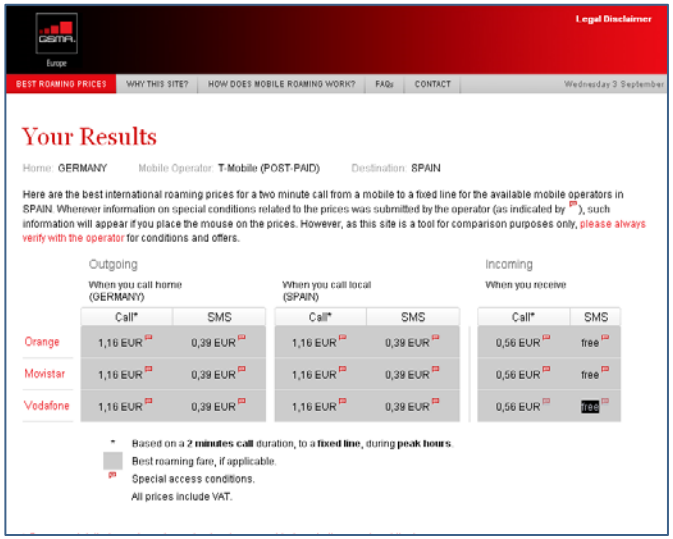
Source: European Commission

Figure 17 - Regulatory association initiatives relating to international roaming in Europe (cont.)

...in response, the GSMA launched a web site with more complete and updated pricing information to show users the more economical alternatives for roaming

- Initiative launched in July 2006 by the GSMA
- Aligned with the code of business conduct, the GSMA Europe was launched in June 2001
- Includes the 27 EU countries
- Shows users, in a simple and dynamic way, the cost of using roaming services

- The web site shows final rates (with tax) for various postpaid and prepaid roaming services:
  - Outgoing calls to country of origin
  - Local calls in the visited country
  - Outgoing SMS to country of origin
  - Outgoing SMS to the visited country
  - Reception of calls and SMS
- The system explains the cases where there is price discrimination between the first and second minute of a call



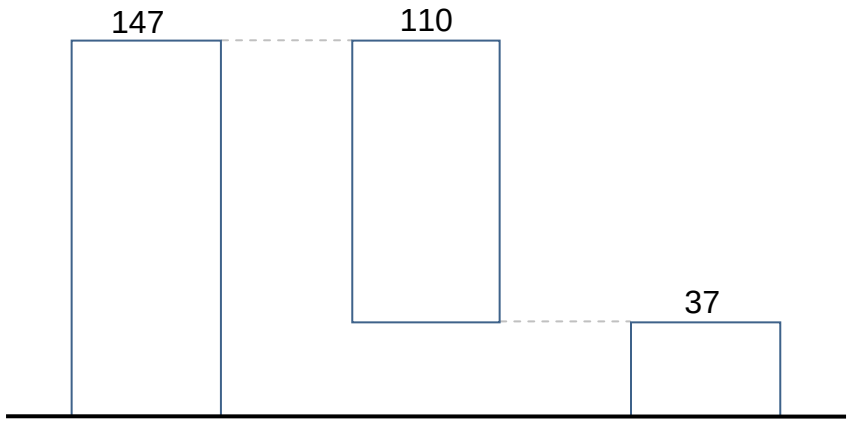
Source: GSMA Europe web site

Figure 18 - EU roaming users and results of the Euorobarometer study

Meanwhile, the European Commission conducted a survey on European roaming, which revealed that many travelers do not use the service due to its high prices

Roaming users in the European Union

2006, Millions of European travelers



- Greatest beneficiaries would be subscribers that don't have corporate plans with special discounts:
  - SME business travelers
  - Frequent leisure travelers
  - Border zone inhabitants

Results from the Eurobarometer survey

November 2006

- Evidence of low roaming service utilization:
  - 15% of European travelers do not carry their mobile during travel, or deactivate it during the trip
  - Only 21% of travelers use SMS when roaming
  - 59% said they would use the service more if the rates were lower
- Lack of transparency, with 43% of users without clear knowledge of applicable prices
- Support by 70% of respondents for EU intervention to lower roaming prices

- Confirmation that prices were high and not transparent to subscribers,..
- ...who preferred not to use or limit use, given the service conditions at that time

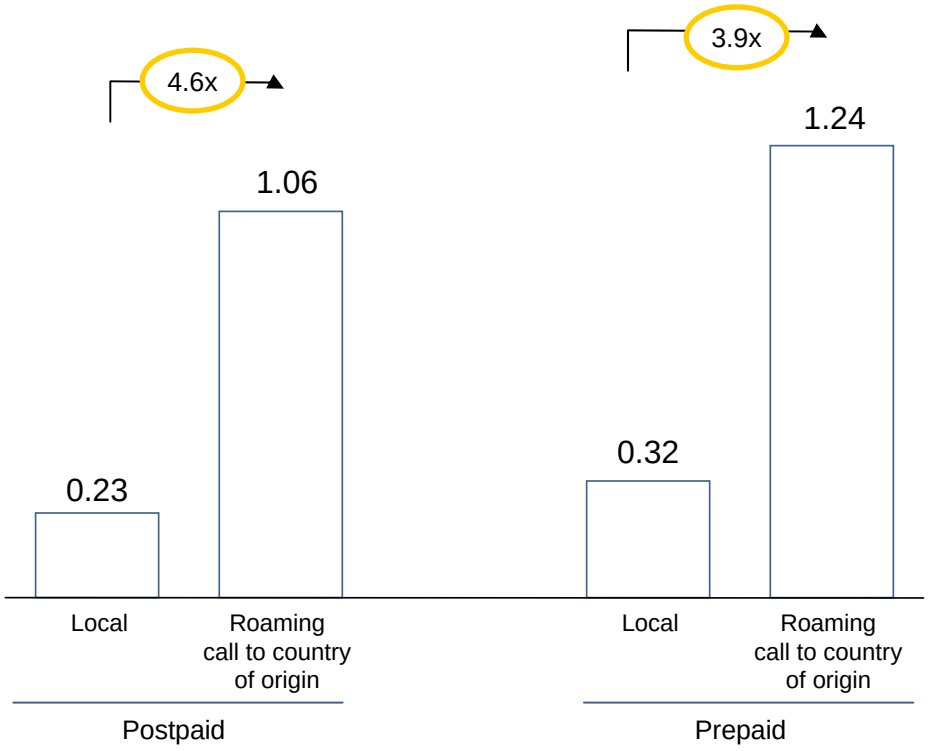
Source: European Commission

Figure 19 - Comparative analysis of prices and costs for outgoing roaming calls in Europe

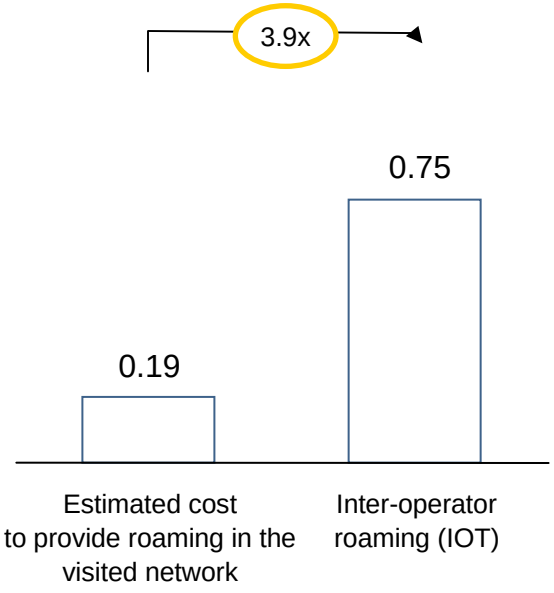
The analysis by the Commission revealed that prices of outgoing roaming calls were significantly higher than domestic prices and not based on actual costs

April 2006, EU average, Euro/min, Excluding tax

Comparison of local retail rates and roaming calls



Comparison of wholesale roaming rates and costs



- Roaming retail rates are ~4 times higher than for domestic calls,...
- ...and are determined by high, arguably unjustifiable, wholesale rates
- The dynamics of free competition were not enough to reduce rates to values closer to costs

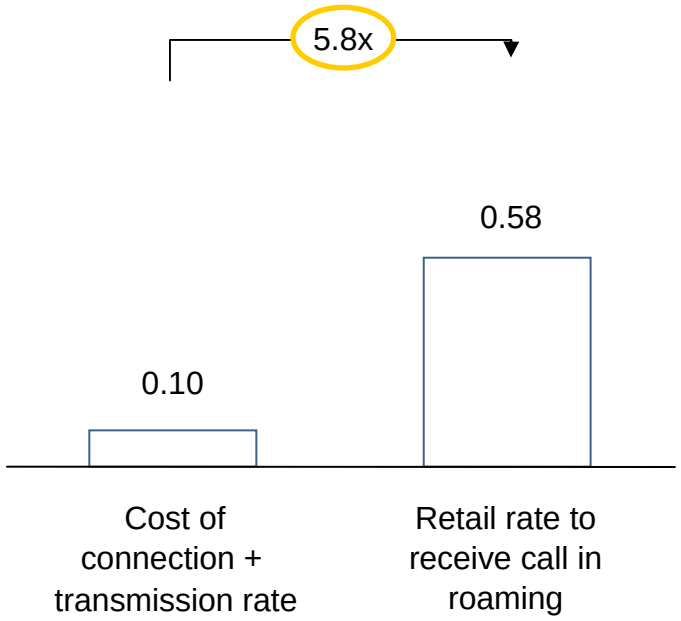
Source: European Commission

Figure 20 - Comparative analysis of costs and prices for incoming roaming calls in Europe

The same pattern of excessively high rates was also shown for calls received in roaming

April 2006, EU average, Euro/min, Excluding tax

Comparison between retail roaming rates and costs



- Unreasonable rates for roaming calls in which the operator must pay:
  - Inter-connection charges to the visited network (generally regulated)
  - International transit tariff
- Retail charges for calls received not dependent on wholesale tariffs (IOT)
- According to the European Commission, operators have an incentive to maintain high prices for calls received to ensure that subscribers make, rather than receive calls

Source: European Commission

On that evidence, the European Commission considered various alternatives before deciding on price intervention...

Selected alternative

Regulatory options considered	Description	Important implications/considerations
Unregulated	• No regulation • Maintain political pressure and promotion of technological development	• Maintains arguably unjustifiable high prices
Self-regulation	• Adoption by operators or code of conduct associations	• TeliaSonera, Orange, Telecom Italia Mobile, Telenor, T-Mobile and Wind proposed to lower inter-operator rates by almost 50% • In general the operators never acknowledged that there had been any problems with roaming pricing
Co-regulation	• General regulatory framework with levels for reduction of wholesale prices • Operators responsible for the transparency of retail rates	• Pricing transparency was one of the main problems • Industry price control could cause problems for competition
Soft law	• Recommendation on international roaming retail rates based on: - Benchmarks - Best practices	• Long process with no guaranteed results
Price intervention	• Intervention in wholesale, retail rates, or both	• Only option with the possibility of immediate results • Less flexibility for operators to determine prices

Source: European Commission, TeliaSonera, GSMA

...looking to simultaneously determine retail and wholesale rates, thus facilitating implementation and avoiding any "price squeeze"

Selected alternative

Object of regulation	Variations	Description	Impact
Only inter-operator tariffs (IOT)	• N.A.	• Maximum rate based on wholesale termination rates • Control over transfer to retail rates	• Difficulty in ensuring that reductions in IOTs would be passed on to retail level
Only retail rates	• N.A.	• Maximum retail rate	• Could result in an obligation for small operators to offer roaming service with rates below cost ("price squeeze")
IOTs and retail rates	• Main domestic rate	• Roaming rate should be comparable to domestic rates: - Local call in roaming similar to local rate - Call to country of origin similar to international long distance	• Difficulty of implementation
	• Main rate in the visited country	• Retail roaming rates comparable to domestic rates of the visited country • IOT: established as a multiple of mobile termination rates	• Difficulty of implementation
	• Main rate in the European market	• Retail rates have a maximum mark-up on IOTs	• Easy implementation and monitoring • Avoids the "price squeeze"

In the final version of the regulation the IOTs and retail rates were standardized for the 27 member states

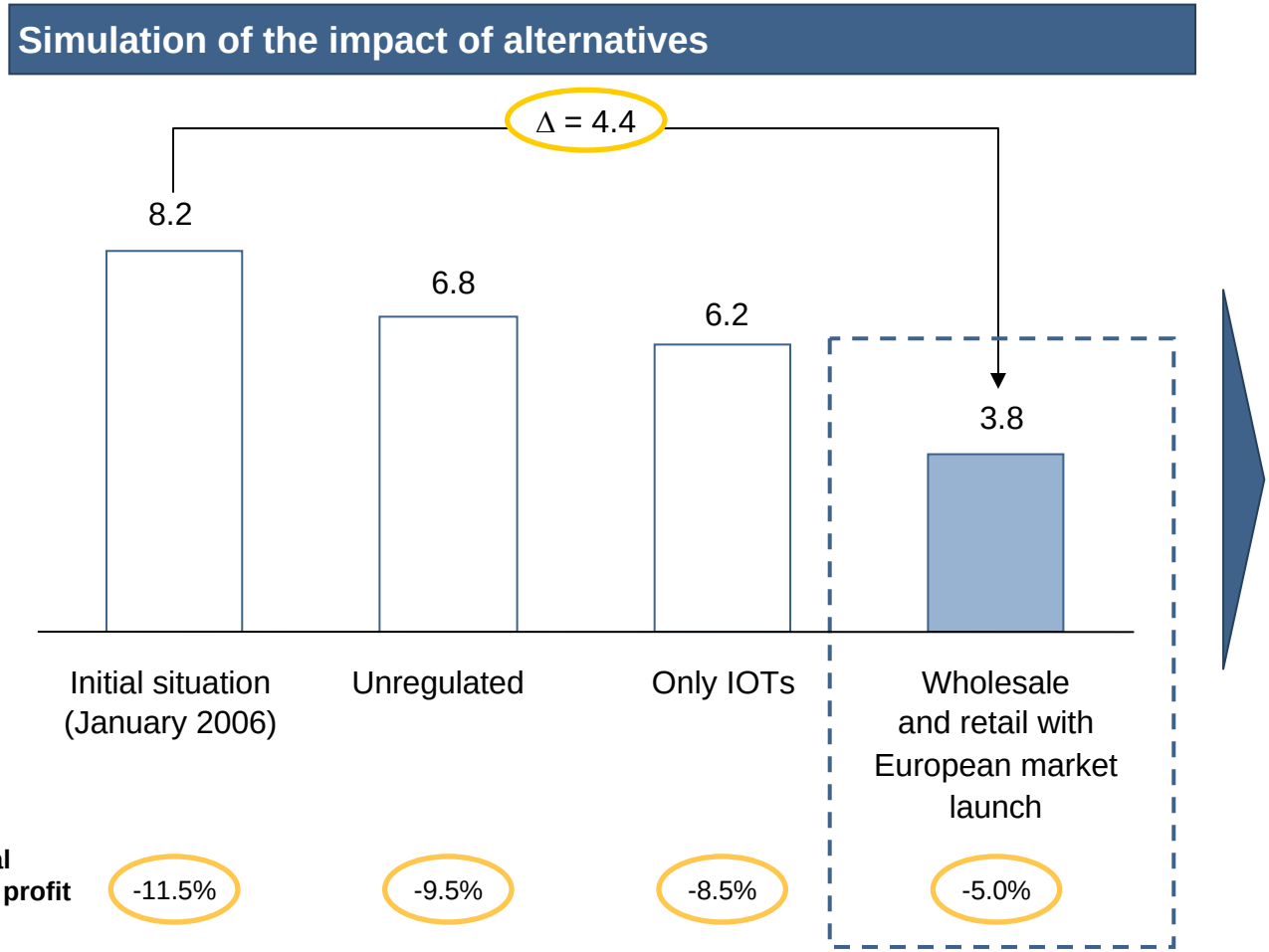
Source: European Commission

Figure 21 - Simulation of the impact of alternatives to regulatory intervention for rates in Europe

Finally, the European Commission decided to regulate wholesale and retail rates to generate greater benefits for users in terms of potential savings

2006 Euro billions

Selected alternative



- The proposal by the European Commission estimated a reduction of earnings by more than 4 billion Euros for operators
- ... which translates into equivalent savings for European roaming consumers within the EU
- Although the estimated 8.2 billion Euro market faced criticism from the industry, where the GSMA argued that the market was overestimated by revenue duplication concepts and incomplete information
- Finally there are additional potential benefits not covered in this analysis, resulting in an increased use of roaming for the lowest cost of service

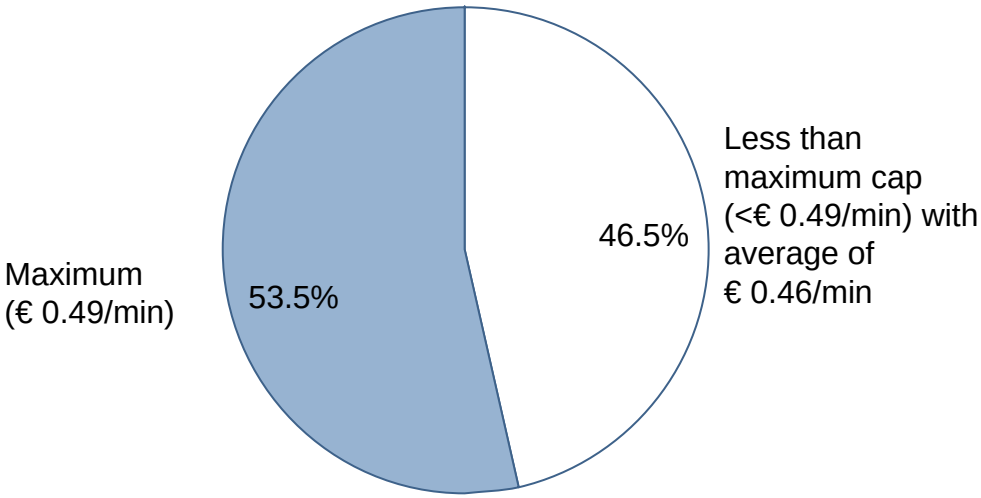
Source: European Commission, BBC, GSMA

Figure 22 - Rates for outgoing and incoming calls after introducing the Eurotariff

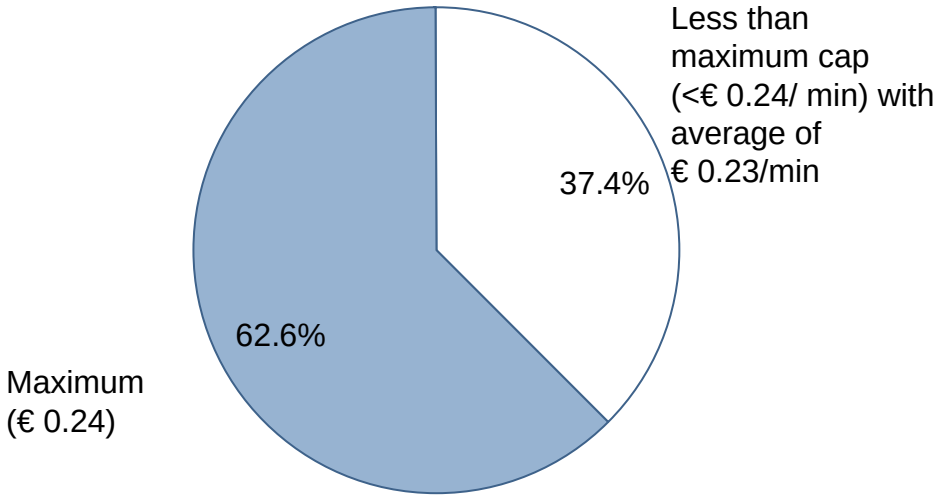
The pricing regulations were met with full compliance regarding implementation, with several cases of rates below the cap set by the Eurotariff

October 2007, Percentage of European operators

Rates for outgoing calls



Rates for incoming calls

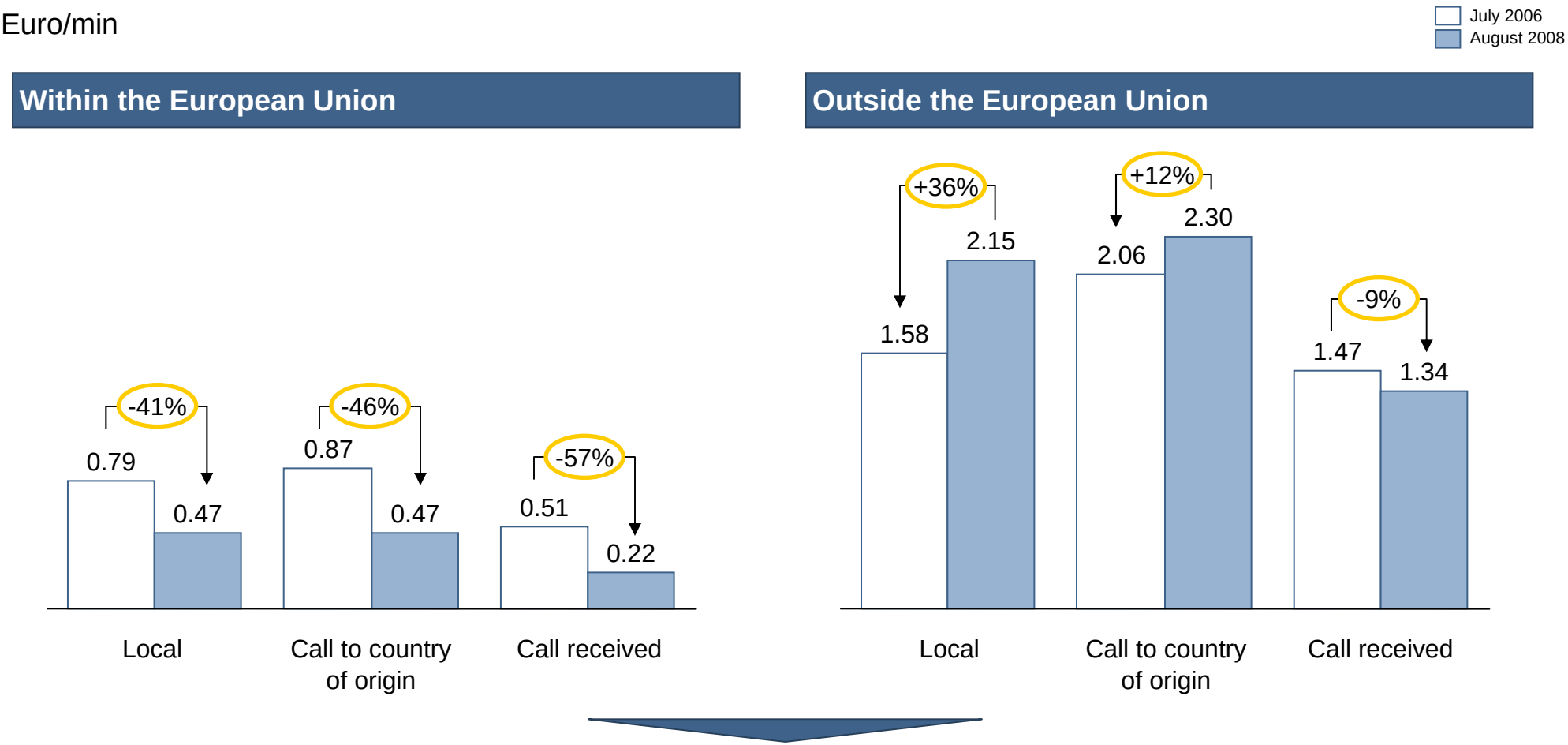


Source: European Commission

Figure 23 - Rates for roaming calls before and after the Eurotariff

European users have benefited from significant price reductions (40-60%) for international roaming calls within the European Union

Euro/min



The tariff reductions for roaming services within the EU was partially offset by rate increases for other regions

Note: Rates vary from those presented in the European roaming market section; this section only considers the European Union countries
Source: European Commission

Figure 24 - Projection of tariff regulation in Europe for SMS and data for 2008

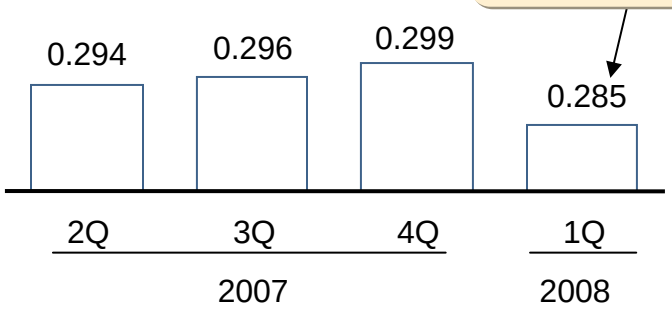
Article 11 of EC regulation 717/2007 defines that in 2008 data and SMS roaming will be analyzed and additional regulations will be considered if necessary

Evolution of prices

SMS

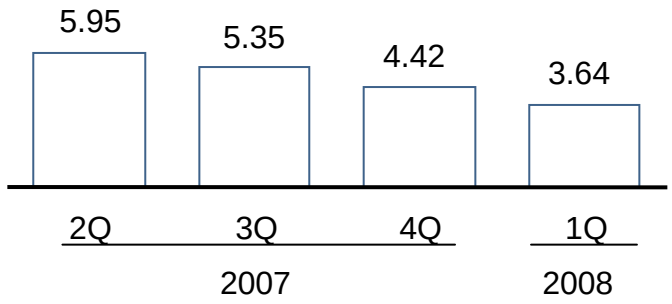
Euro/message, Average

In February 2008, Viviane Reding called for the voluntary reduction of prices



Data

Euro/MB, Average



Comments by the European Commission

- SMS roaming price:
  - They cost more than ten times the price of domestic SMS
  - Remain stable, at around ~0.29 Euro/message, even after applying reductions
  - The additional cost of SMS in roaming is negligible (~0.008 Euro/message*)
  - Maximum rate according to the ERG should be between 0.11 and 0.15 €/ message

- Data roaming prices are falling but are still high
- The "bill shock" is a problem because of:
  - High price variation (from 0.25 to 16 €/MB)
  - Prices set by Megabyte, unit unknown to subscribers, who tend to encounter flat rates in domestic markets

- It is expected that the European Commission proposes:
  - Regulation of wholesale and retail rates for SMS roaming services
  - Transparency measures for data roaming

* According to the study of the Danish regulator

Source: European Commission, ERG

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- **Chapter I: Study of international roaming markets**
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    - . Roaming market
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    - . **Regional alliances**
  - Africa and the Middle East
  - Asia-Pacific
  - Analysis of inter-operator roaming tariffs
  - Technology
  - Tax issues

- Chapter II: Comparison of the international and South American context

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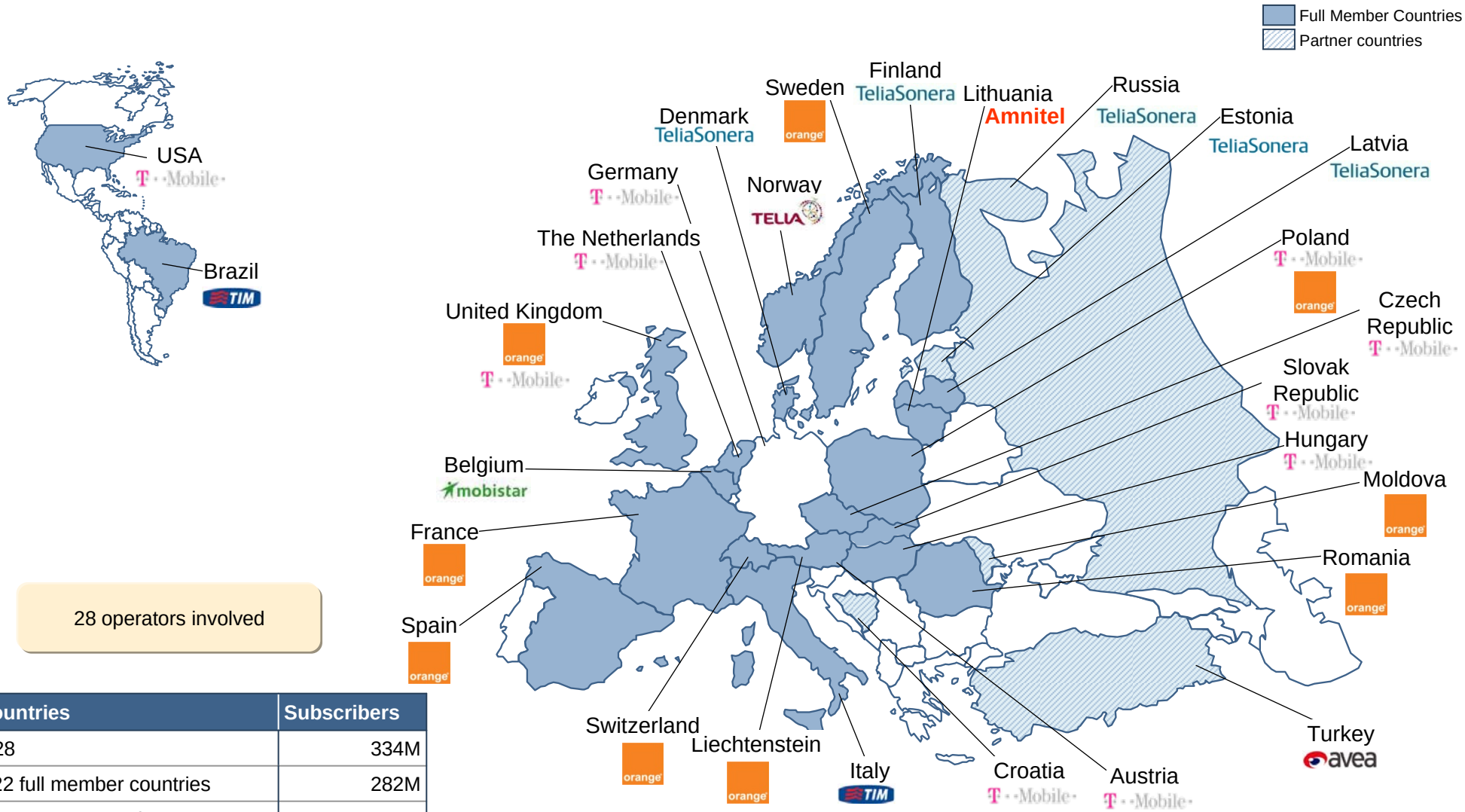
Figure 25 - Regional Alliances: FreeMove - Coverage and member operators

The FreeMove alliance is led by 3 major European groups (Orange, T-Mobile and TIM), and operates in 27 countries (25 in Europe and 2 in the Americas) ...



28 operators involved

Countries	Subscribers
28	334M
22 full member countries	282M
6 partner countries	52M

Source: FreeMove web site

...with a range of roaming services targeted at multinational corporate customers

		Description
Type of alliance		• Alliance with equitable representation among the full members • Board consisting of vice-presidents of full member operators, with rotation every 6 months • Main full members are T-Mobile, Orange and TIM • Established in response to Vodafone alliance
Brand and positioning		• FreeMove brand not widely known • Operators advertise the services under their own brand or co-brand (own + FreeMove) • Services orientated to corporate clients of European multinationals
Main features of the offer	**Convenience**	• Virtual environment simulating the experience of domestic service: - Caller ID - Special access code for voice mail and customer service - Automatic adjustment of international codes from the contact list in the mobile phone
	Special prices	• Discounted rates for calls between users of the same company • Prices standardized in 6 tariff zones • Flat rate for data roaming service (Blackberry)
	Global management	• Global account manager for multinationals • Consolidated service usage reports for users in various countries (employees of subsidiaries of multinational companies)

Telefonica (Spain) was one of the founders of the alliance, but the European Commission forced it to leave after the acquisition of O2

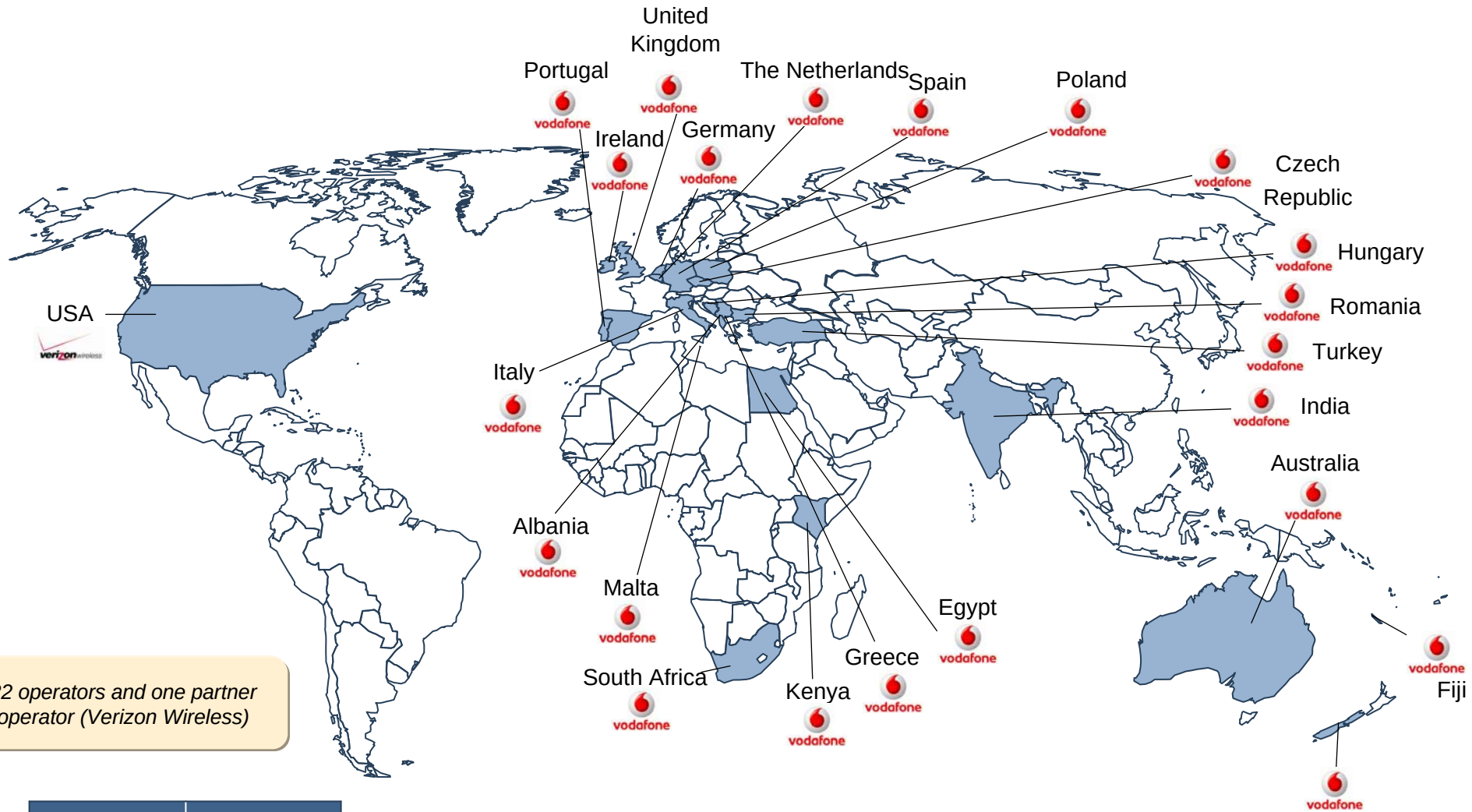
FreeMove has fought to make a unified brand, but due to its base of operators, it will continue to be unrecognizable to users

Functionality also available for individual customers

Source: FreeMove, T-Mobile, TIM, Orange

Figure 26 - Regional Alliances: Vodafone - coverage and subsidiary operators and affiliates of the Vodafone Group

The Vodafone group formed a roaming alliance among its 22 subsidiary and affiliate operators...

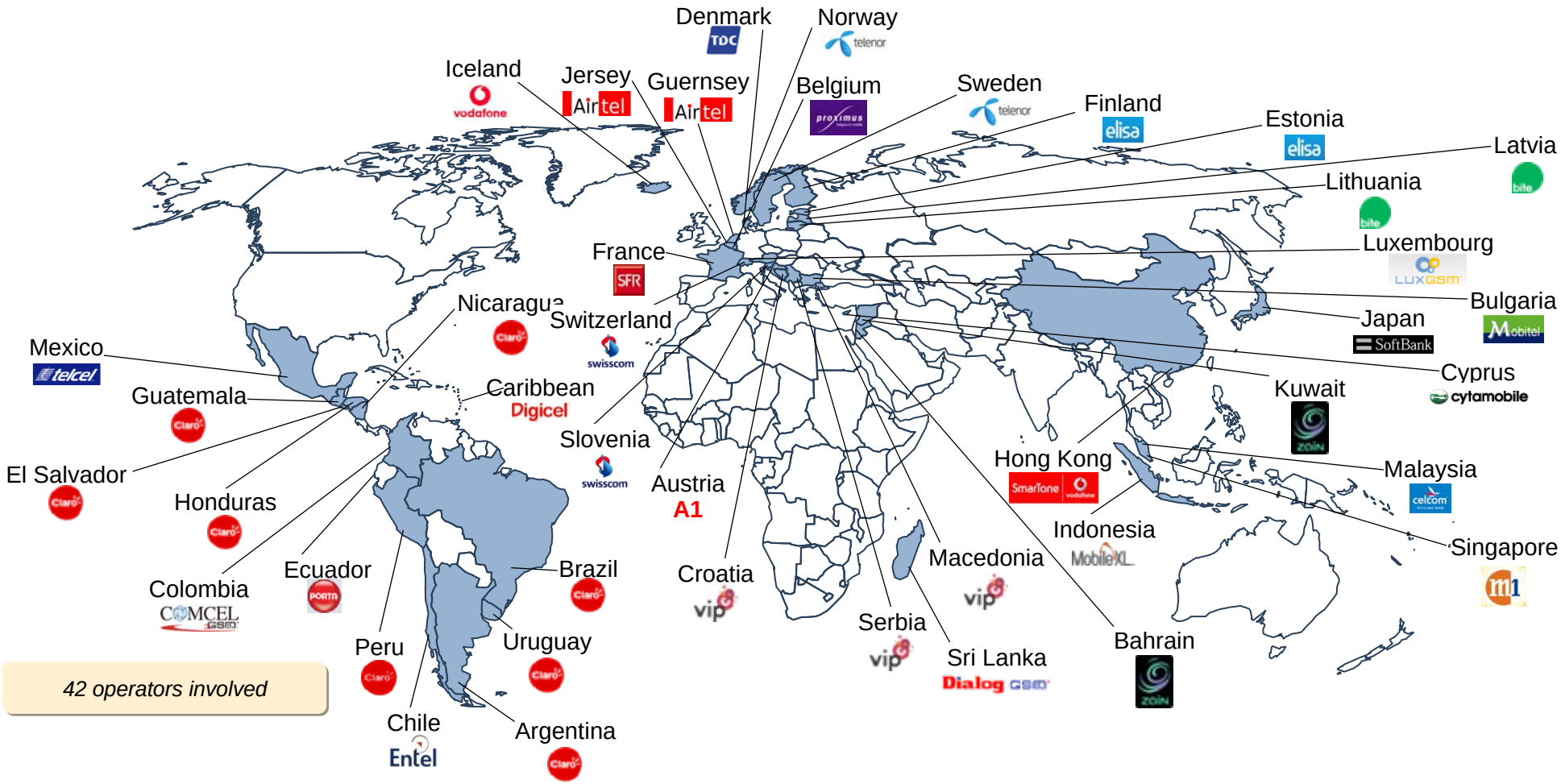


22 operators and one partner operator (Verizon Wireless)

Countries	Subscribers
• 22	• 241M

Figure 27 - Regional Alliances: Vodafone - coverage and operators associated with the group

...incorporating a further 42 partners in countries where it does not have an actual presence, doubling coverage in terms of subscribers reached



Countries	Subscribers
• 42	• 257M

Total of 498M subscribers reached in the Alliance, including associated operators and Vodafone subsidiaries

Vodafone offers a wide range of voice and data roaming services for both the individual and corporate segments

		Description
Type of alliance		• Alliance is led by the Vodafone business group • The partner operators (eg. Claro/Telcel/Comcel, Softbank, SFR, etc.) benefit from: - Preferential IOTs for its roaming customers on alliance member networks - Possible joint purchase of handsets with reduced unit cost or sale of Vodafone branded products (eg. Vodafone Data Card)
Brand and positioning		• Vodafone brand used by affiliated operators or subsidiaries of the group (associated operators rarely use it as a co-brand) • Vodafone client-oriented services in the individual (prepaid and postpaid) and corporate segment
Main features of the offer	**Convenience**	• Special access code for: - Voice mail - Customer service - Credit prepaid in roaming
	Special prices	• Voice and SMS roaming package (with discounts from 10 to 30%): - "Vodafone World: with discounted fixed rates for 5 geographical zones - "Vodafone Passport" with domestic rates in roaming . The first minute is charged at a fixed value (€0.75 - €2.00 depending on the country of origin) . the remaining minutes are billed at the same rate as domestic calls • Data Roaming Package: "Vodafone Mobile Broadband" with flat rates for daily or monthly use (traffic limited to 50MB and 200MB respectively)
	Global management	• Global account manager for multinationals • Coordinated customer Service

- *Reaction to criticism from the European Commission about the lack of transparency of rates per megabyte*
- *Generally only applies to data cards and USB modems*

Source: Vodafone

Document contents

Study of Africa and the Middle East: Executive summary

Socioeconomic situation

- Africa and the Middle East have large economic disparities, despite their cultural similarities and geographic proximity
- At the regional level, there is a strong concentration of revenues in the core countries:
  - 4 African countries (South Africa, Egypt, Nigeria and Algeria) account for 52% of GDP and 33% of the population
  - In the Middle East, Saudi Arabia and Iran account for 50% of the population and 49% of GDP
- Africa has low levels of per capita GDP compared to South America (USD 5,000 vs USD 10,000)...
- ... while the Middle East presents average per capita GDP levels similar to South America, although with high income dispersion among countries in the region
- The age distribution of the population of Africa and the Middle East has a similar profile to South America, with over half the population under 30 years old
- Intra-regional travel in Africa has a 2% penetration level, reaching values similar to those of South America (3%)
- In the Middle East, intra-regional travel is much more significant, with a penetration level of 9% of the population

Telecommunications market

- Market characteristics:
  - The African mobile market shows strong growth (49% annually, on average), but still has a low level of penetration (29% of the population)
  - In the Middle East, the mobile market has also shown strong growth (41% annually), reaching a penetration of more than twice that of the African market (61% of the population in 2007)
  - Prepaid service was the largest driver of mobile service growth in Africa, at 52% annually, and represented 95% of all lines in 2007...
  - ...and in the Middle East, prepaid service was also the biggest driver of growth (54% annually) but is still a smaller percentage of total lines when compared to the African market (69% in 2007)
  - Since 2003, the ARPU in Africa has declined sharply, by 10% annually, partly due to the strong expansion of services targeting lower-income users ...
  - ...while in the Middle East ARPU had decreased slightly, at only 3% annually, in part due to the appreciation of local currencies

Study of the Africa and the Middle East: Executive summary (cont.)

Telecommunications market (cont.)	• Market characteristics (cont.): - In Africa, GSM is the dominant technology, used in 97% of handsets in 2007, and 100% of handsets in several major countries in the region - In the Middle East, GSM is also the dominant technology (94% in 2007), and its third generation successor (UMTS) has also grown strongly in recent years, reaching 5% of the total in 2007 • Market regulation: - AREGNET is the leading association of national regulators in the region, covering 19 countries in Africa and the Middle East, and with a specialized working group for international roaming . In Africa there are also several regional regulatory associations that share similar objectives for the development of telecommunications and partially overlapped coverage . The participation of these regional regulatory associations on the African international roaming market has been limited
Roaming market	• Annually, 26M trips utilizing roaming services are made by African and Middle Eastern travelers, which represents 55-60% of the total trips in the region • The rates for roaming calls in the region are similar to those of South America,... • ..while for SMS while roaming, the rates in Africa and the Middle East are less than those in South America • Roaming revenue from African and the Middle Eastern travelers using roaming (outbound) reached USD 2.3 billion, with 75% generated in the Middle East
Roaming initiatives by ARGNET and other regulators	• In 2005, AREGNET created a specialized working group focusing on international roaming rates, which conducted a regional study on roaming, and proposed regulatory initiatives in 2008 to reduce rates • In 2007, in response to the AREGNET study, the GSMA created a web site with the roaming rates for Arab countries, similar to that launched in Europe in 2006, to improve the communication of rates • In 2008, AREGNET defined an innovative proposal to set maximum prices for roaming calls, but it faces several coordination challenges for its practical implementation

Study of Africa and the Middle East: Executive summary (cont.)

Type of alliance

- Zain developed "One Network", the largest roaming alliance in the region:
  - Zain is a mobile operator in Kuwait, which in recent years has had strong growth in the Middle East and Africa ...
  - ...reaching ~43M customers, mostly prepaid, and with ARPU levels and similar to those of South America
  - The One Network alliance covers 15 countries in Africa and the Middle East, where Zain operates under the same brand name
  - The One Network initiative offers roaming at local prices among several of its subsidiaries with a convenient offer and high service availability for prepaid subscribers
- The One Network alliance had a high impact in the region in terms of:
  - Strong positioning for advantage in markets where Zain operates
  - Competitive response by forming similar roaming alliances, which are still in the process of expansion
  - Support from the governments in the region, to facilitate investment and enable international consolidation of the operations between the various Zain subsidiaries
- Since the launch of One Network, two new alliances have emerged in the region: Etisalat in MENA and Kama Kawaida in East Africa ...
- ... with offerings similar to those of Zain, focusing on local rates for calls and SMS while roaming on networks from operators within the alliance

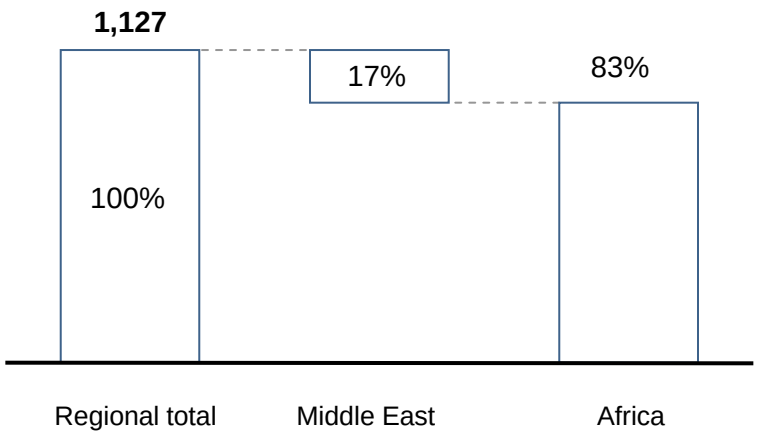
Document contents

Figure 28 - Analysis of population and nominal GDP in Africa and Middle East

Africa and the Middle East have large economic disparities despite their cultural similarities and geographic proximity

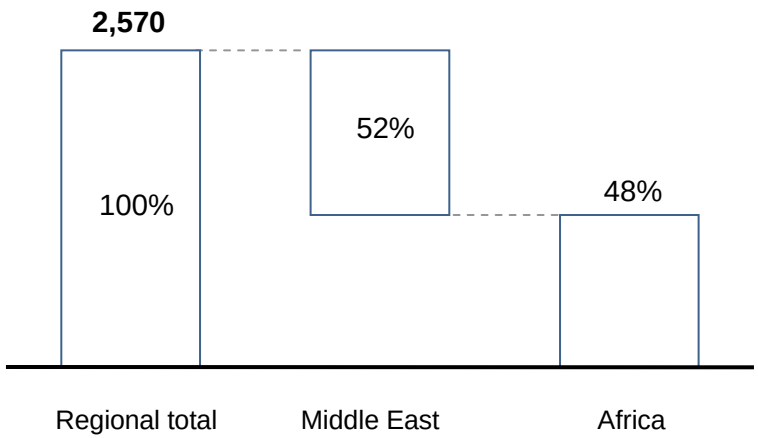
Population

2007, Millions of people, Percentage



Nominal GDP

2007 USD billions



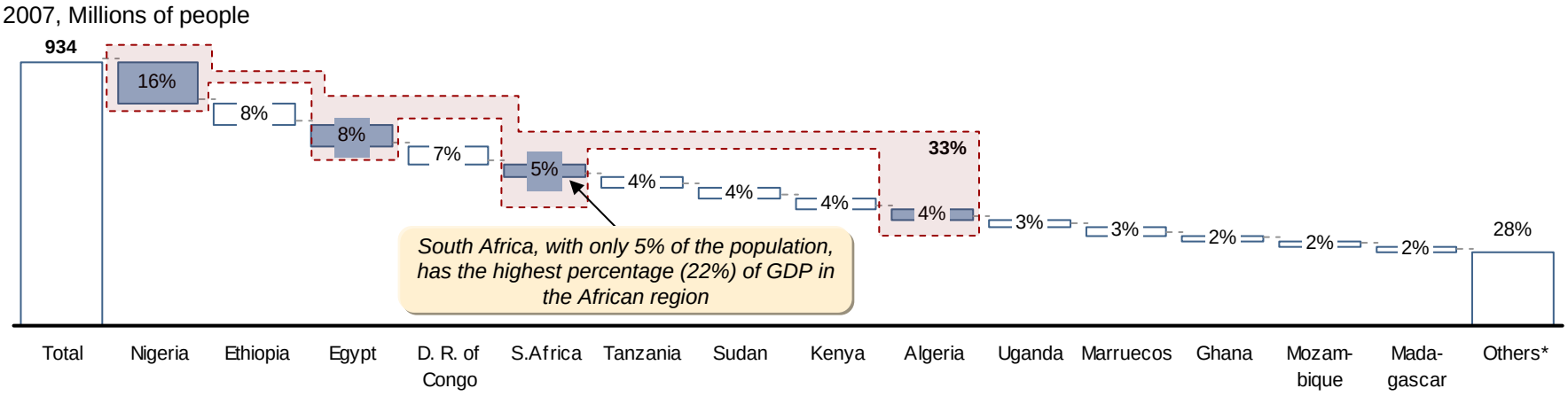
% Worldwide	Regional total	Middle East	Africa
Population	20%	3%	17%
Nominal GDP	8%	4%	4%

- Africa and the Middle East have large disparities, with Africa accounting for more than 80% of the population but less than 50% of GDP
- For the purpose of this study, however, it is useful to consider the following:
  - There are strong cultural, religious and commercial links between the two regions
  - Several domestic mobile operators are active at the regional level (eg. Zain, Etisalat)

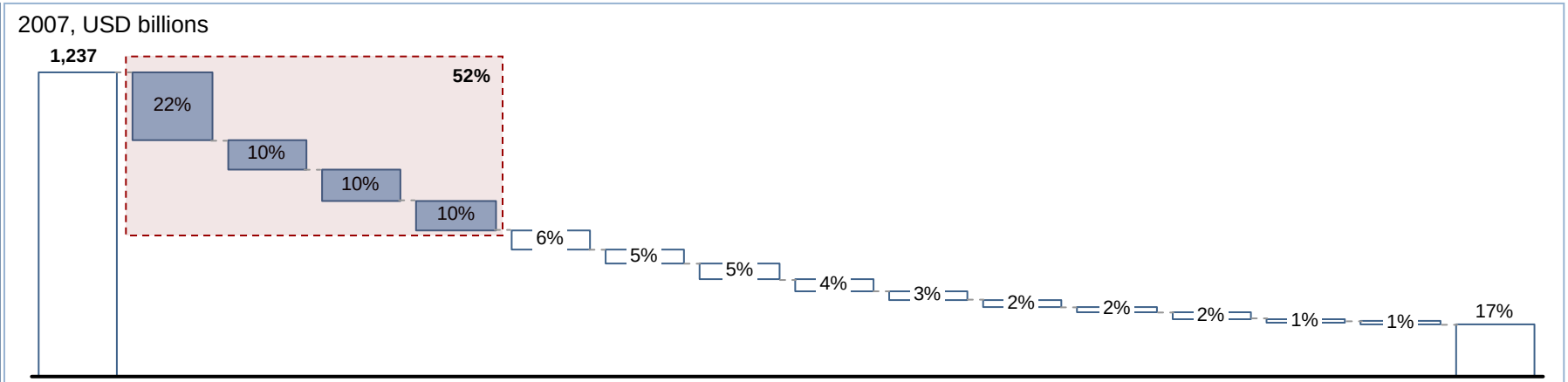
Figure 29 – Analysis of population and nominal GDP by country, according to proportion of Africa total

4 African countries (South Africa, Egypt, Nigeria and Algeria) account for only 33% of the population but 52% of GDP

Population



Nominal GDP



* Cameroon, Ivory Coast, Angola, Burkina Faso, Malawi, Niger, Mali, Senegal, Zambia, Zimbabwe, Tunisia, Guinea, Chad, Rwanda, Benin, Burundi, Togo, Libya, Sierra Leone, Eritrea, Central African R., Liberia, D. R. of Congo, Mauritania, Lesotho, Namibia, Guinea-Bissau, Gambia, Botswana, Gabon, Mauritius, Equatorial Guinea, Swaziland, Djibouti, Comoros, Cape Verde, Sao Tome, Seychelles

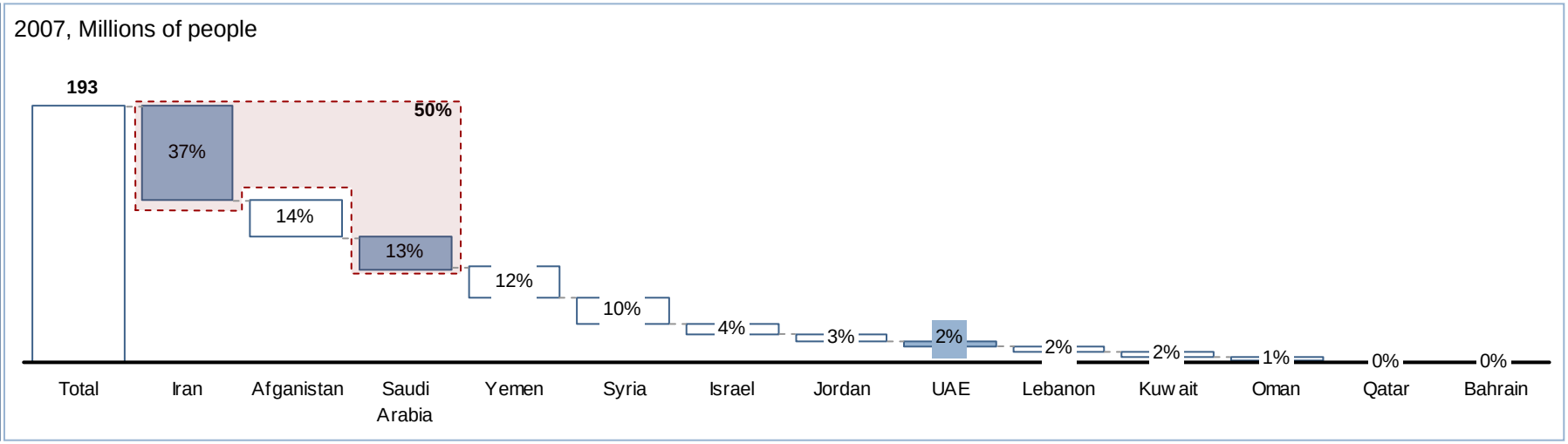
** Ghana, Tanzania, Botswana, Uganda, Zambia, Senegal, Gabon, D. R. of Congo, Equatorial Guinea, Mozambique, Madagascar, Mauritius, Mali, Burkina Faso, D. R. of Congo, Namibia, Chad, Benin, Guinea, Niger, Malawi, Rwanda, Mauritania, Swaziland, Togo, Central African R., Lesotho, Sierra Leone, Eritrea, Cape Verde, Burundi, Djibouti, Seychelles, Liberia, Comoros, Gambia, Guinea-Bissau, Sao Tome

Source: IMF, World Economic Outlook Database, October 2007

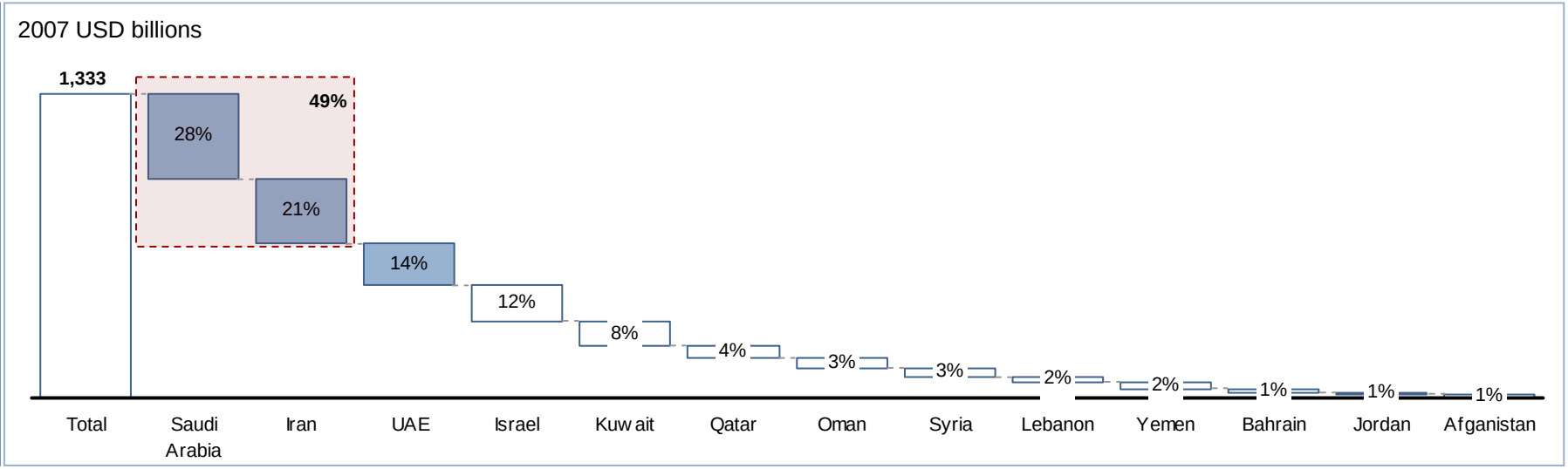
Figure 30 - Analysis of population and nominal GDP by country, according to proportion of Middle East total

In the Middle East, Saudi Arabia and Iran account for 50% of the population and 49% of GDP

Population



Nominal GDP



Source: IMF, World Economic Outlook Database, October 2007

Figure 31 - Evolution of PPP adjusted per capita GDP in Africa and country ranking for 2007

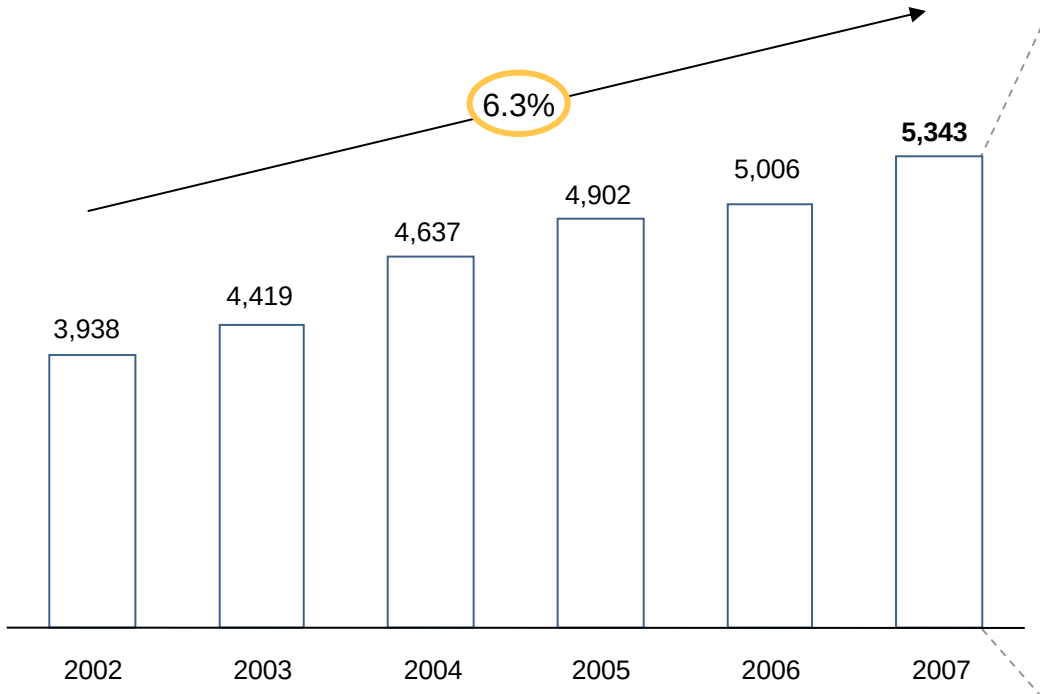
Africa has low levels of per capita GDP compared to South America (USD 5,000 vs. USD 10,000)...

2007

CAGR 02-07

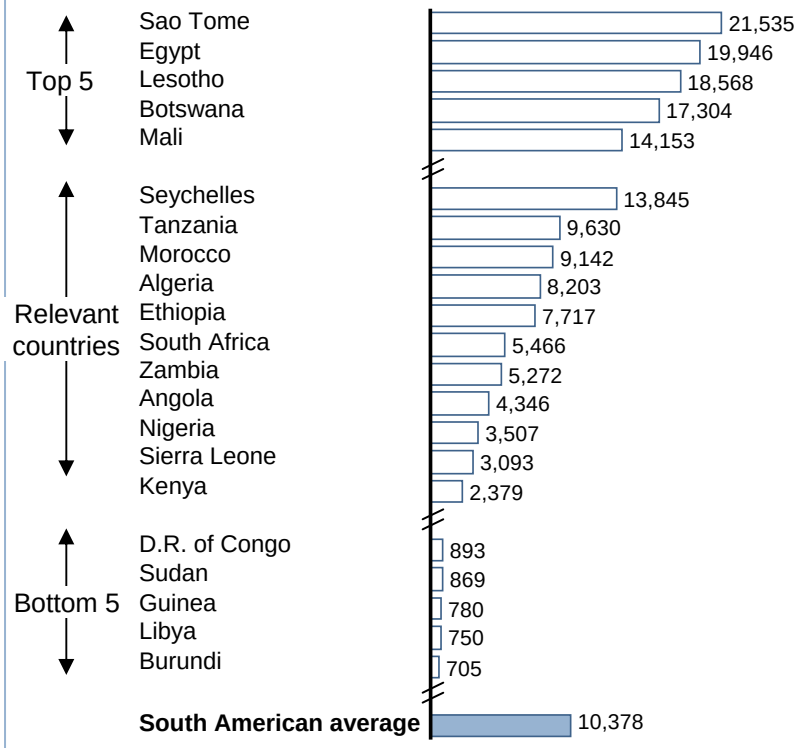
PPP* adjusted per capita GDP in Africa

Nominal USD



Country ranking, Africa

2007, Nominal USD



* Purchasing power parity

Source: IMF, Work team analysis

Figure 32 - Evolution of ARPU for mobile services in the Middle East and country ranking for 2007

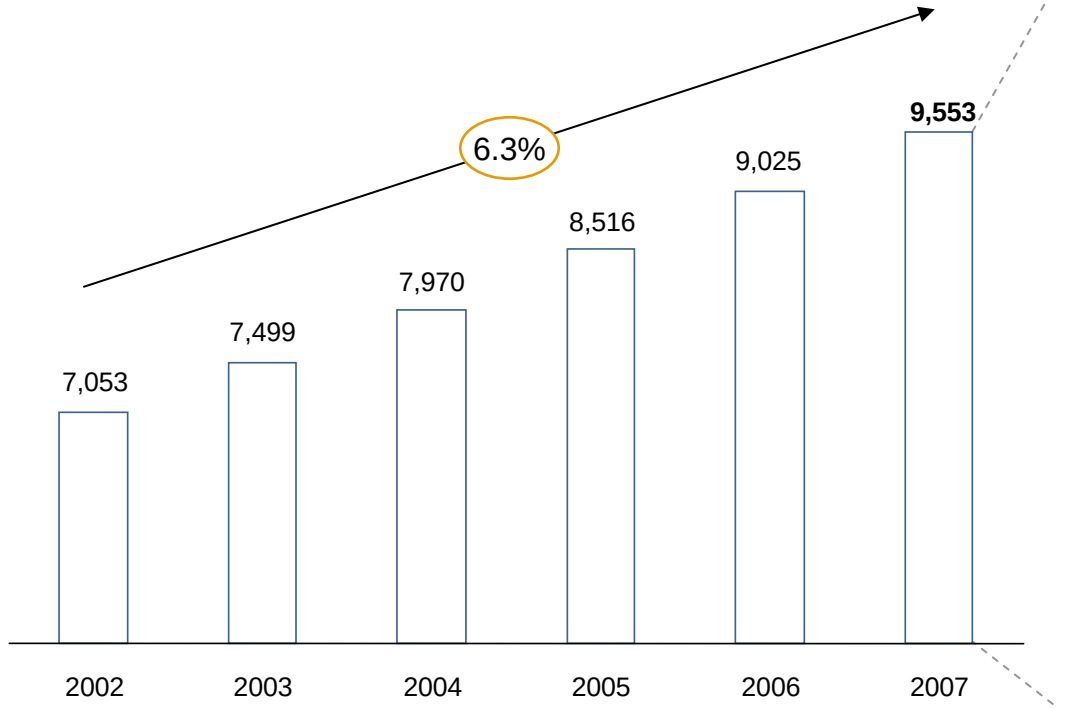
...while the Middle East presents average per capita GDP levels similar to South America, although has a high dispersion of income among countries in the region

2007

CAGR 02-07

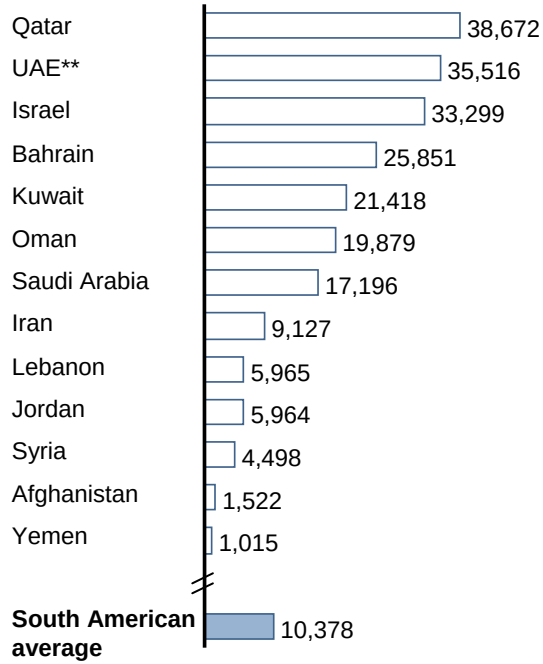
PPP* adjusted per capita GDP in the Middle East

Nominal USD



Country ranking, the Middle East

2007, Nominal USD

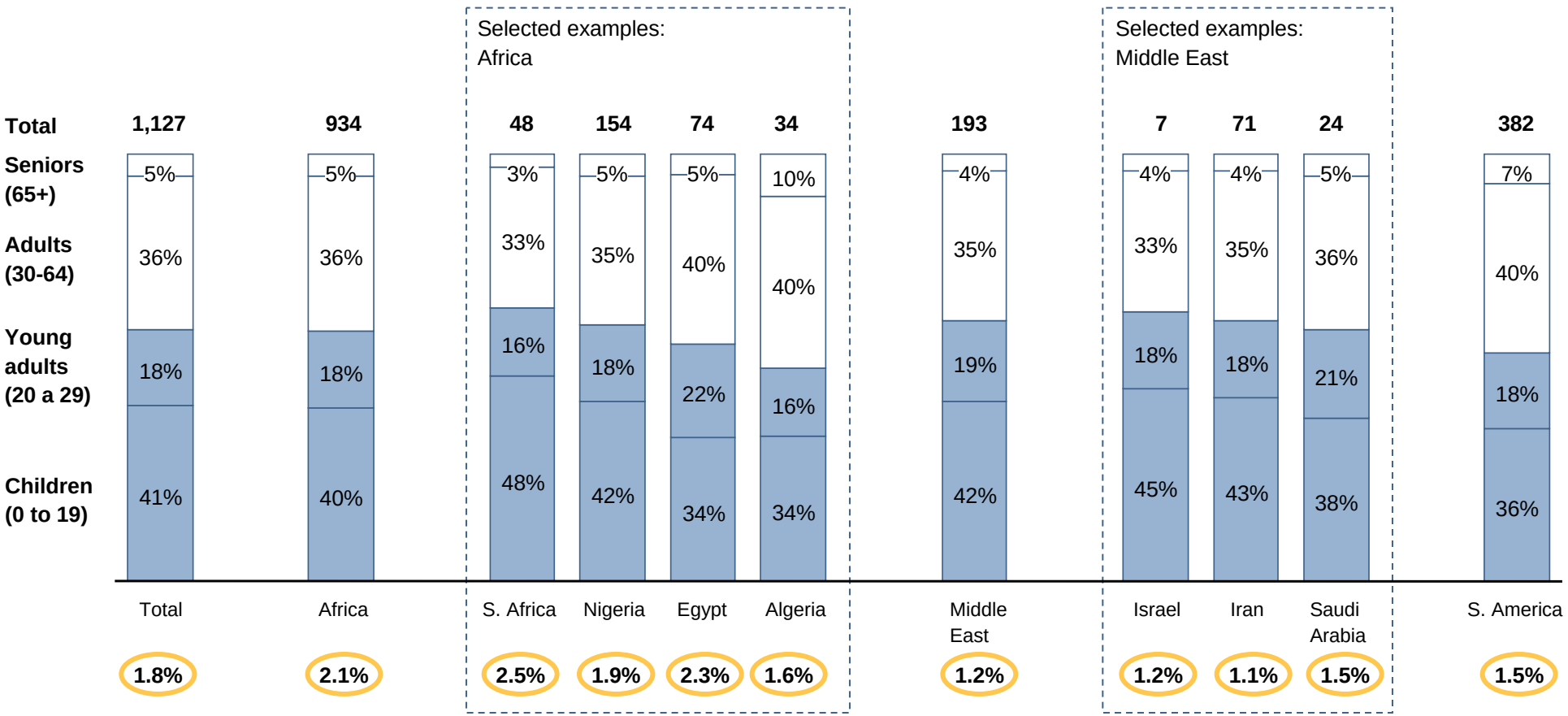


* Purchasing power parity
** United Arab Emirates
Source: IMF, Work team analysis

Figure 33 - Analysis of population by age for Africa and the Middle East and selected countries

The population distribution of Africa and the Middle East has a similar profile to that of South America, with more than half the population under 30 years old

2007, Millions of people, Age group, Percentage

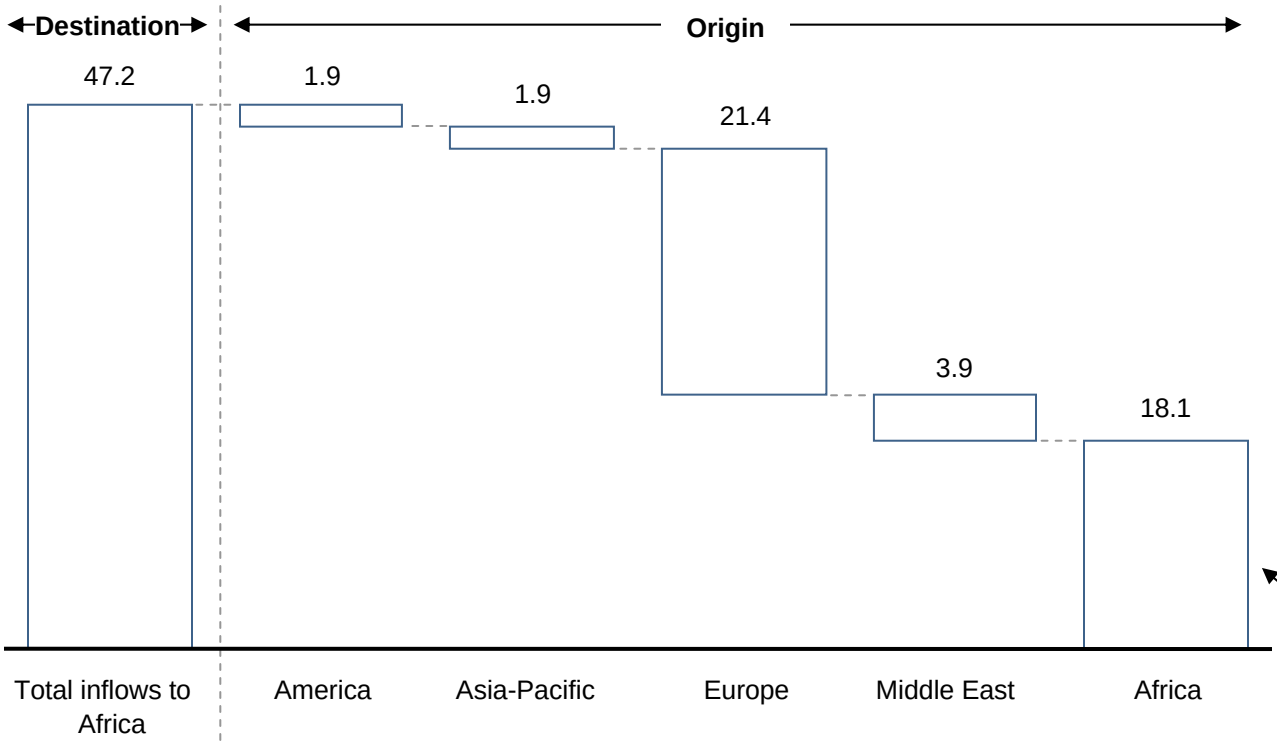


Source: EIU, Agency for National Statistics, Work team analysis

Figure 34 - Analysis of travel inflows to Africa, by region of origin

Intra-regional travel* in Africa has a 2% penetration level**, similar to that in South America (3%)

2006, Millions of travelers per year



- Intra-regional travel in Africa represents 38% of total travel in the region
- The largest percentage of travel in Africa, at 45% of the total, comes from European travelers

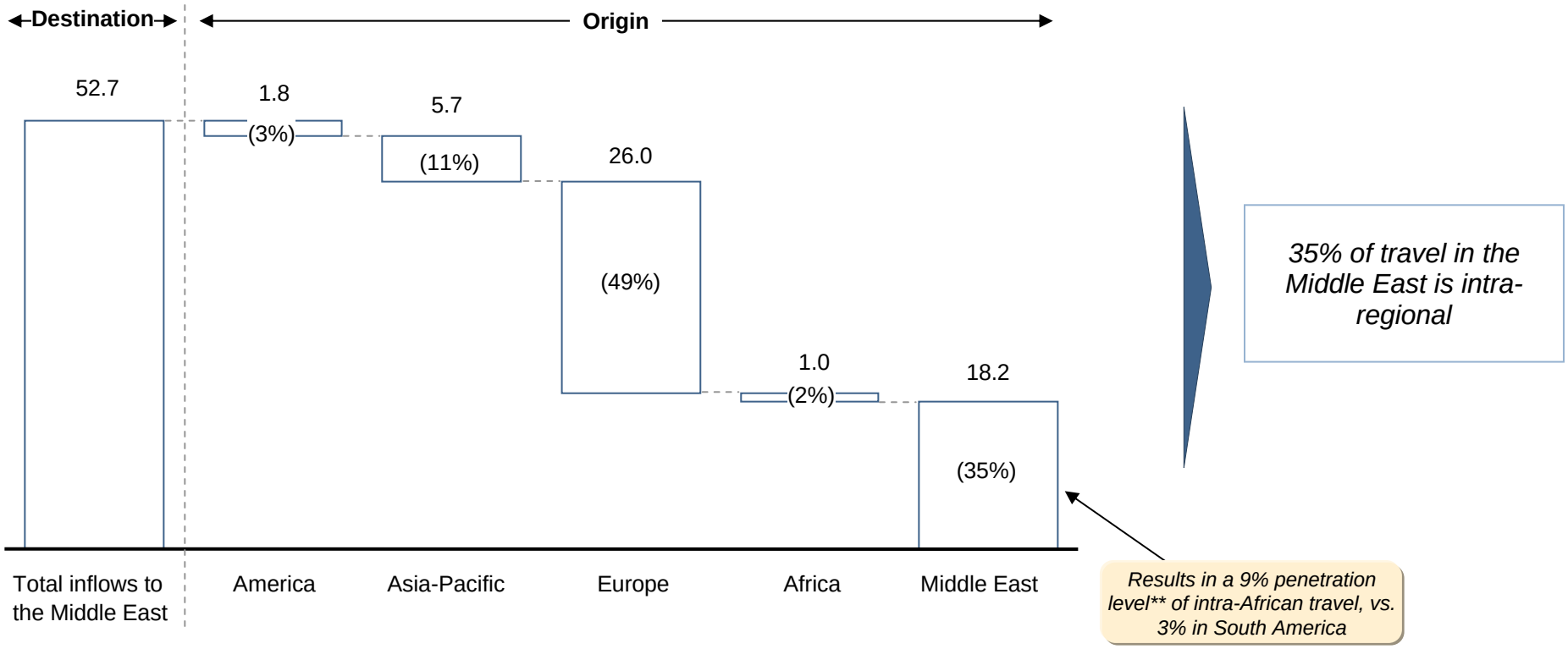
*Results in a 2% penetration level** of intra-African travel, vs. 3% in South America*

* Annual visits to countries within the region
** Percentage of intra-regional travel over population in the region
Source: WTO, Work team analysis

Figure 35 Analysis of travel inflows to the Middle East, by region of origin

In the Middle East, intra-regional travel* is much more significant, with a penetration level** of 9%

2006, Millions of travelers per year



* Annual visits to countries within the region
** Percentage of intra-regional travel over population in the region
Source: WTO, Work team analysis

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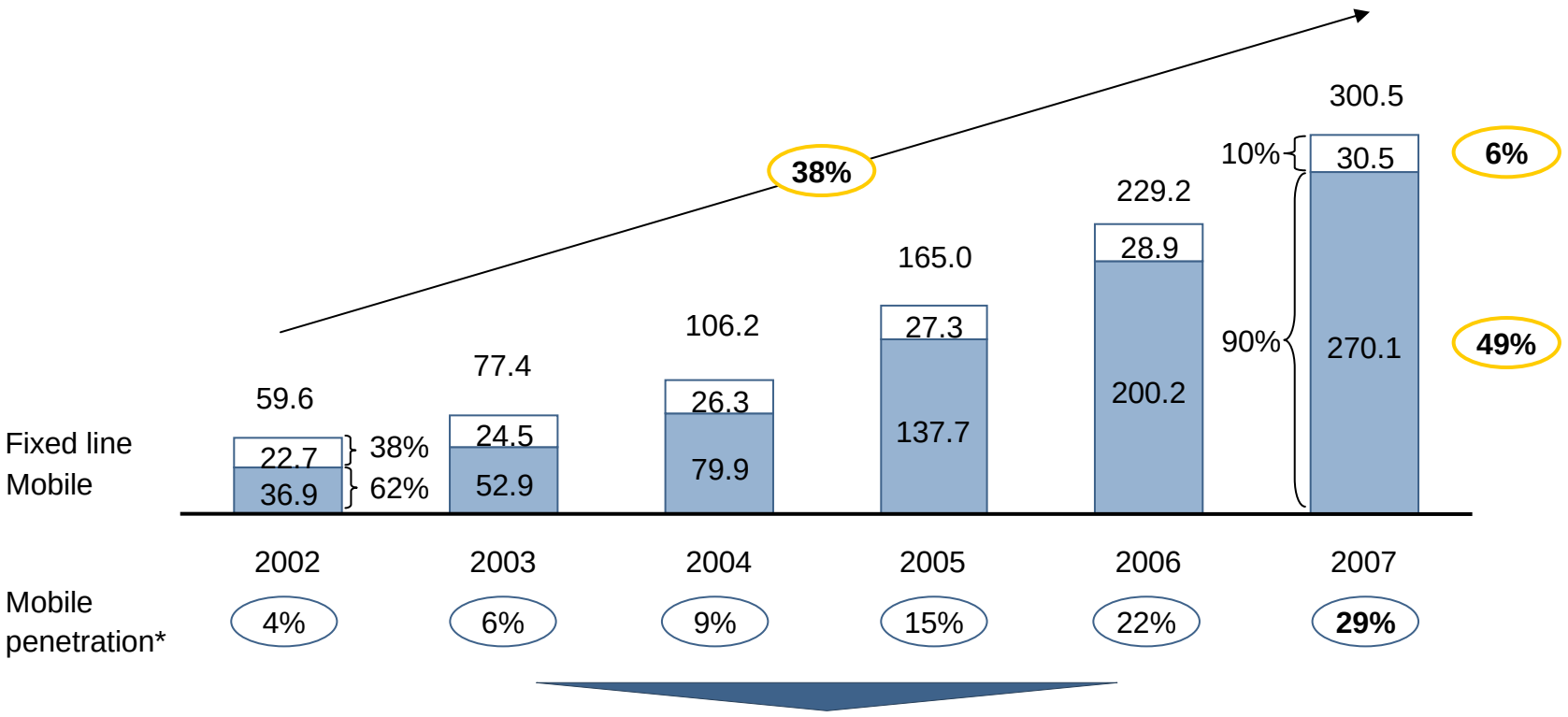
Figure 36 - Analysis of the evolution of fixed line and mobile subscriptions in Africa

The African mobile market has shown strong growth (49% annually, on average), but still has a low level of penetration (29% of the population)

Millions of subscriptions



- Given the regional characteristics, the mobile market represents 90% of all subscribers with annual growth of 49% (2002-2007)
- Mobile service coverage, however, reaches only 29% of the population

* Mobile subscriptions over total population

Source: ITU, IMF, Work team analysis

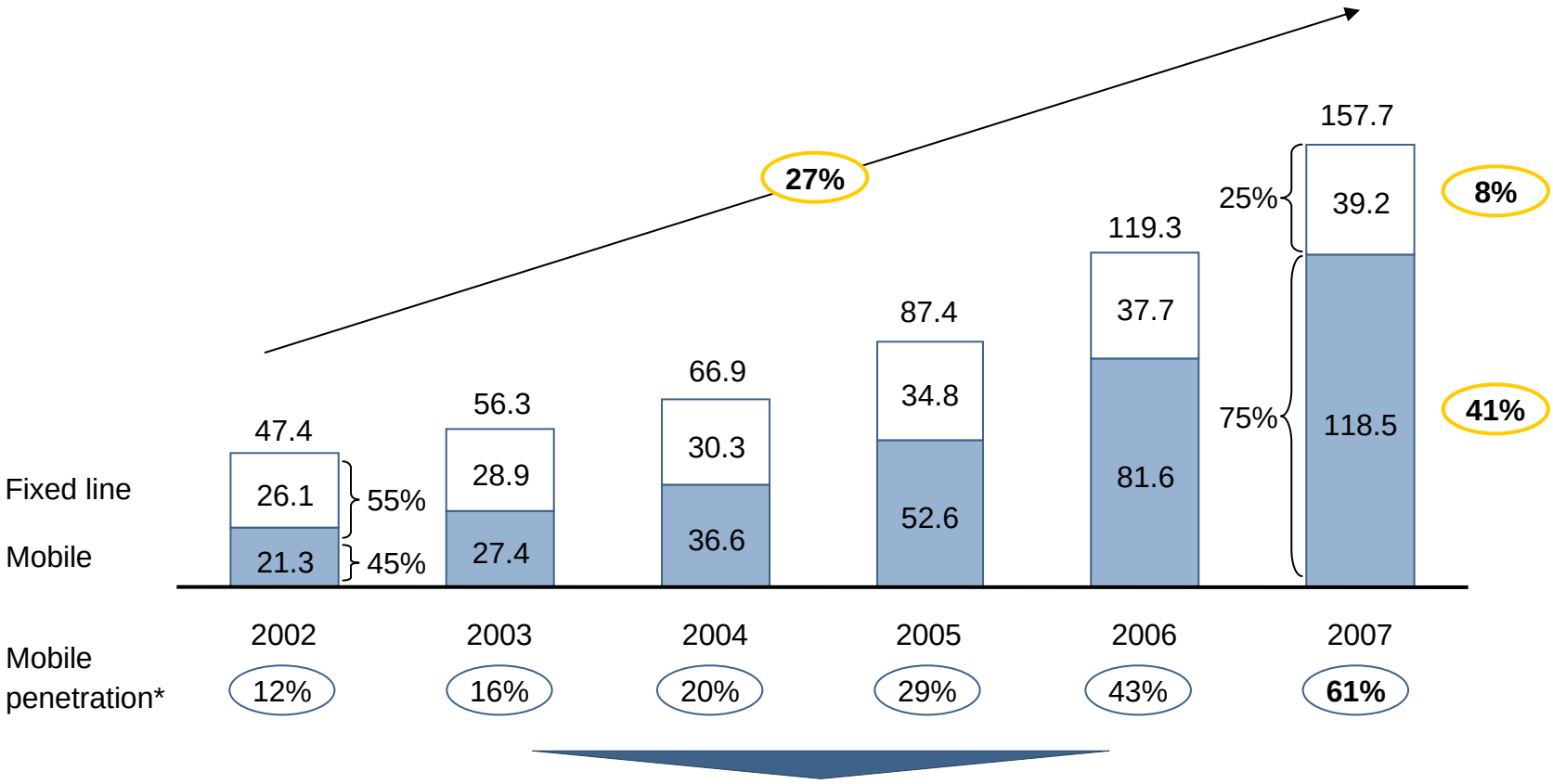
IMOBIX | VALUE PARTNERS

IIRSA | BID

Figure 37 - Analysis of the evolution of fixed line and mobile subscriptions in the Middle East

In the Middle East, the mobile market has also shown strong growth (41% annually), reaching a penetration of more than twice that of the African market (61% of the population in 2007)

Millions of subscriptions



- The Middle Eastern mobile market has been growing rapidly, at 41% annually, to become the main telecommunications service, at 75% of subscriptions in 2007 vs. 45% in 2002
- Mobile service coverage has also grown over the same time period, from 12% to 61% of the population

* Mobile subscriptions over total population

Source: ITU, IMF, Work team analysis

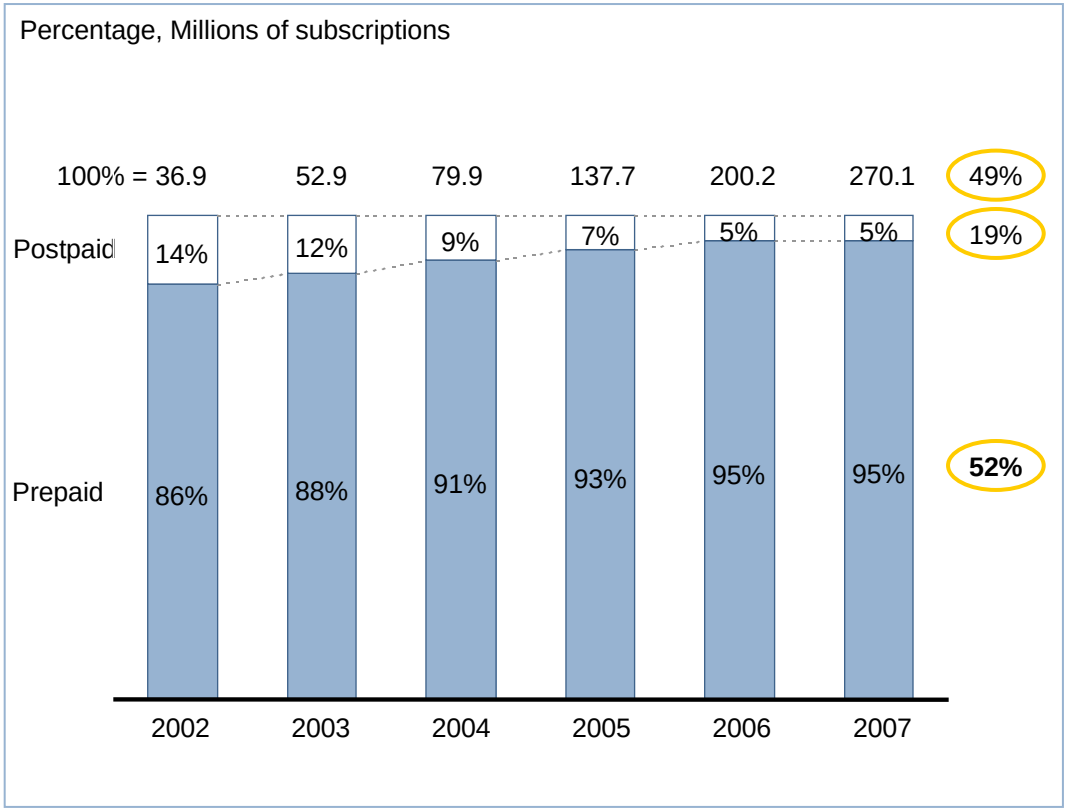
Figure 38 - Breakdown of mobile subscriptions in Africa, by type of service and country ranking

Prepaid service has been the largest driver of mobile service growth in Africa, at 52% annually, and represented 95% of all lines in 2007...

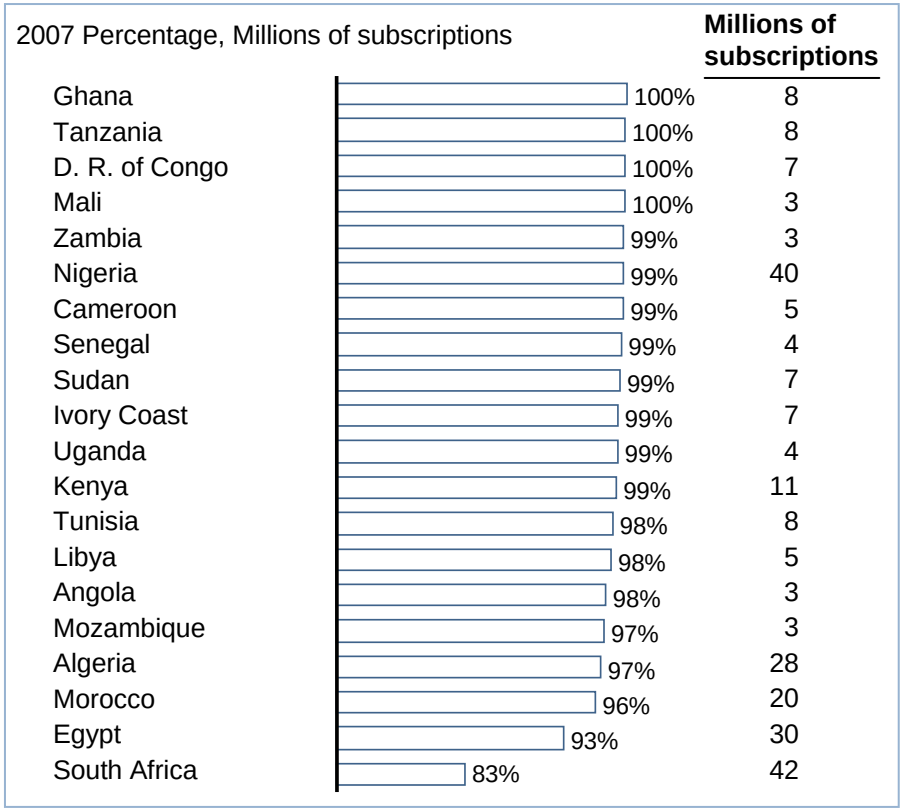
Millions of subscriptions, Percentage

CAGR 02-07

Breakdown of mobile subscriptions in Africa, by type of service



Percentage of prepaid, by country (Top 20*)



* Selected according to largest subscriber base

Source: ITU, WSCI Informa, Work team analysis

Figure 39 - Breakdown of mobile subscriptions in the Middle East, by type of service and country ranking

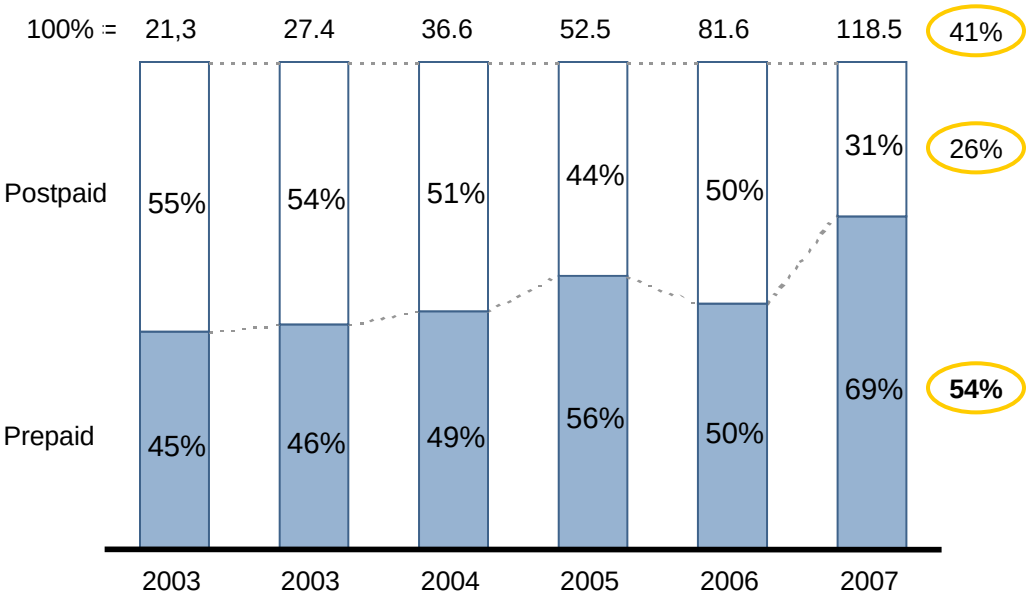
...and in the Middle East, prepaid service was also the biggest driver of growth (54% annually), but it still represents a smaller percentage of total lines when compared to the African market (69% in 2007)

Millions of subscriptions, Percentage

CAGR 02-07

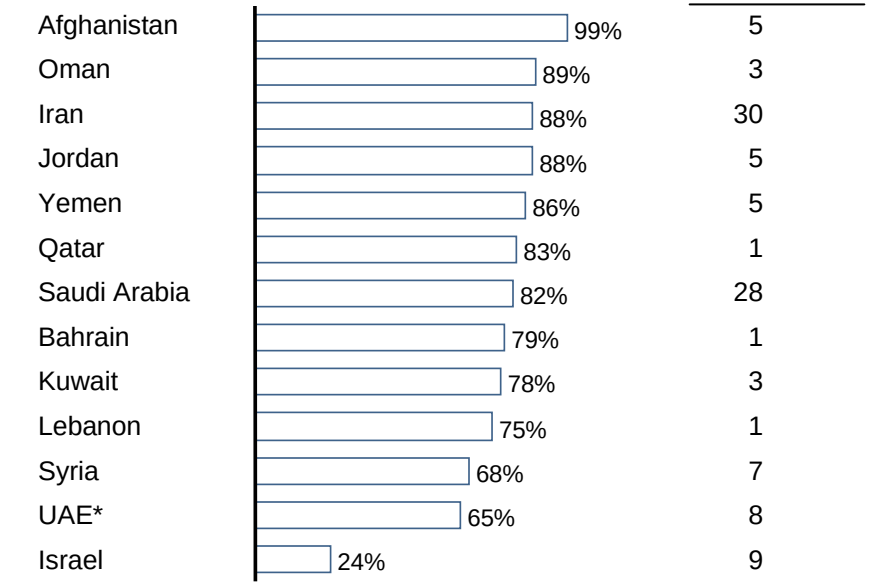
Breakdown of mobile subscriptions in the Middle East, by type of service

Percentage, Millions of subscriptions



Percentage of prepaid, by country

2007, Percentage, Millions of subscriptions



* United Arab Emirates

Source: ITU, Yankee Group, WSCI Informa, Work team analysis

Figure 40 - Evolution of ARPU for mobile services in Africa and country ranking

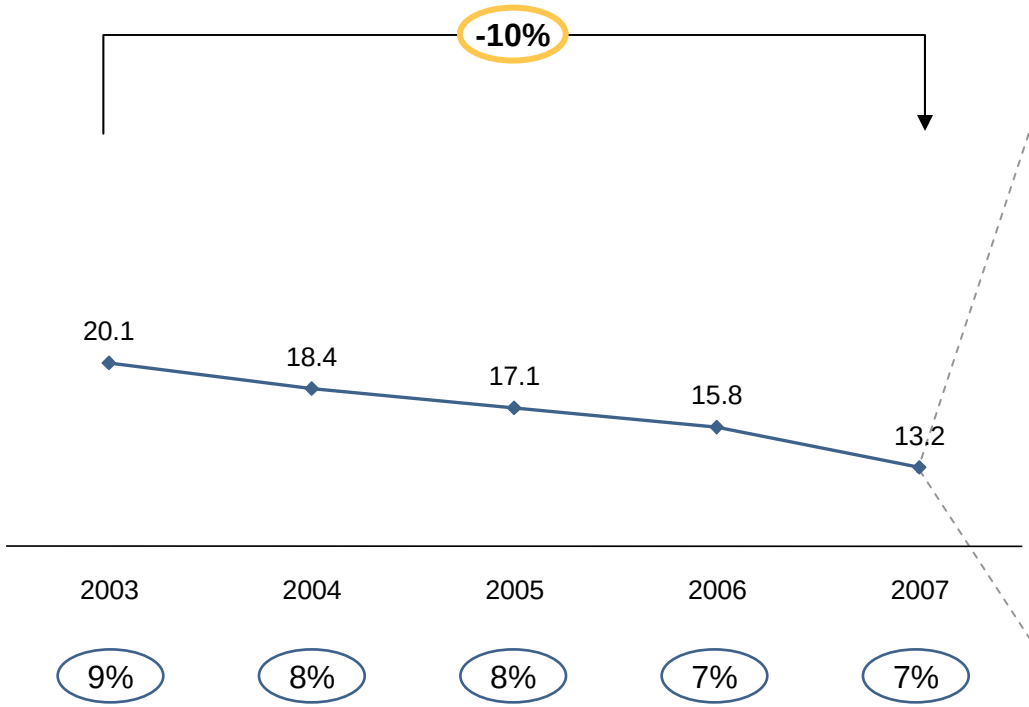
Since 2003, the ARPU in Africa has been declining sharply, by 10% annually, partly due to the strong expansion of services targeting lower-income users...

USD monthly, Percentage

CAGR 03-07
% of income**

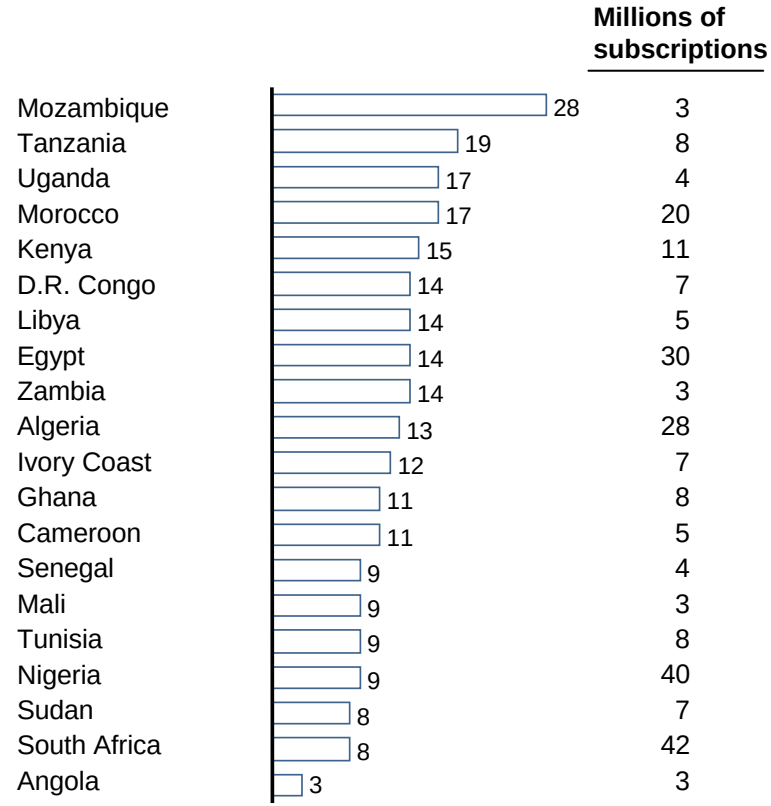
Evolution of ARPU* for mobile services in Africa

USD monthly, Percentage



Detail of mobile ARPU, by country (Top 20***)

2007, USD monthly, Millions of subscriptions



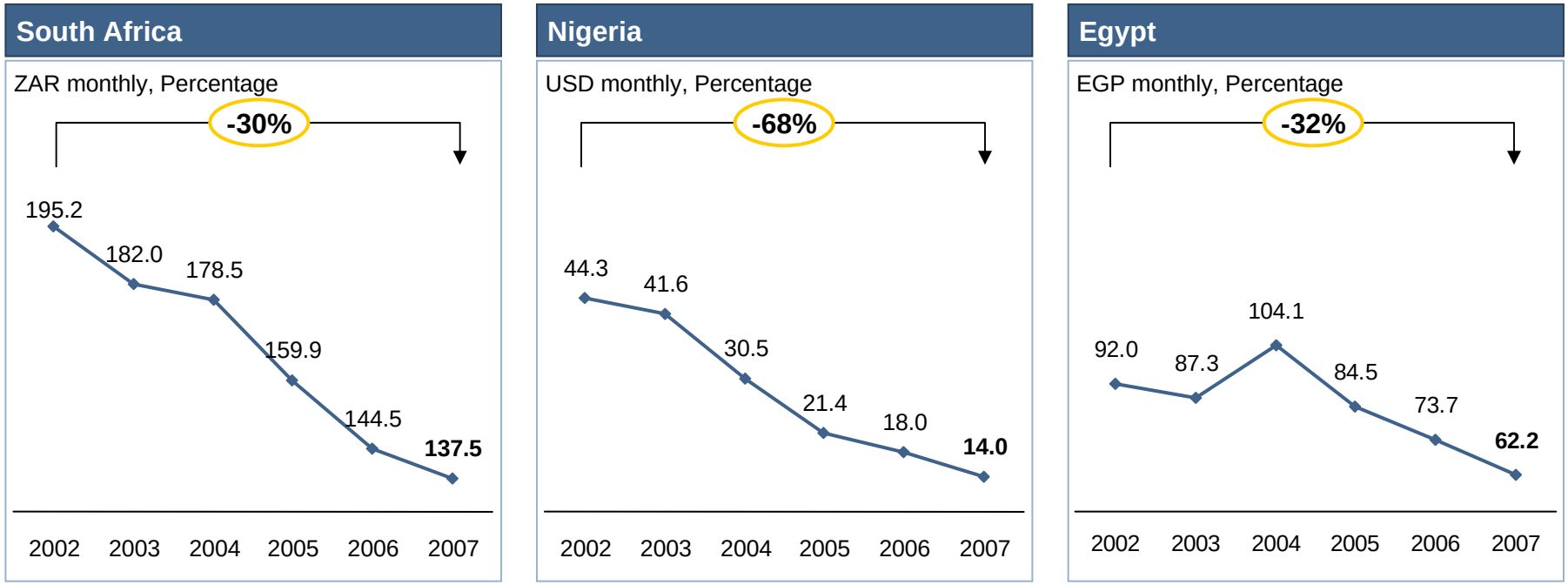
* Weighted average of subscriptions by country
** Disposable income adjusted for average PPP in the region
*** Selected from its subscriber base
Source: Yankee Group, ITU, WCIS, Work team analysis

Figure 41 - Evolution of ARPU for mobile services in South Africa, Nigeria, and Egypt, measured in local currency

...which, when measured in local currency, shows a sharp fall in ARPU at the national level

Local currency, Evolution of ARPU for mobile services, Percentage

CAGR



ARPU is declining sharply as operators, following international trends, compete to expand their user base by attracting lower-income segments

Source: Merryll Lynch, Work team analysis

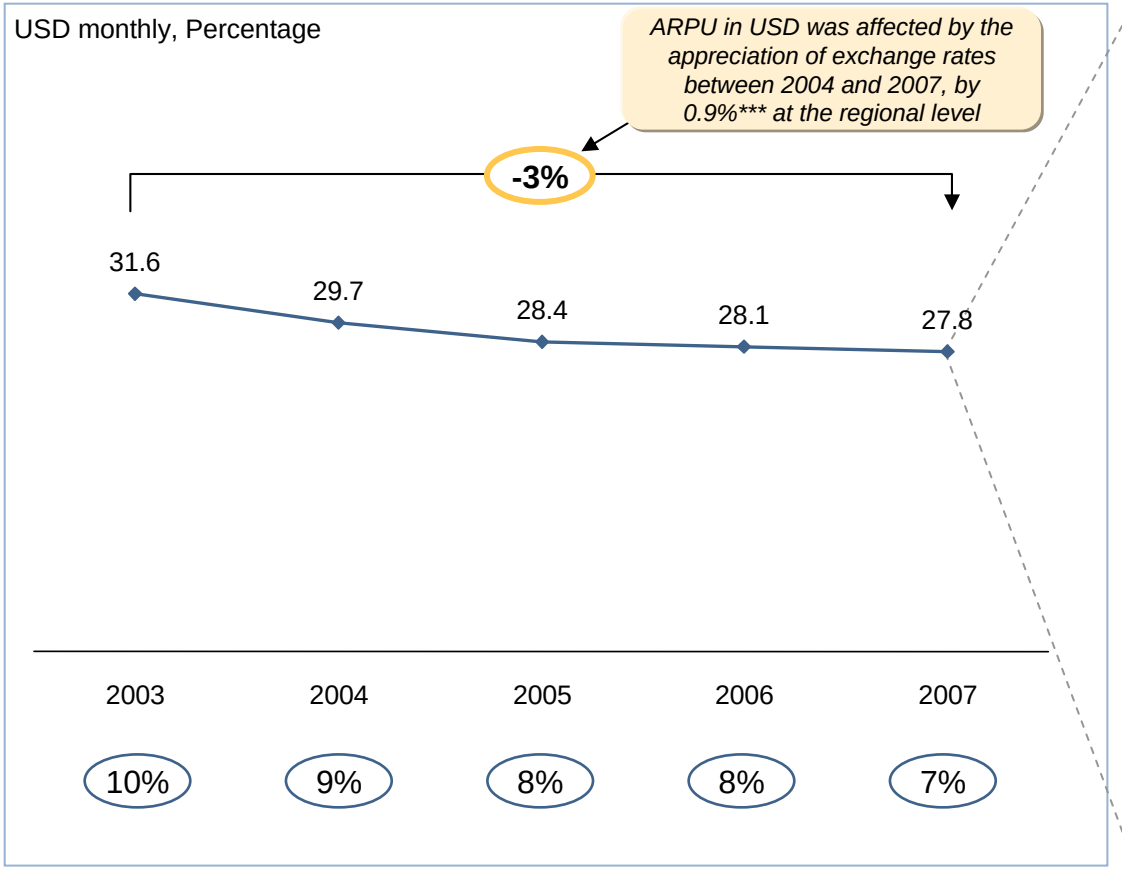
Figure 42 – Evolution of ARPU for mobile services in the Middle East and country ranking

ARPU in the Middle East has been decreasing slightly, at 3% per year, in part due to the appreciation of local currencies

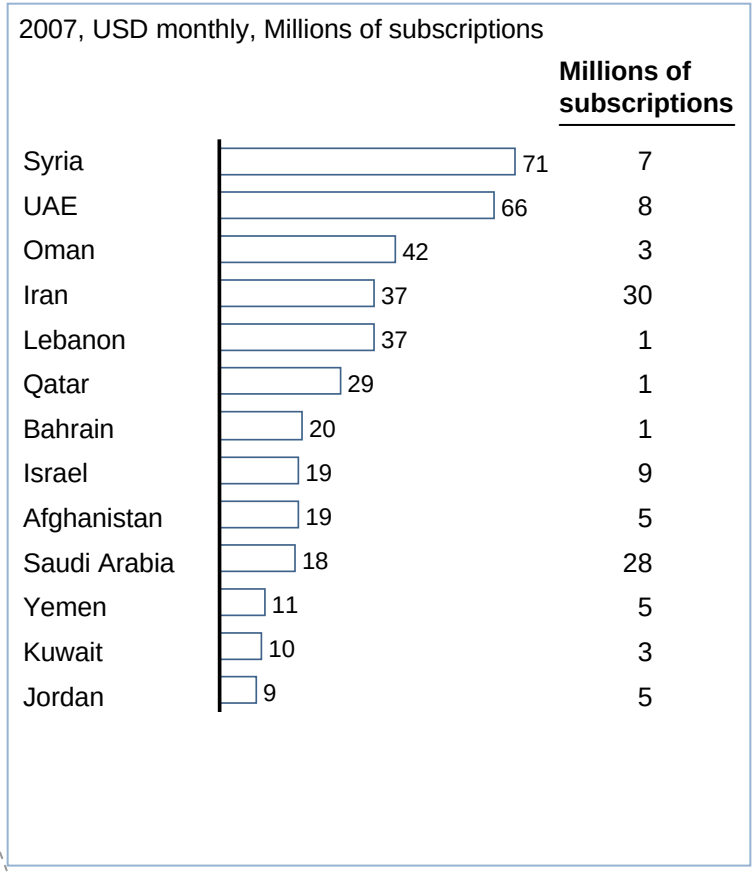
USD monthly, Percentage

CAGR 03-07
% of income**

Evolution of ARPU* for mobile services in the Middle East



Detail of mobile ARPU, by country

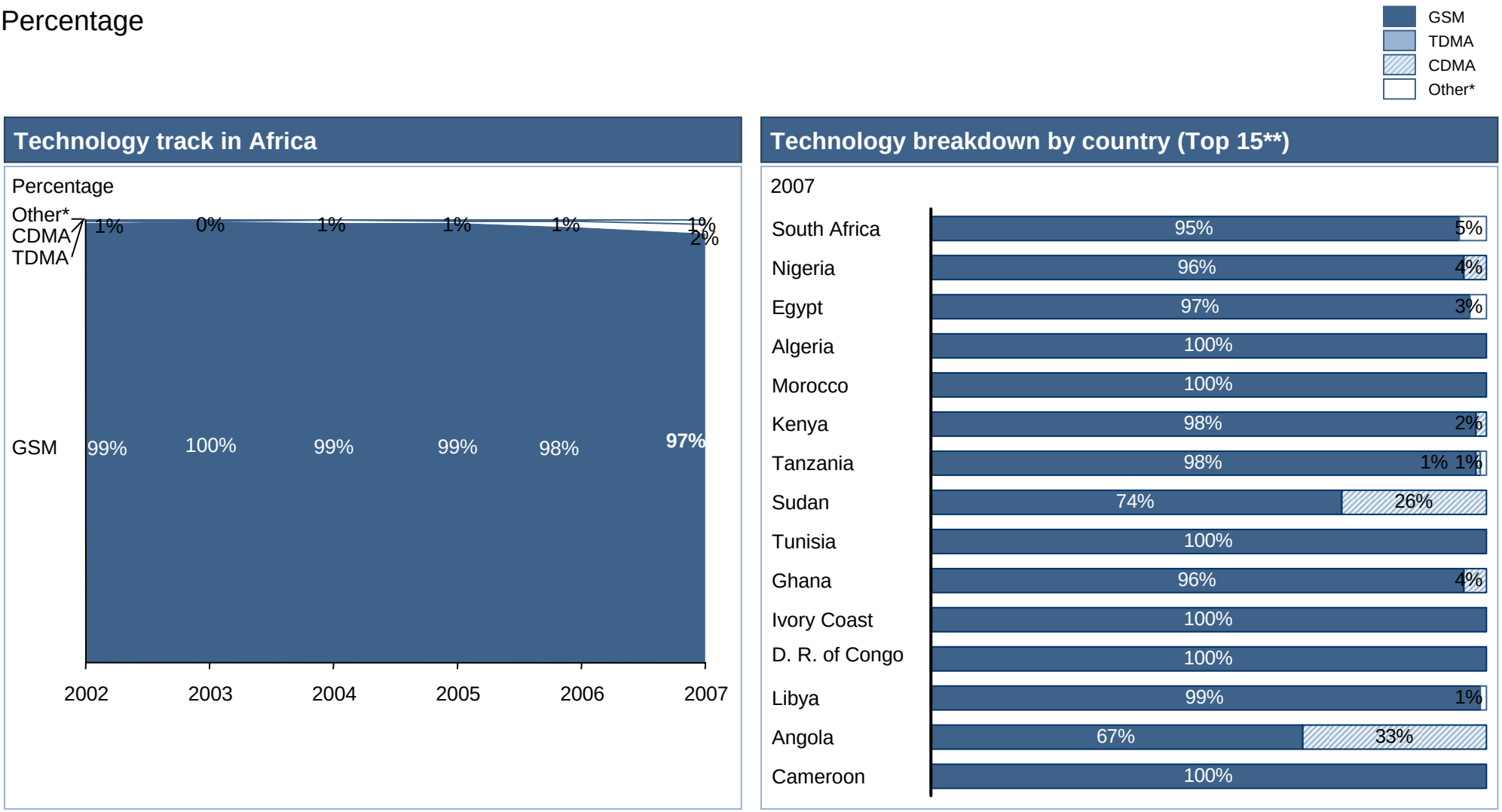


* Weighted average of subscriptions by country
** Disposable income adjusted for average PPP in the region
*** Weighted average by GDP
Source: Yankee Group, ITU, WCIS, Work team analysis

Figure 43 - Technology track in Africa and breakdown by country

In Africa, GSM has been the dominant technology in recent years, used in 97% of handsets in 2007, and represents 100% of handsets in several major countries in the region

Percentage



* 3G (UMTS), NMT, TAC and Analog

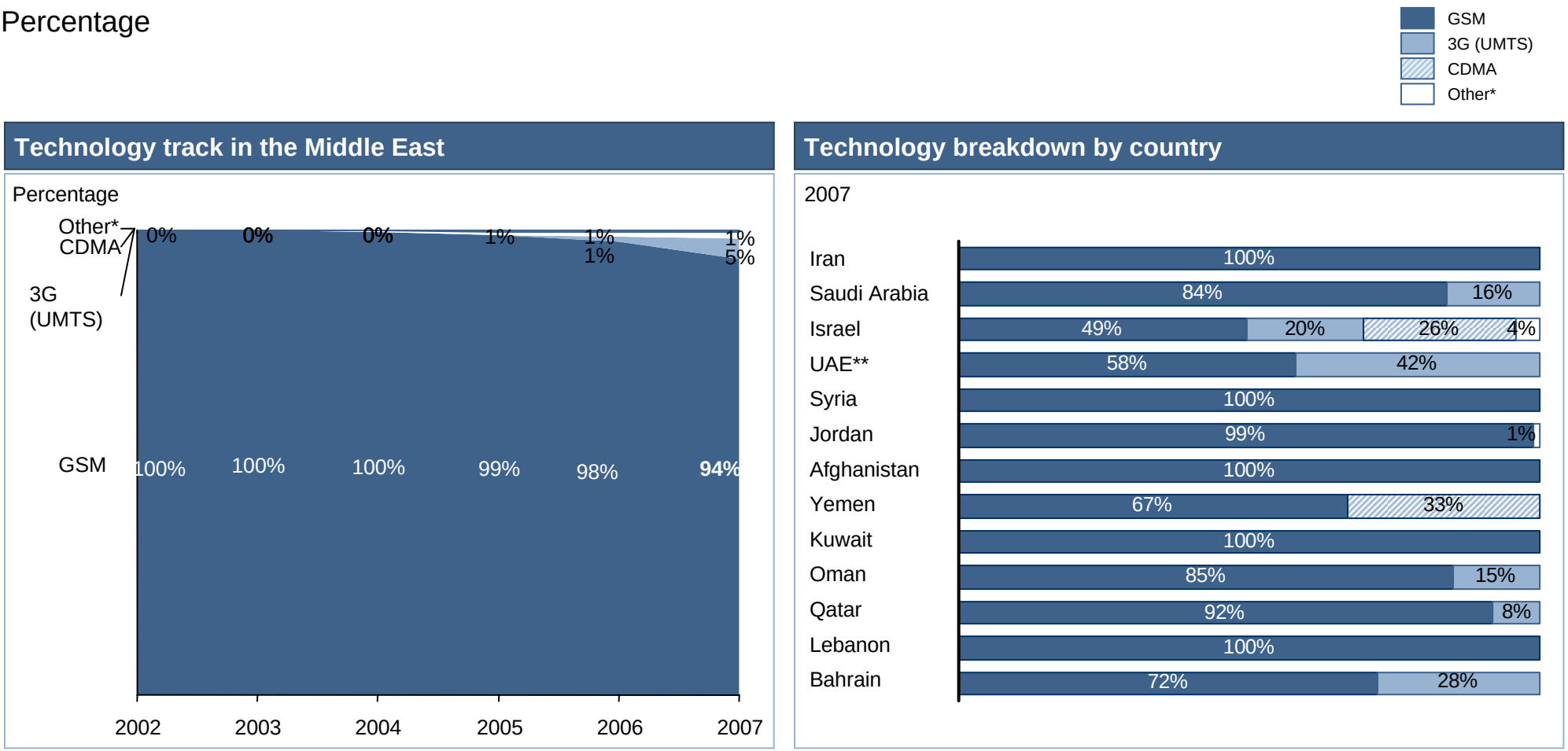
** Selected according to their subscriber base

Source: Informa, WCIS, Work team analysis

Figure 44 - Technology track in the Middle East and breakdown by country

In the Middle East, GSM is also the dominant technology (94% in 2007), and its third generation successor (UMTS) has also grown strongly in recent years, reaching 5% of the total in 2007

Percentage



* IDEN, NMT and TACS
** United Arab Emirates
Source: Informa, WCIS, Work team analysis

Figure 45 - AREGNET: Regional Association of Regulators for Africa and the Middle East

AREGNET is the leading association of national regulators in the region, covering 19 countries in Africa and the Middle East, with a working group specialized in international roaming

Association	Objectives
AREGNET (Arab Regulator Network)	• Coordinate telecommunications regulation between the members of the League of Arab States • Promote development in telecommunications and IT through the exchange of experiences and know-how among member countries • Create attractive conditions for private investment in the region

Members (19)

- Algeria
- Bahrain
- Comoros
- Djibouti
- Egypt
- Iraq
- Jordan
- Kuwait
- Lebanon
- Morocco
- Oman
- Palestine
- Qatar
- Saudi Arabia
- Sudan
- Syria
- Tunisia
- UAE
- Yemen

In 2005 AREGNET formed a specialized working group to study the roaming market and roaming rates in the Arab region

Source: ITU, Web sites of regulatory associations

Figure 46 - Main regional telecommunications regulation associations in Africa

In Africa there are also several regional regulatory associations that share similar objectives for telecommunications development and a partially overlapped coverage

Associations	Objectives	Member countries
TRASA (Telecomm-unication Regulators Association of Southern Africa)	• Promote the development and universalization of telecommunications infrastructure • Facilitate the coordination of telecommunications regulation • Perform studies and exchange experiences in the region	 • Angola • Botswana • D. R. of Congo • Lesotho • Malawi • Mauritania • Mozambique • Namibia • Seychelles • South Africa • Swaziland • Tanzania • Zambia • Zimbabwe
WATRA (West Africa Telecommunication Regulators Association)	• Create unified telecommunications statistics in the region • Explore opportunities for cross-border connectivity and roaming • Conduct training	 • Benin • Burkina Faso • Ivory Coast • Ghana • Gambia • Guinea • Guinea Bissau • Nigeria • Mali • Senegal • Sierra Leone
ARTAC (Association Telecomm-unications Regulators for Central Africa)	• Promote the coordination of regulation and development in telecommunications and IT services • Promote the development of autonomous regulatory agencies at the national level • Create unified telecommunications statistics in the region	 • Angola • Burundi • Rwanda • Sao Tome & Principe • D. R. of Congo
ARICEA (Association of Regulators of Information and Communications for Eastern and Southern Africa)	• Promote the development and universalization of telecommunications infrastructure • Contribute to regional integration • Coordinate cross-border regulatory issues • Perform studies and exchange experiences in the region	 • Angola • Burundi • Comoros • Congo • Kinshasa • Djibouti • Egypt • Eritrea • Ethiopia • Kenya • Madagascar • Malawi • Mauritius • Namibia • Uganda • Rwanda • Seychelles • Sudan • Swaziland • Tanzania • Zambia • Zimbabwe

Source: ITU, Web sites of regulatory associations

Figure 46 - Main regional telecommunications regulatory associations in Africa (cont.)

In Africa there are also several regional regulatory associations that share similar objectives for telecommunications development and a partially overlapped coverage (cont.)

Associations	Objectives	Member countries
EARPTO The East African Regulatory, Postal and Telecomm-unications Organization	• Facilitate the regulatory coordination of postal and telecommunications services • Contribute to the development and coordination of these services among member countries • Guarantee the provision of a tariff structure and the settlement of accounts	 • Kenya • Uganda • Tanzania

Source: ITU, Web sites of regulatory associations

The work of these regional regulatory associations in the African international roaming market has been limited

Associations	Initiatives related to international roaming	Description
TRASA	• No specific initiatives published	
WATRA	• Conferences on international roaming (2007 and 2008)	• Analysis of roaming offers in Western Africa • Discussion on the challenges for roaming and impacts of regulation
ARTAC	• Seminar on border zone frequency management (2007)	• Discussion on the coordination and resolution of frequency conflicts in border zones
ARICEA	• No specific initiatives published	
EARPTO	• Meeting for the improvement of communications infrastructure (2005)	• Demonstrate opportunity to cut roaming costs through direct interconnection • Encourage operators to develop prepaid roaming in the region

- The main measures from the African multilateral agencies were limited to:
  - Analysis of current roaming offers
  - Analysis of the various opportunities for the development of roaming services
  - Declaration of intent to cooperate and regulate, although without significant practical results

Source: Association web sites, Work team analysis

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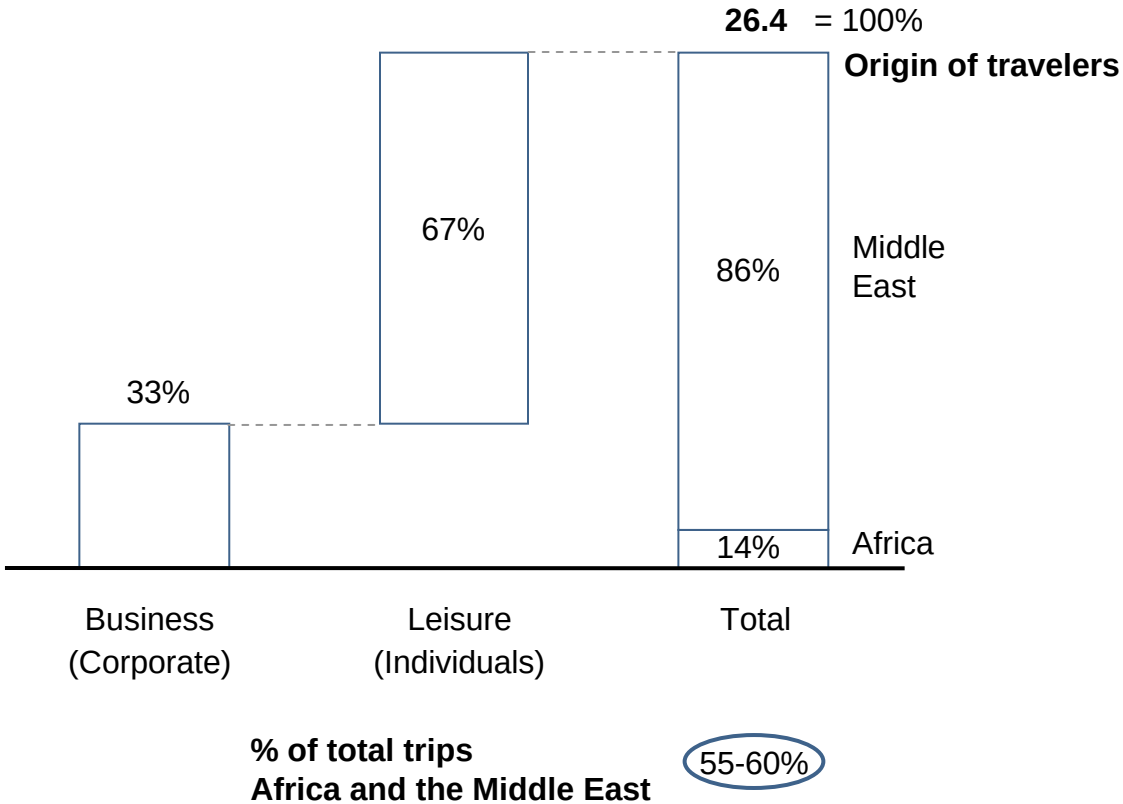
Figure 47 - Analysis of travel using roaming in Africa and the Middle East

African and Middle Eastern travelers carry out 26M trips utilizing roaming services each year, which represents 55-60% of the total trips in the region

2008, Millions of roaming travelers, Percentage



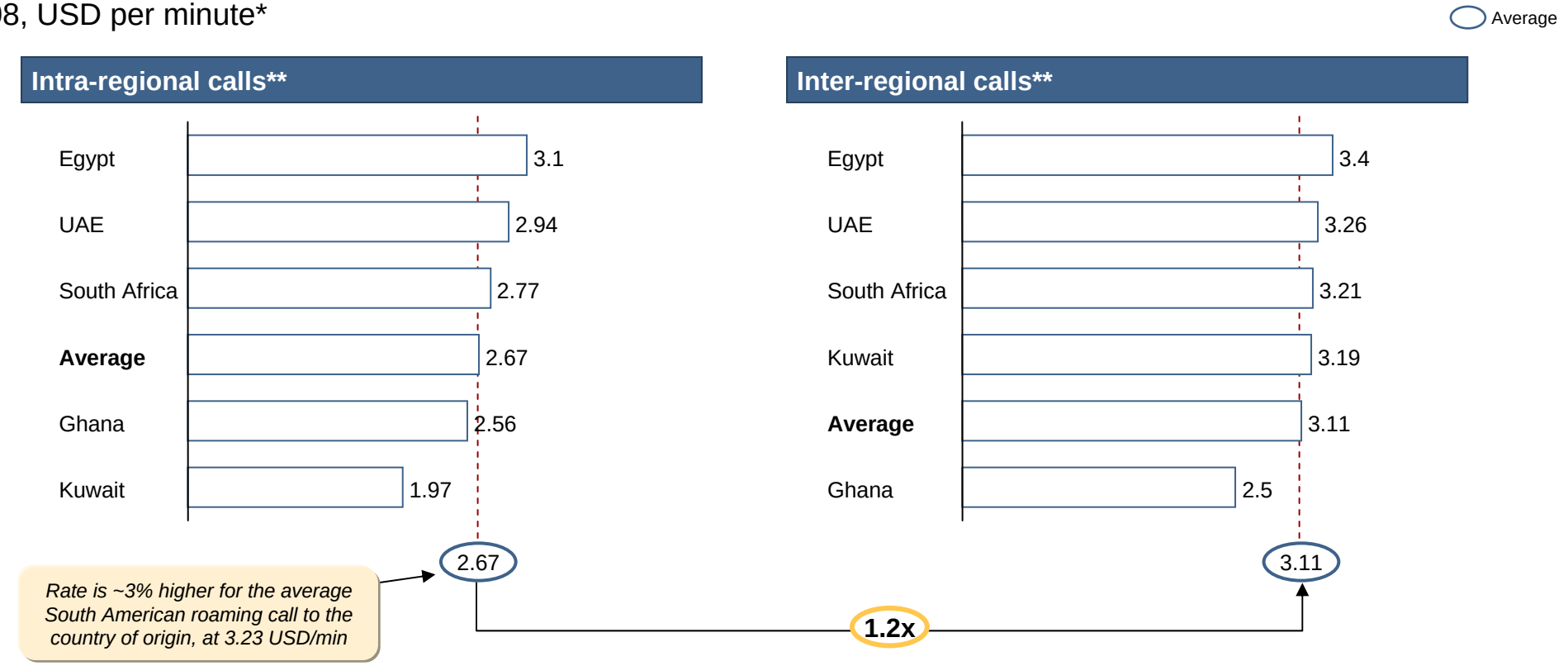
Source: Informa, Work team analysis

Figure 48 - Comparison of inter-operator tariffs for intra-regional and inter-regional calls in Africa and the Middle East

Rates for roaming calls in the region are similar to those in South America...

NON-EXHAUSTIVE

2008, USD per minute*



- *In Africa, the high cost of ILD affects roaming rates, requiring periodic intervention by regulators ...*
- *...and the GSMA has ruled in favor of releasing international gateways for its high impact in reducing roaming*
- *To release international gateways, steps were taken to release ILD licenses in order to reduce prices...*
- *...and thanks to the assistance of UNCTAD (in response to a request from the operators), the cost of acquiring an international gateway license in Africa has been reduced*

*Net of taxes

**For basic postpaid roaming service, without considering special packages but including set-up fees for calls of at least 5 minutes

Note 1: Intra-regional calls are those between the countries listed in the chart

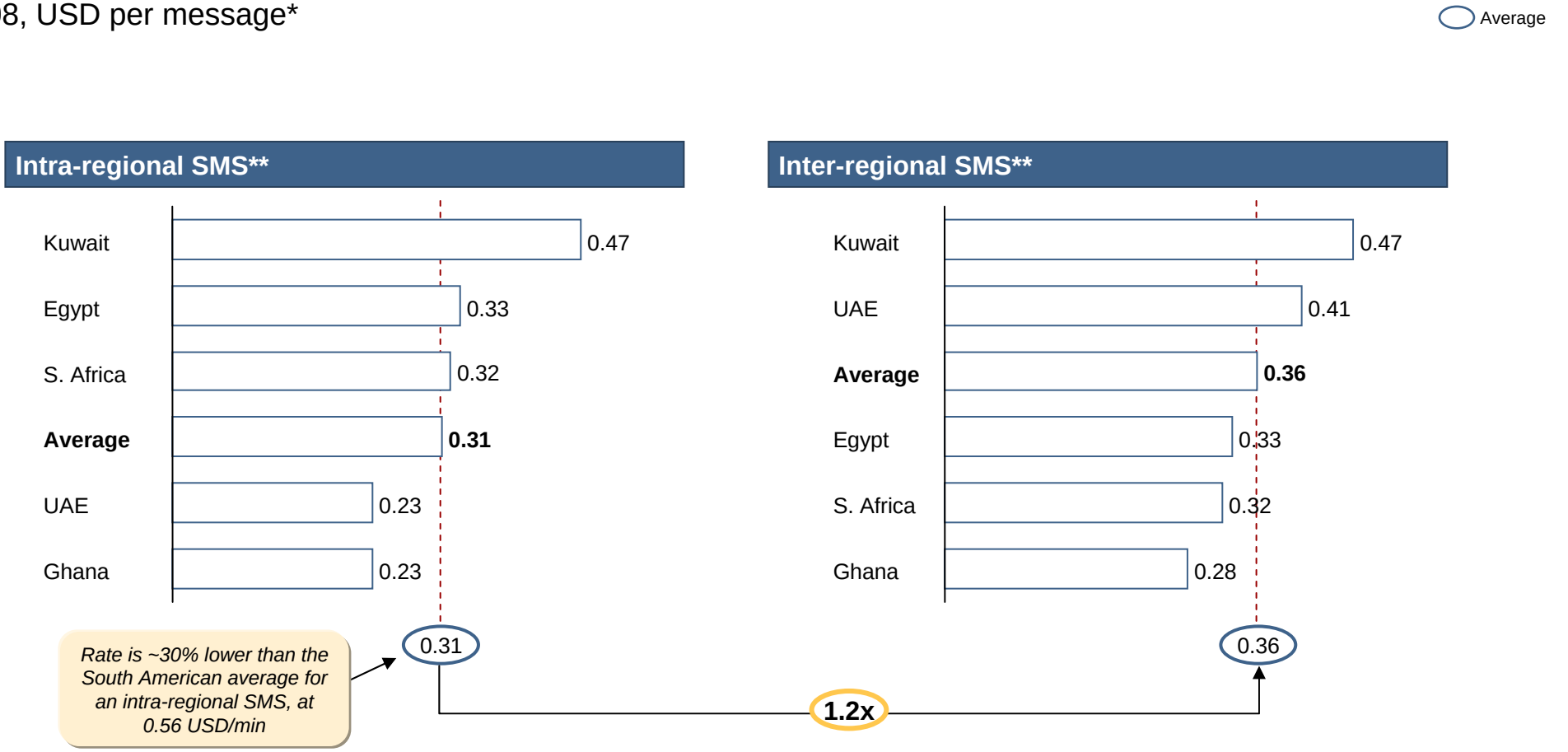
Source: Informa, Daily Trust, ICT Regulation Toolkit

Figure 49 - Comparison of inter-operator tariffs for intra-regional and inter-regional SMS in Africa & the Middle East

…but for SMS while roaming, rates in Africa and the Middle East are less than those in South America

NON-EXHAUSTIVE

2Q08, USD per message*



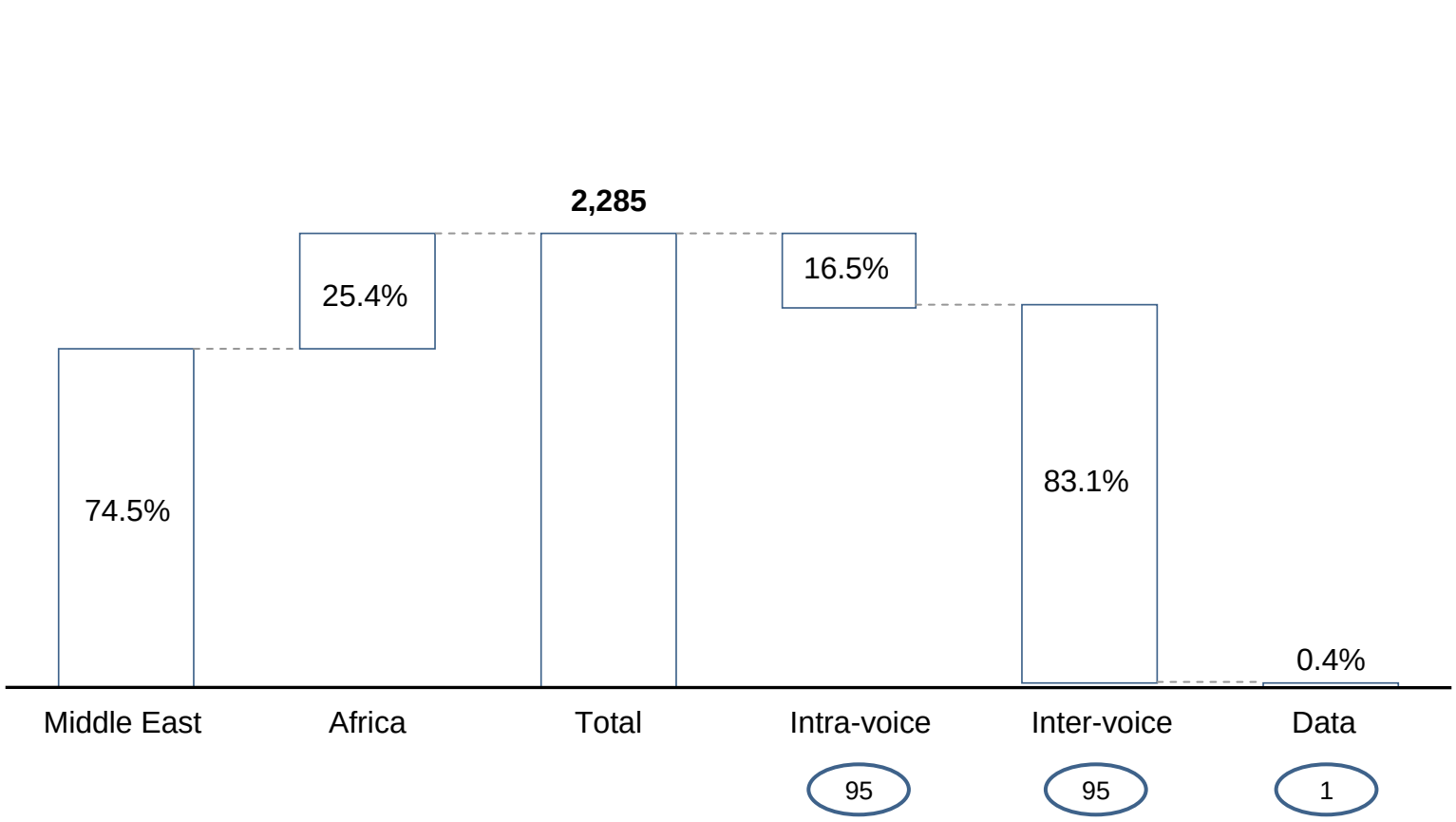
*Net of taxes
**For basic postpaid roaming service, without considering special packages

Note 1: Intra-regional SMS are those between the countries listed in the chart
Source: Informa

Figure 50 - Revenue from roaming travelers in Africa and the Middle East by type of service

Revenue from roaming (outbound) from travelers in Africa and the Middle East reached USD 2.3 billion, with 75% generated by travelers to the Middle East

USD millions



Source: Informa, Work team analysis

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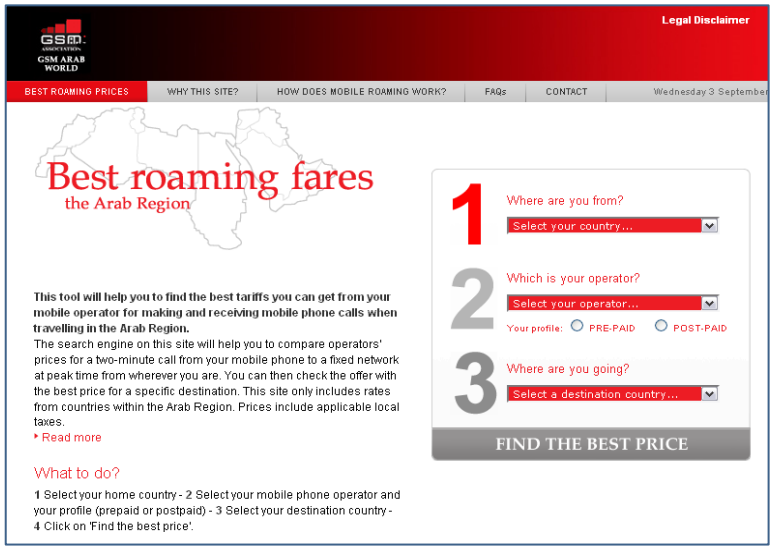
In 2005, AREGNET created a specialized working group focused on international roaming rates, which conducted a regional study on roaming, and in 2008, proposed regulatory initiatives to reduce tariffs

	Description	Important considerations
2005	• At the request of the Ministry Council of Communications of the League of Arab States, establishment of a working group dedicated to roaming	• The working group identified 3 main objectives: - Analyze the operators and roaming offers in the region - Review roaming prices among Arab countries - Evaluate regulatory options and alternative solutions to reduce excessive roaming charges
January 2006	• AREGNET study on international roaming tariffs among Arab countries	• Analysis of roaming fees of 10 operators in 6 countries for: - Calls to the home country and other Arab countries - Local calls in the visited country • Criticism of the analyzed roaming fees for: - High prices and lack of uniformity (eg. price range of USD 0.10 to 3.05 per minute on calls to the home country) - Lack of clear communication and accessible information on prices, including frequent changes to rates without notice
April 2008	• Report with recommendations from AREGNET to reduce roaming rates among Arab countries	• In recommendation, AREGNET considers that: - The self-regulation of operators in the region did not resolve the problem of high rates - It is necessary to take regulatory measures on operator and retail roaming rates among Arab countries • The GSMA responded negatively to the recommendation: - Increasing competition in the regional market will bring cheaper rates in the future - Regulation of rates would hinder future investment, threatening coverage expansion and the launch of new services
June	• Consideration of the AREGNET recommendations in the Ministry of Communications and IT of the League of Arab States	• The member countries supported AREGNET's recommendations for tariff reductions but there is still no consensus on its implementation

Source: ITU, Regulatory agency web sites, News clippings, Informa, AREGNET working papers, Middle East & Africa Wireless Analyst

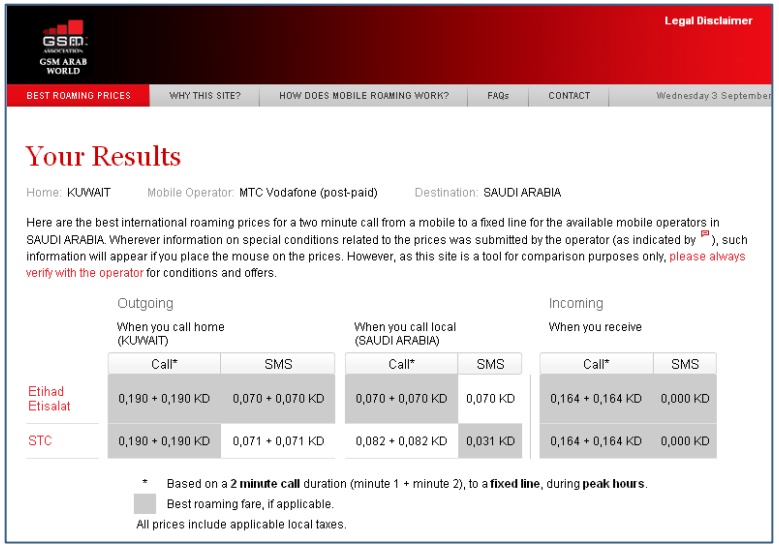
Figure 51 - Regulatory association initiatives in Africa and the Middle East: Web site with rates

In 2007, in response to the AREGNET study, the GSMA created a web site with the roaming rates for Arab countries, similar to that launched in Europe in 2006, to improve the communication of rates



- Initiative launched in April 2007 by the GSMA
- Aligned with the GSMA Arab World Code of Conduct for Business, December 2006
- Includes 28 operators in 13 countries in the Middle East and North Africa
- Shows users, in a simple and dynamic way, the cost of using roaming services

- The site shows final prices (with tax) in local currency for various prepaid and postpaid roaming services:
  - Outgoing calls to country of origin
  - Local calls in the visited country
  - Outgoing SMS to country of origin
  - Outgoing SMS to the visited country
  - Reception of calls and SMS
- Prices are differentiated for the first and second minute of the call
- Shows the most competitive rates for each roaming service in the selected country



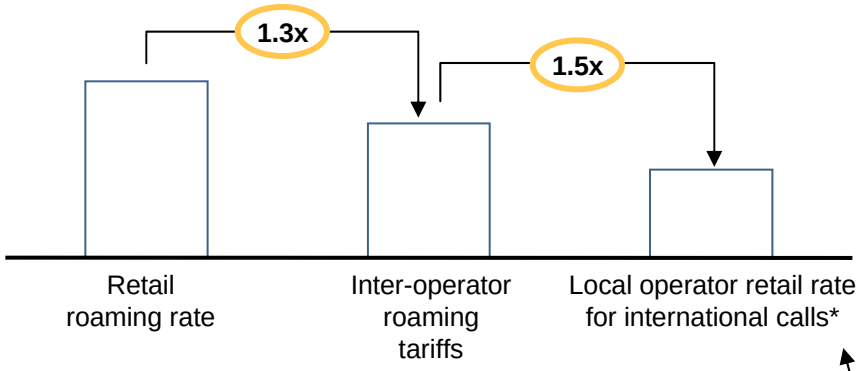
Source: GSMA Arab World web site

Figure 52 - Proposal for regulatory intervention rates in Africa and the Middle East

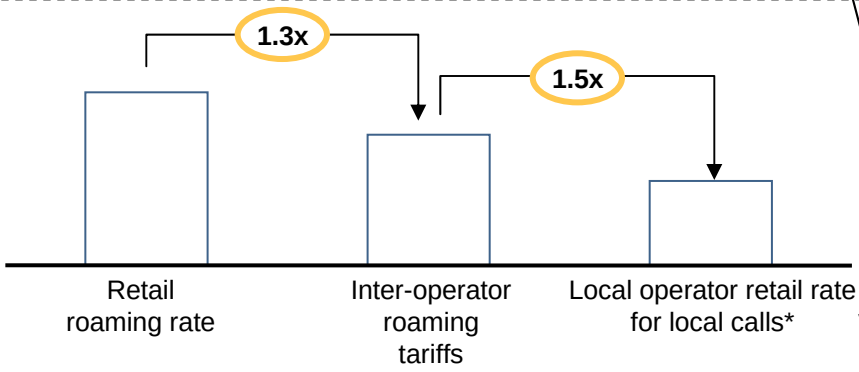
In 2008, AREGNET defined an innovative proposal to set maximum prices for roaming calls, but it faces several coordination challenges for its practical implementation

Pricing proposal for roaming services among Arab countries

Maximum charge for outgoing calls to the home country or other Arab nation



Maximum charge for outgoing local calls in the visited country



Maximum charge for calls received while in roaming

- Inter-operator roaming tariffs less than or equal to the termination charges for international calls in the visited network
- Retail roaming rates less than or equal to those for international calls made in the country of origin

Implementation challenges

- Lack of coordination of national ministries, where some were opposed to the proposal because of:
  - Risk of reduced investment by operators for coverage and new services
  - Potential higher rates for other mobile services to offset falling revenue from roaming
- The proposal should be coordinated with the national laws of member states
- As a result, AREGNET will try an initial implementation with a group of key countries and then expand to other members**

The proposal by AREGNET depends on a complex formula that applies particular local rates to international rates, with the potential risk of distorting prices in the region and creating discrepancies when applied

*Rate for each respective destination weighted by minutes of traffic from the previous year

**In a meeting in June 2008, the Ministers of Communications of the GCC (Gulf Cooperation Council, comprised of Saudi Arabia, Bahrain, UAE, Qatar, Kuwait and Oman) pledged to take steps to reduce the cost of roaming

Source: AREGNET, Informa, AREGNET working papers, Middle East & Africa Wireless Analyst, Work team analysis

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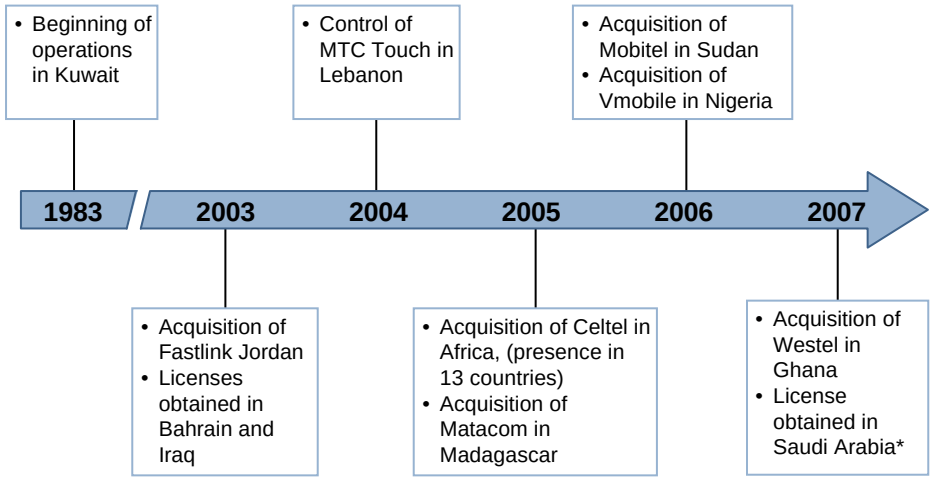
Figure 53 - Regional alliances: Zain and its One Network alliance - historical evolution and coverage

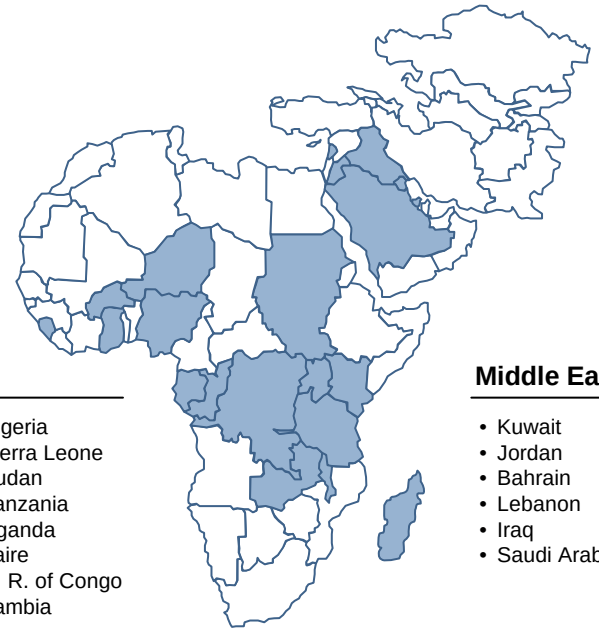
Zain is a mobile operator in Kuwait, which in recent years has had strong growth in Africa and the Middle East...

Historical evolution of Zain



International presence (22 countries)

2007



Africa

- Burkina Faso
- Chad
- Congo
- Gabon
- Ghana**
- Kenya
- Madagascar
- Malawi
- Niger
- Nigeria
- Sierra Leone
- Sudan
- Tanzania
- Uganda
- Zaire
- D. R. of Congo
- Zambia

Middle East

- Kuwait
- Jordan
- Bahrain
- Lebanon
- Iraq
- Saudi Arabia**

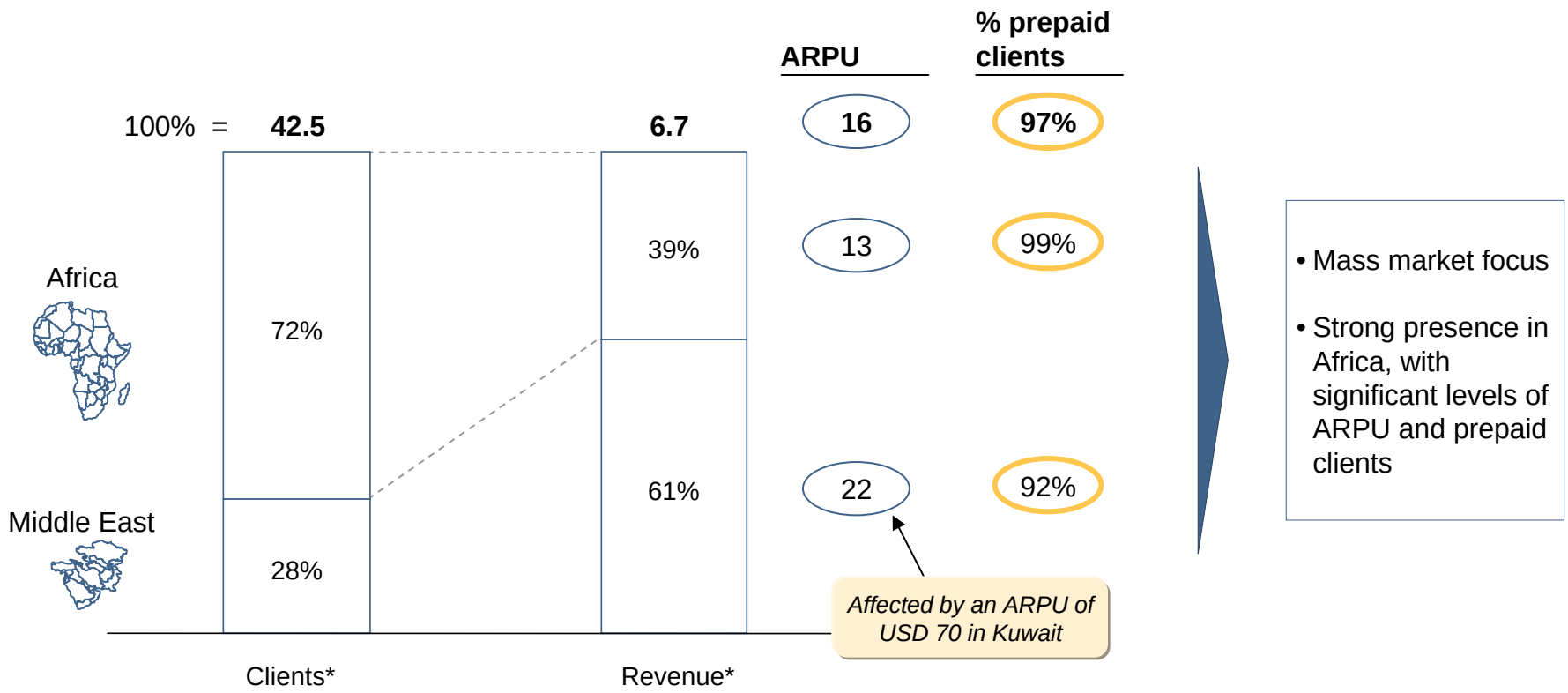
- *Fourth largest global operator, in terms of geographical presence*
- *Lead operator in 14 markets and second in 5*

* As part of a consortium of local and foreign investors
** Operations not yet consolidated in the company's financial statements
Source: Zain corporate web site

Figure 54 - Regional alliances: Zain and it's One Network alliance - customers and revenue

...reaching ~43M customers, mostly prepaid, and with ARPU levels similar to those in South America

2007, Millions of customers, USD billions, USD monthly, Percentage

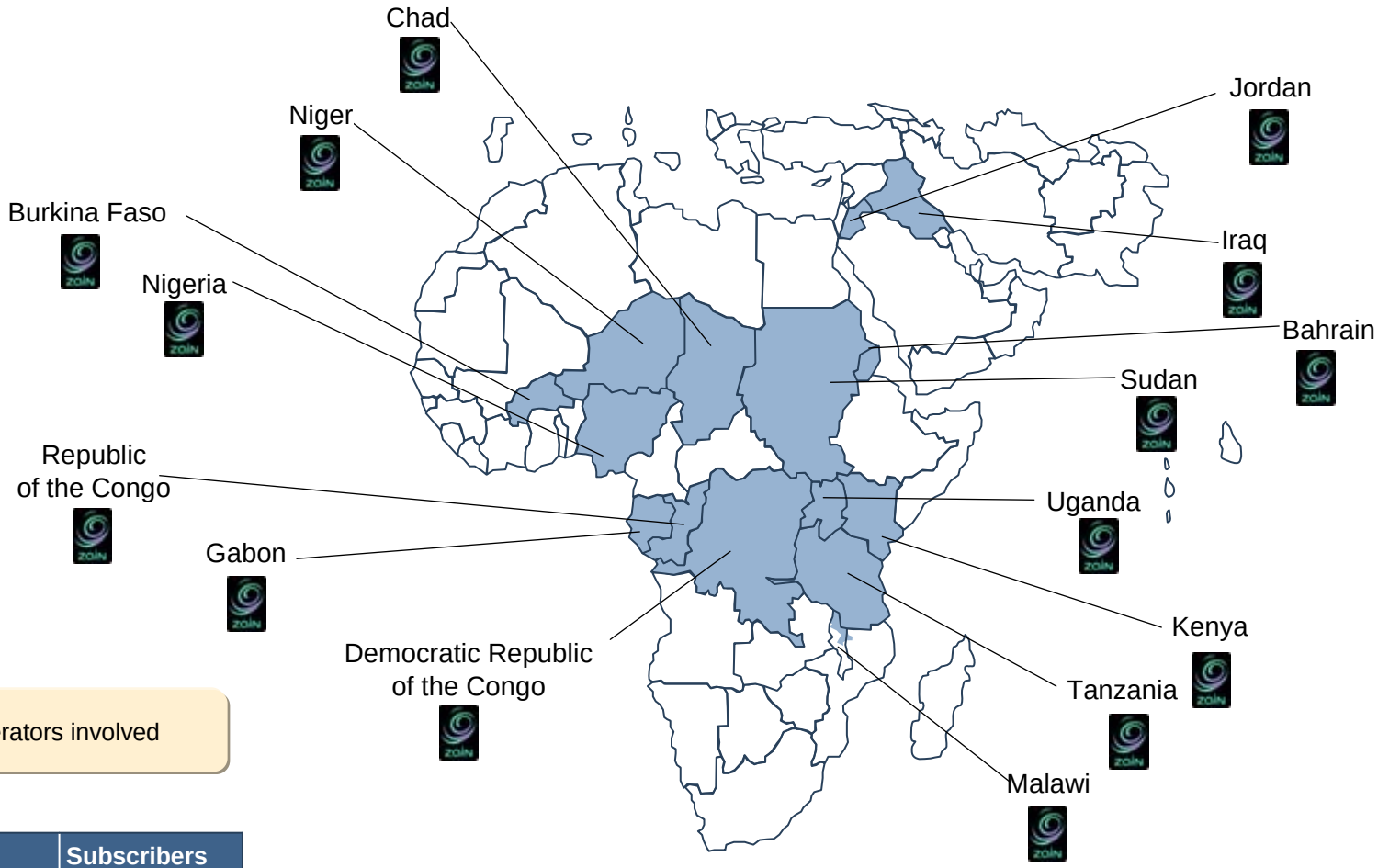


* Does not include Saudi Arabia or Ghana

Source: Zain financial reports, Work team analysis

Figure 55 - Regional alliances: One Network Alliance - coverage

The One Network alliance covers 15 countries in Africa and the Middle East, where Zain operates under the same brand



15 operators involved

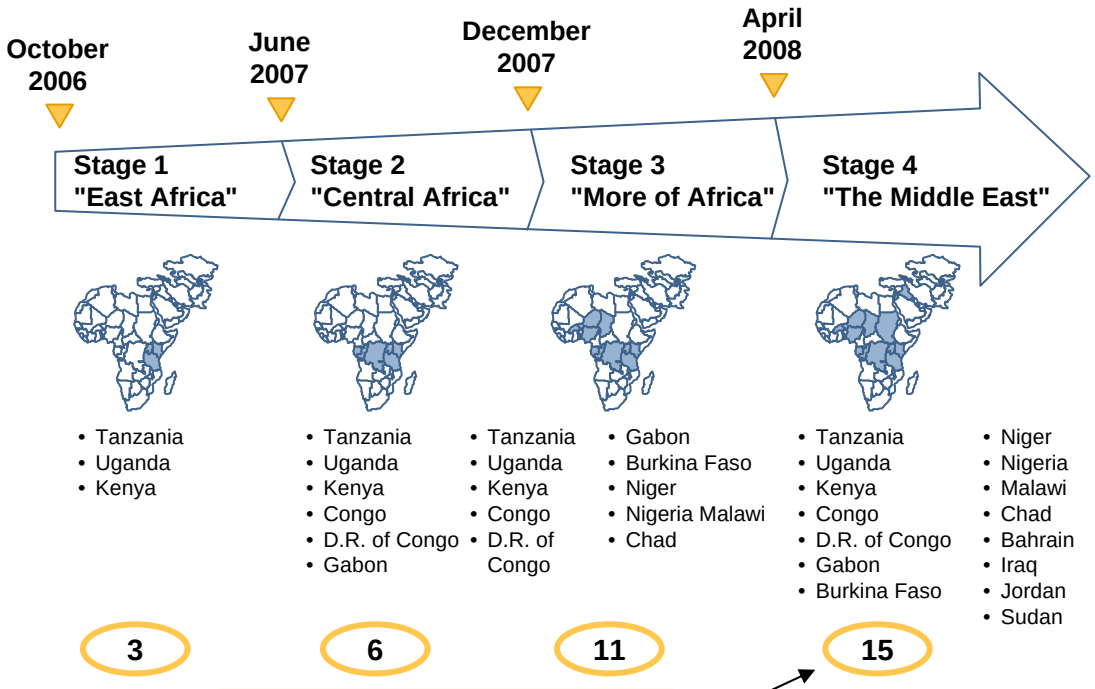
Countries	Subscribers
• 15	• ~37M

Figure 56 - Regional alliances: One Network Alliance - stages of development and value proposition

The One Network alliance offers roaming at local prices among several of its subsidiaries with a convenient offer and high service availability for prepaid subscribers

Countries reached

One Network stages of development



Zain hopes to include 6 new countries in the short-term, including Saudi Arabia, Kuwait, Lebanon, and Ghana

One Network value proposition

Economical rates

- Outgoing calls and messages while in roaming at local rates* among member countries
- Incoming calls and messages while in roaming free among member countries

Convenience and simplicity

- Automatic use of roaming, without need for prior activation
- Virtual home environment:
  - Mailbox and customer service available in all countries
  - Use of special access codes from the country of origin

Integral prepaid roaming

- Prepaid roaming available throughout the entire One Network
- Credit purchases for prepaid roaming with cards available in more than 200,000 outlets throughout the region

The One Network initiative is dependent on specific developments and processes that will require an analysis of their applicability in South America

- Development in stages simplifies the complexity of the initiative
- Prepaid is paramount because of its importance to the customer base

* For international calls to member countries, a surcharge of 10% can be added

Source: Zain web site, News clippings, Middle East & Africa Wireless Analyst

The One Network alliance has had a high impact in the region in terms of positioning, competitive response and action by governments

Zain positional advantage

- Innovative leadership in a region of high intra-regional traffic
  - One Network is the second reason why Zain customers chose Zain in Africa, after network coverage
  - By December 2007, 5 million Zain customers used One Network at least once

"Reactionary" alliances by competitors

- In Africa, operators in Tanzania (MTN), Uganda (Vodacom) and Kenya (Safaricom) launched the Kama Kawaida alliance*, increasing international traffic by ~400%
- In the Middle East, Etisalat launched a roaming alliance with its subsidiaries in the United Arab Emirates, Saudi Arabia and Egypt

Active role of governments in the region

- Removal of import tariffs for information technology products (eg. Kenya)
- Support and assistance for foreign direct investment in infrastructure and telecommunications (Nigeria)
- Open access to international communication links

Zain was unable to implement One Network in Zambia because the government controls all access to its operator, Zamtel

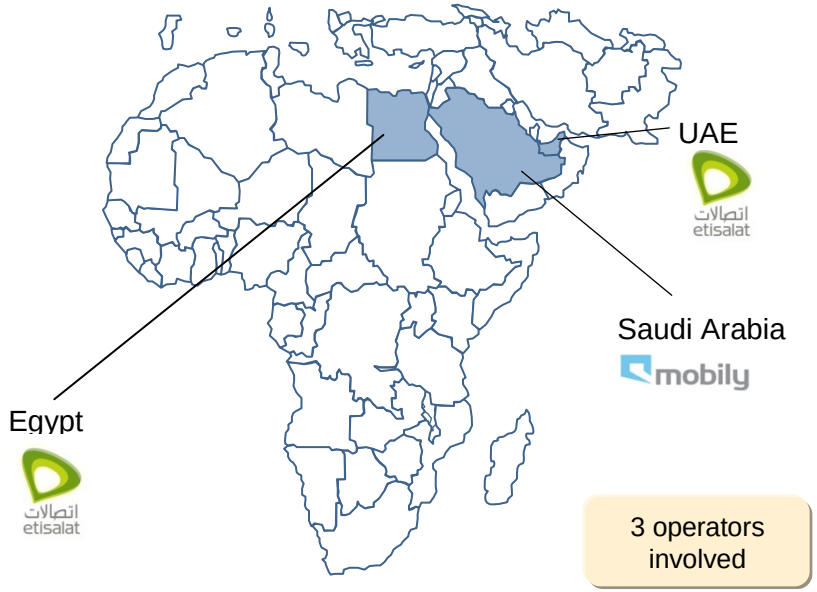
* Later, Uganda Telecom, MTN Rwanda and Burundi Ucom joined

Source: Huawei Technologies Report, International Herald Tribune, Zain web site, Informa

Figure 58 - Regional alliances: Etisalat alliance and Kama Kawaida - coverage

Since the launch of the One Network, two new alliances have emerged in the region: Etisalat in MENA and Kama Kawaida in East Africa ...

Etisalat

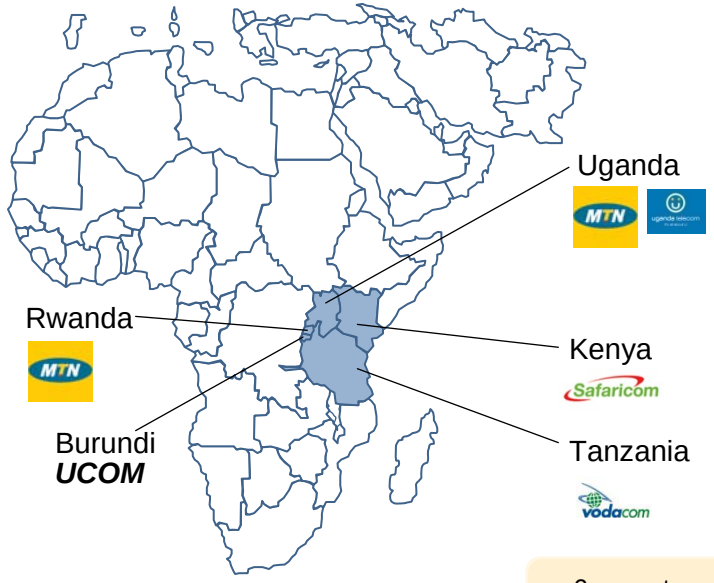


3 operators involved

Countries	Subscribers
• 3	• ~21M

Launched in June 2008

Kama Kawaida



6 operators involved

Countries	Subscribers
• 5	• ~17M

Launched in February 2007

Source: Operator web sites and financial statements, News clipping, GMSD Informa

...with offerings similar to those of Zain, focusing on local rates for calls and SMS while roaming on alliance operator networks

		Etisalat	Kama Kawaida
Type of alliance		• Alliance of subsidiaries within the UAE Etisalat Group	• Equal representation of member operators in the alliance
Brand and positioning		• Services oriented to individual and corporate customers	• Services oriented to individual and corporate customers
Main features of the offer	**Conven-ience**	• Special access code for voice mail and customer service	• Voice mail and customer service (without access code) • Prepaid credit purchase in the visited country
	Special prices	• Local rates for calls and messages from operators within the alliance	• Local rates for calls and messages from operators within the alliance

Source: Operator web sites, News clippings

Document contents

Study of the Asian Market: Executive summary

Socioeconomic situation

- In Asia-Pacific, China and India account for 67% of the population and 35% of GDP
- The region has low levels of per capita GDP compared to South America (USD ~8,000 vs. 10,000), which is driven by highly populated emerging countries (eg. India, China and Indonesia)
- The age distribution of the population in Asia is similar to that of South America
- Intra-regional travel in the Asia-Pacific region has a low penetration level, at 6%, which is similar to levels in South America

Telecommunications market

- Features of the mobile market:
  - The Asian mobile market has had strong development (26% per year) and has been the main component of growth in the telecommunications market
  - Although the Asia-Pacific prepaid market has been growing at 39% annually since 2003 and reached 69% of total subscriptions in 2007...
  - ...ARPU in the region has been declining sharply at 11% annually since 2003
  - By the end of 2007, 80% of Asian handsets were using GSM technology
- Market regulation:
  - There are multilateral agencies in the Asia-Pacific region,...
  - ...although their performance in the international roaming market has been very limited

Roaming market

- Annually, travelers from Asia-Pacific carry out ~73 million trips using roaming, which represents 30-35% of the total trips in the region
- Tariffs for roaming calls are cheaper than in South America (~20% lower)...
- ... while the rates for SMS while in roaming are slightly higher than in South America (~5% higher)
- Roaming revenue from Asians while traveling (outbound) has reached USD 3.9 billion, with 70% derived from inhabitants from the developed Asia-Pacific countries

Study of the Asian market: Executive summary (cont.)

Regional alliances

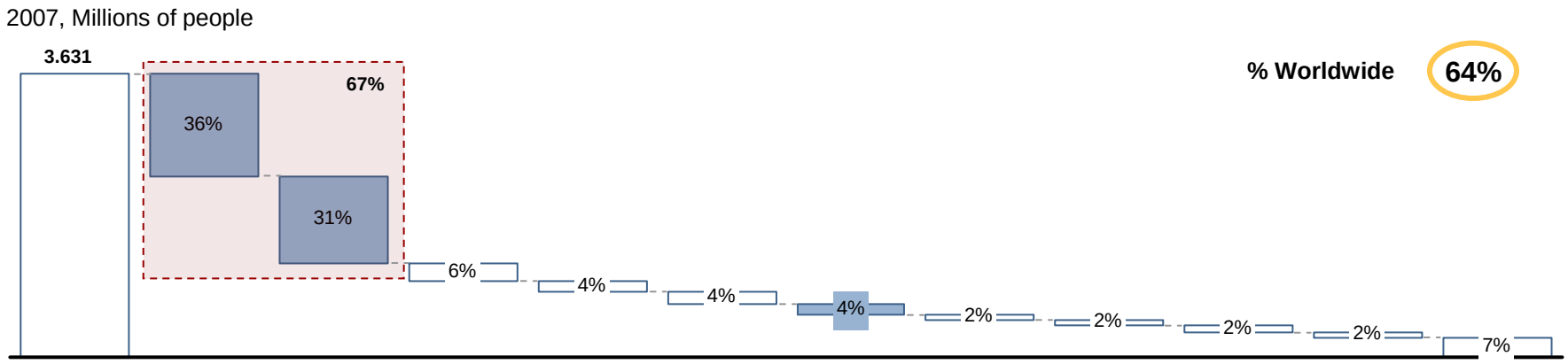
- The Asia-Pacific market has three independent operator alliances:
  - The independent Bridge alliance, with 207M subscribers, is led by Singtel and covers 11 countries, offering various roaming services for voice and data to both business and leisure travelers
  - The independent alliance Conexus, formed by competitors in response to the Bridge alliance, is more focused on corporate customers and data roaming services
  - The alliance of independent operators, AMI (Asia Mobility Initiative), was the first Asian alliance, but is losing members and has a service offering that is only slightly differentiated

Document contents

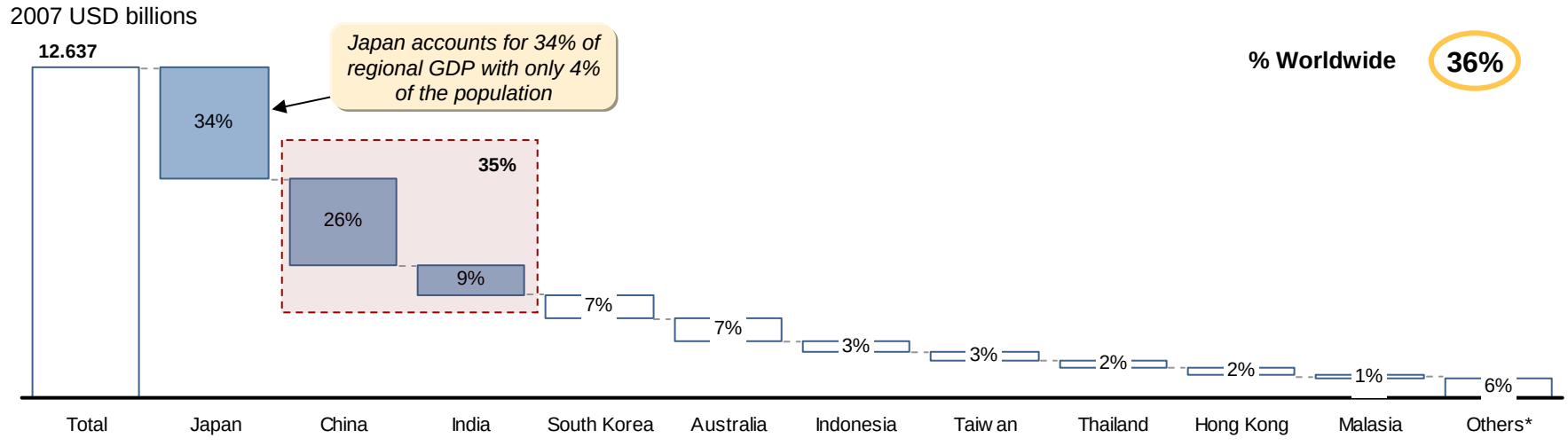
Figure 59 - Population and nominal GDP per country, as a proportion of Asia-Pacific total

In Asia-Pacific, China and India account for 67% of the population and 35% of GDP

Population



Nominal GDP



* Singapore, Pakistan, Philippines, New Zealand, Bangladesh, Vietnam, Sri Lanka, Myanmar, Brunei Darussalam, Nepal, Cambodia, Papua New Guinea, Laos, Mongolia, Fiji, Bhutan, Maldives, East Timor, Vanuatu, Samoa, Solomon Islands, Tonga, Kiribati

** South Korea, Malaysia, Nepal, Taiwan, Australia, Sri Lanka, Hong Kong, Laos, Papua New Guinea, Singapore, New Zealand, Mongolia, East-Timor, Fiji, Bhutan, Solomon Islands, Brunei Darussalam, Maldives, Vanuatu, Samoa, Tonga, Kiribati

Source: IMF, World Economic Outlook Database, October 2007

Figure 60 - Evolution of PPP adjusted per capita GDP in Asia-Pacific and country ranking for 2007

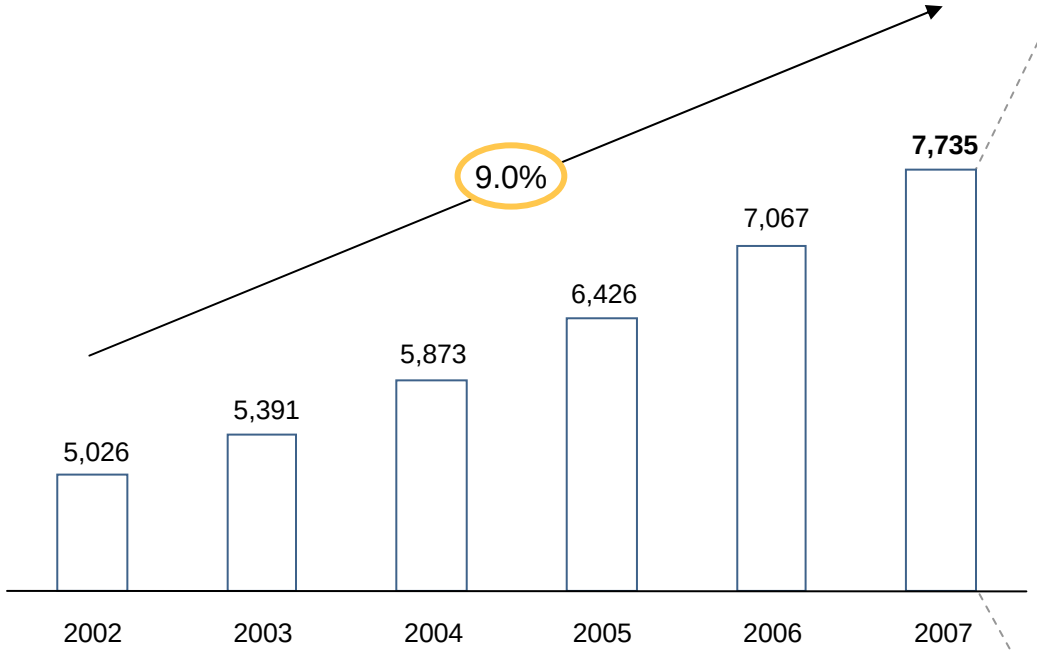
The region has low levels of per capita GDP compared to South America (USD ~8,000 vs. 10,000), which is driven by highly populated emerging countries (eg. India, China and Indonesia)

2007

CAGR 02-07

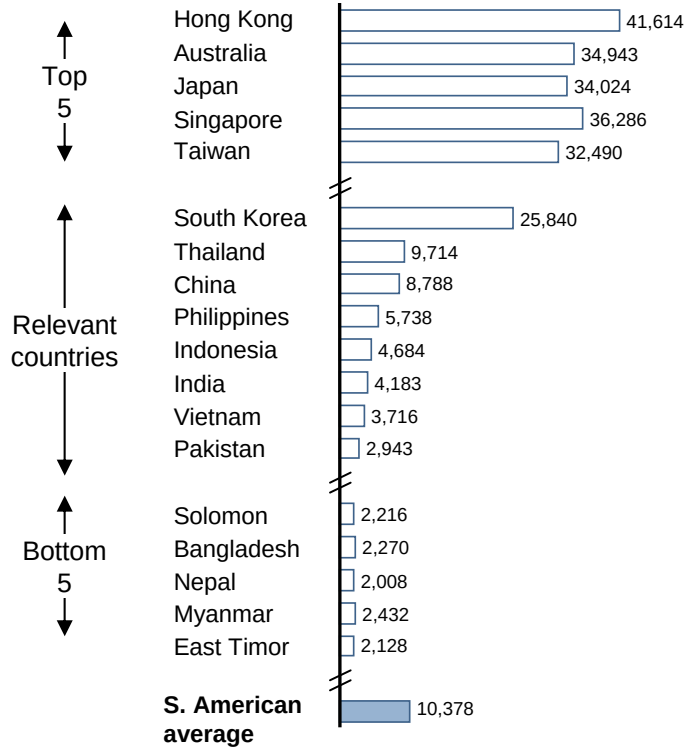
PPP* adjusted per capita GDP in Asia-Pacific

Nominal USD



Country ranking, Asia-Pacific

2007, Nominal USD



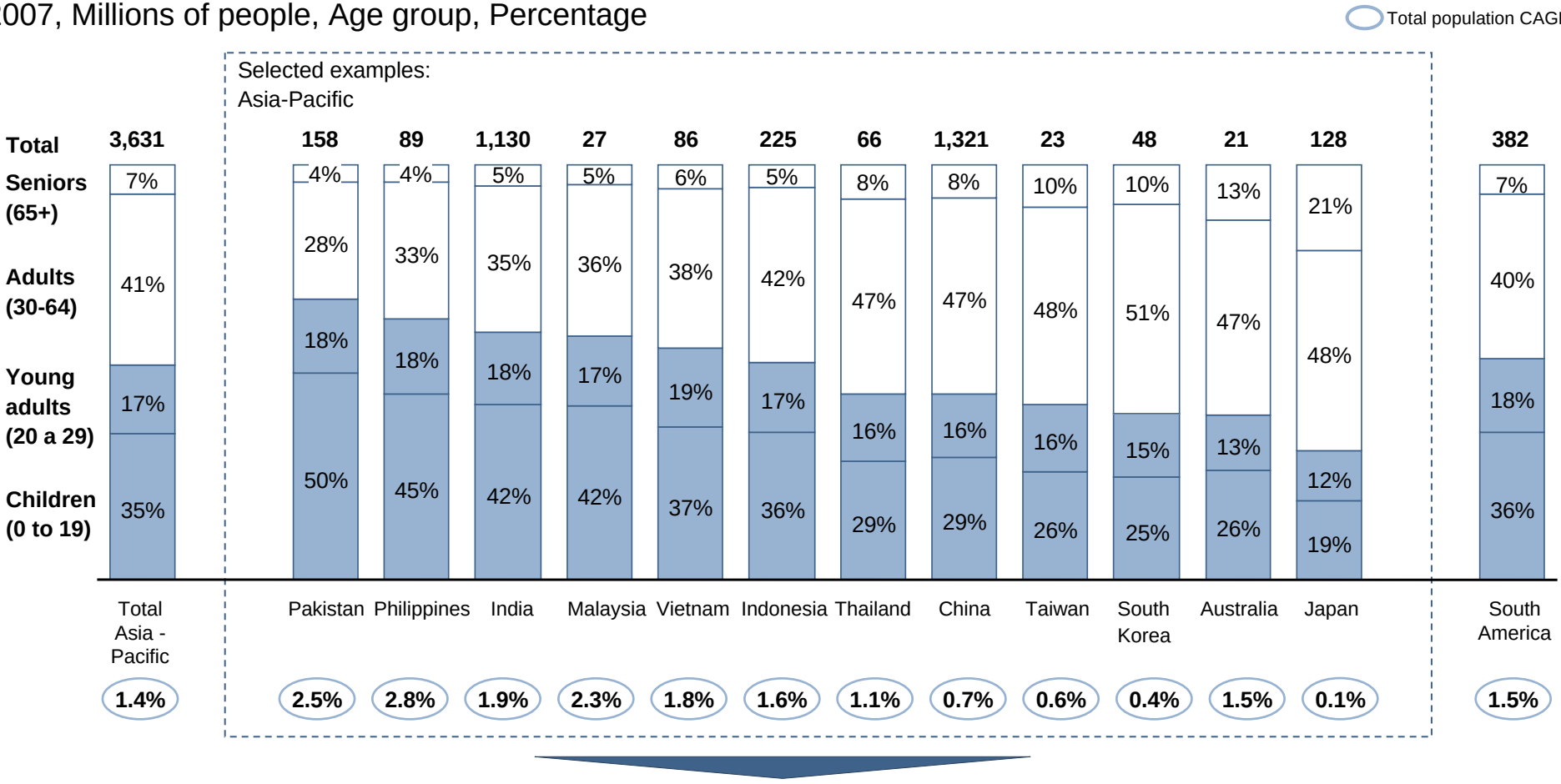
* Purchasing power parity

Source: IMF, Work team analysis

Figure 61 - Analysis of population by age for Asia-Pacific and selected countries

The age distribution of the population in Asia is similar to that of South America

2007, Millions of people, Age group, Percentage



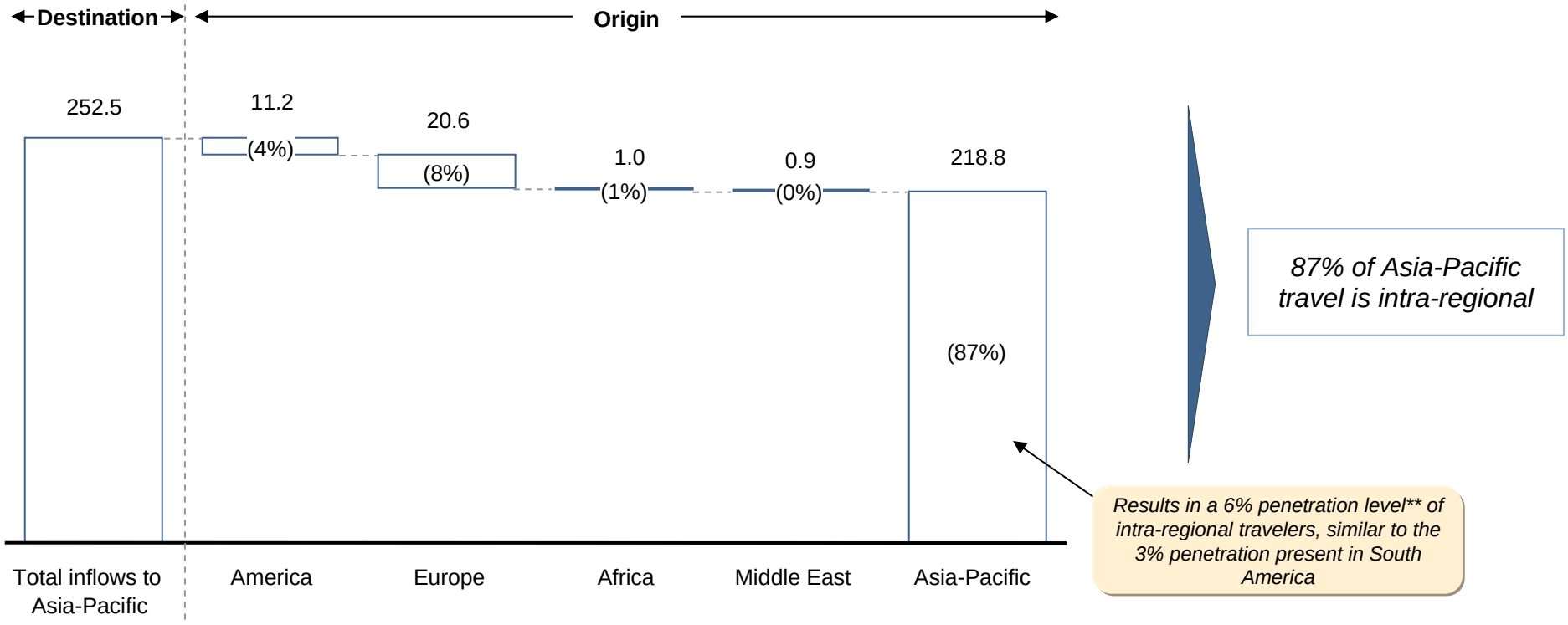
In several developing Asia-Pacific countries there are high rates of population growth, significantly higher than those in South America

Source: EIU, Agency for National Statistics, Work team analysis

Figure 62 - Analysis of travel inflows to Asia-Pacific, by region of origin

Intra-regional travel* in the Asia-Pacific region has a low penetration level**, at 6%, which is similar to levels in South America

2005, Millions of travelers per year

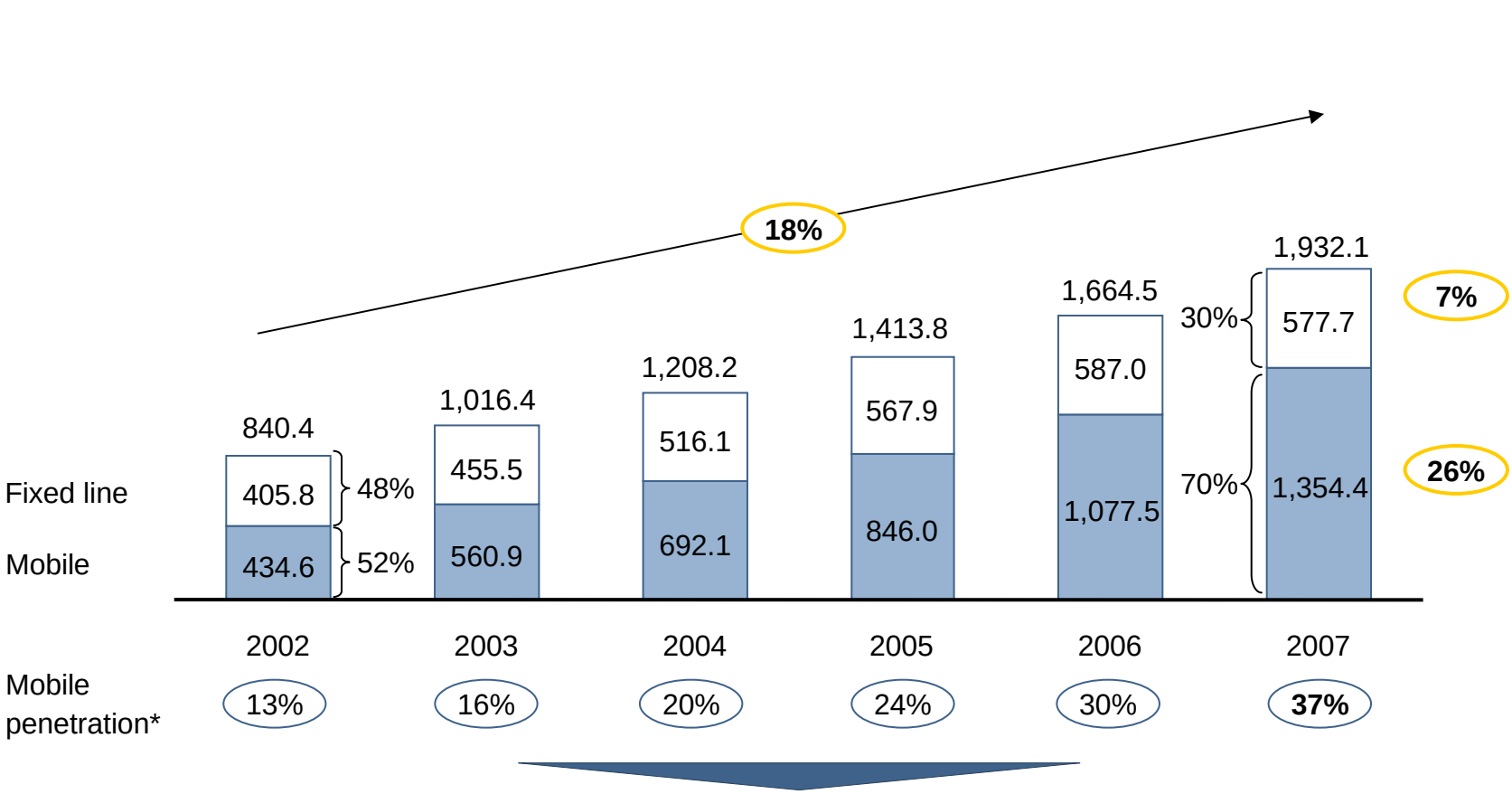


* Annual visits to countries within the region
** Percentage of intra-regional travel over population in the region
Source: WTO, Work team analysis

Document contents

Figure 63 - Analysis of the evolution of fixed line and mobile subscriptions in Asia-Pacific

The Asian mobile market has shown strong development (26% per year) and has been the main component of growth in the telecommunications market



- The Asia-Pacific mobile market grew 26% annually from 2002 – 2007 and reached 70% of telecommunications subscriptions in 2007
- Mobile service coverage reached 37% of the population in 2007

* Mobile subscriptions over total population

Source: ITU, IMF

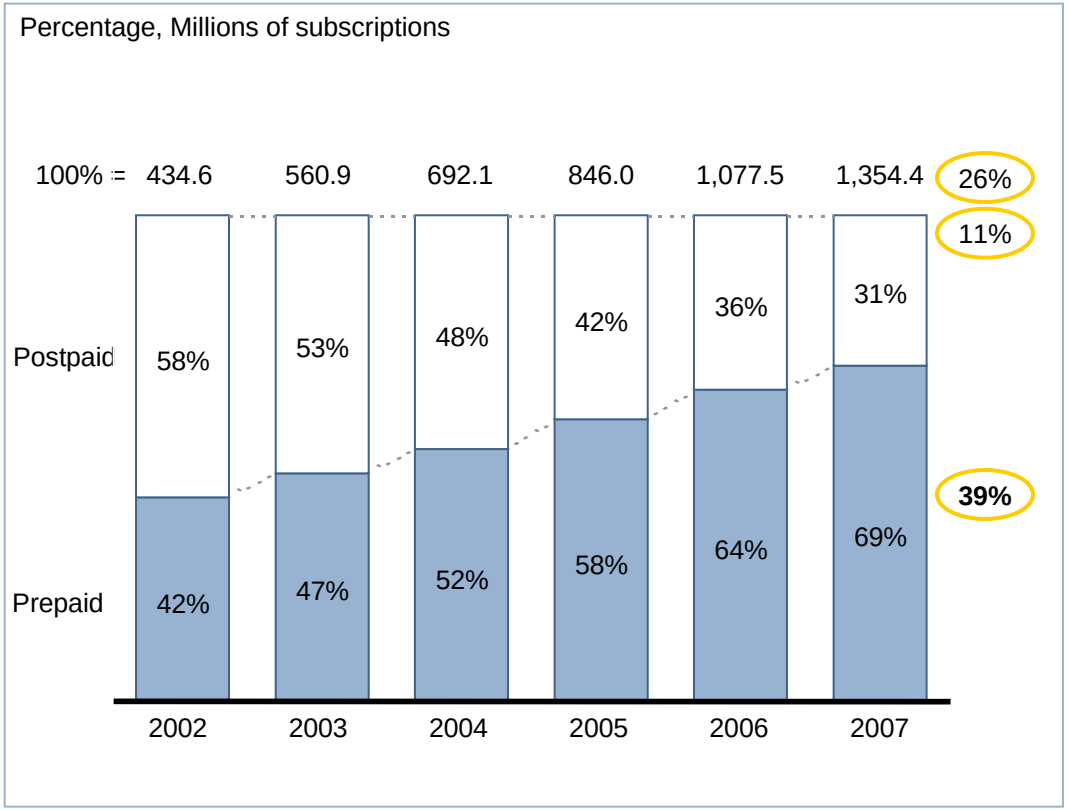
Figure 64 - Breakdown of mobile subscriptions in Asia-Pacific, by type of service and country ranking

Although the Asia-Pacific prepaid market has been growing at 39% annually since 2003 and reached 69% of total subscriptions in 2007...

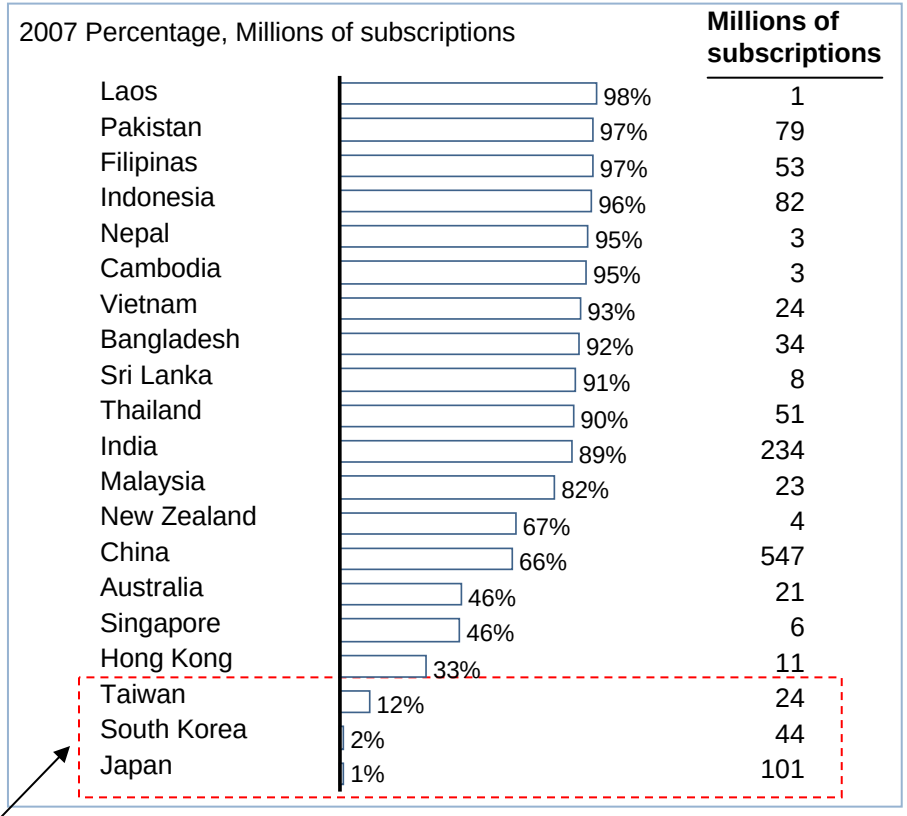
Millions of subscriptions, Percentage

CAGR 02-07

Breakdown of mobile subscriptions in Asia-Pacific, by type of service



Percentage of prepaid, by country (Top 20*)



In these markets, postpaid is the dominant service due to cultural, idiosyncratic and economic factors (these countries have the highest GDP in the region) that allow the widespread use of postpaid, which generally offers cheaper rates than prepaid

* Selected according to the largest subscriber base

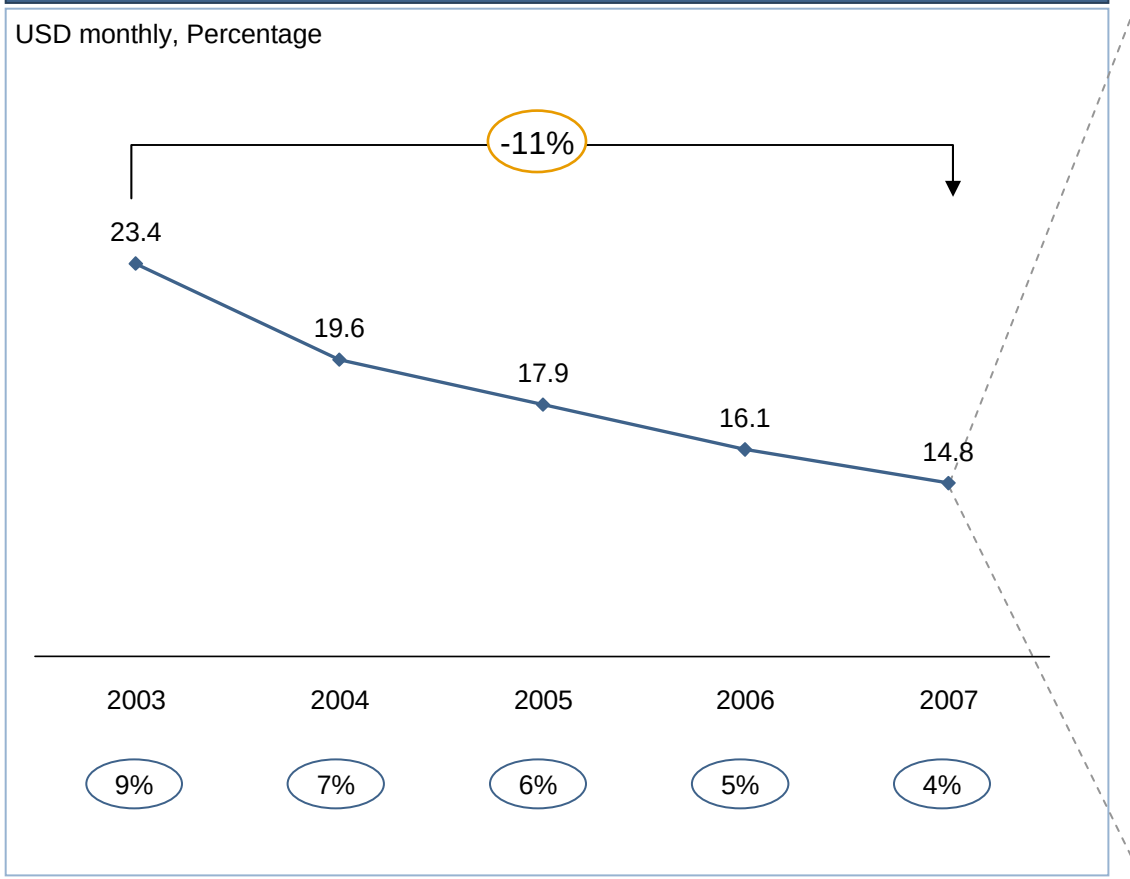
Source: ITU, Yankee Group, WSCI Informa, Work team analysis

...ARPU in the Asia-Pacific region has been declining sharply at 11% annually since the same period...

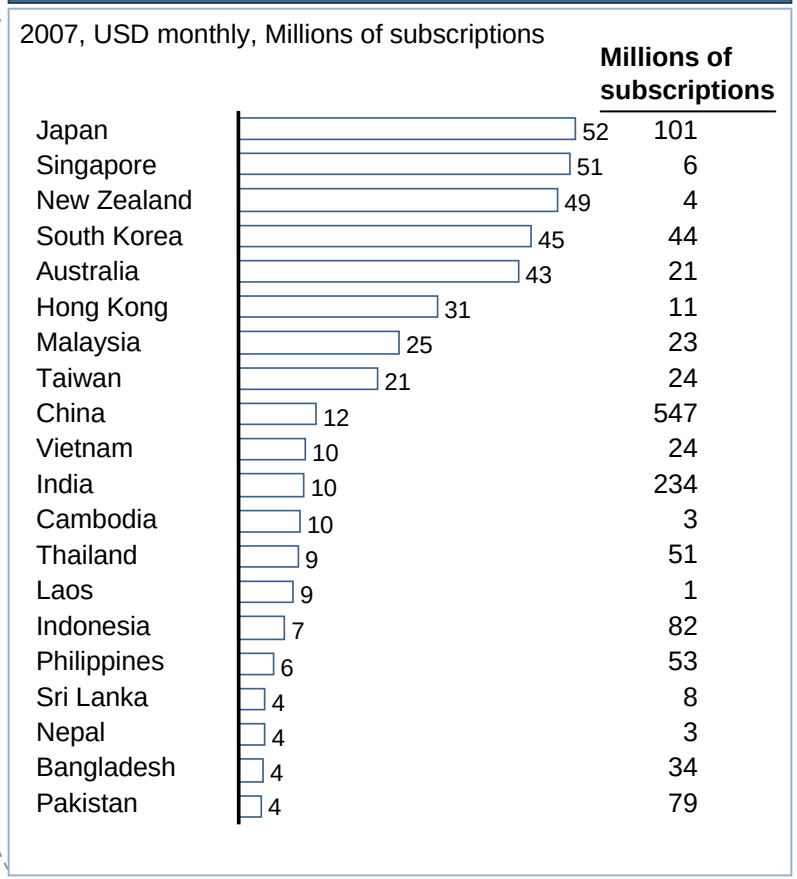
USD monthly, Percentage

% Disposable income**
CAGR 03 - 07

Evolution of ARPU* for mobile services in Asia-Pacific



Detail of mobile ARPU, by country (Top 20***)



* Weighted average of subscribers by country
** PPP adjusted
*** Selected from its subscriber base
Source: Yankee Group, Work team analysis

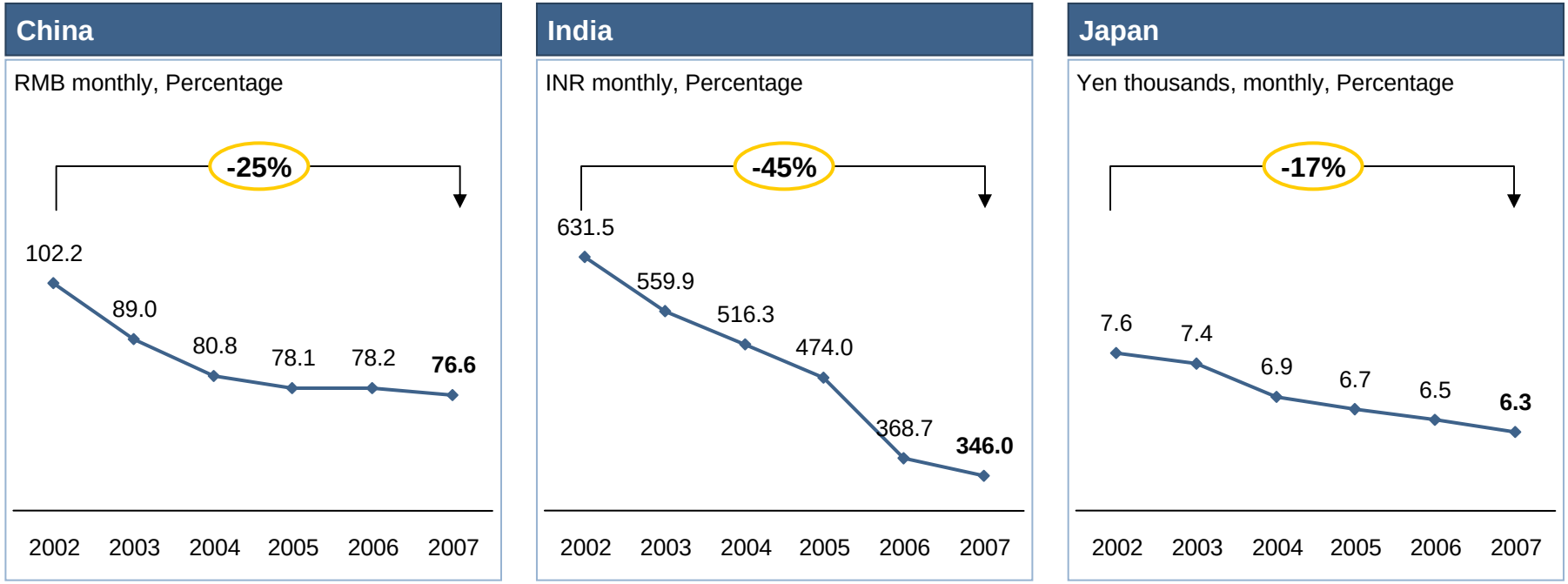
Figure 66 - Evolution of ARPU for mobile services in China, India, and Japan, measured in local currency

...which, when measured in local currency, shows a sharp decrease in ARPU at the national level

NON-EXHAUSTIVE

Local currency, Evolution of ARPU for mobile services, Percentage

CAGR



ARPU is declining sharply as operators, following international trends, compete to expand their user base by attracting lower-income sectors

Source: Merryll Lynch, Work team analysis

Figure 67 – Technology track in Asia-Pacific and breakdown per country

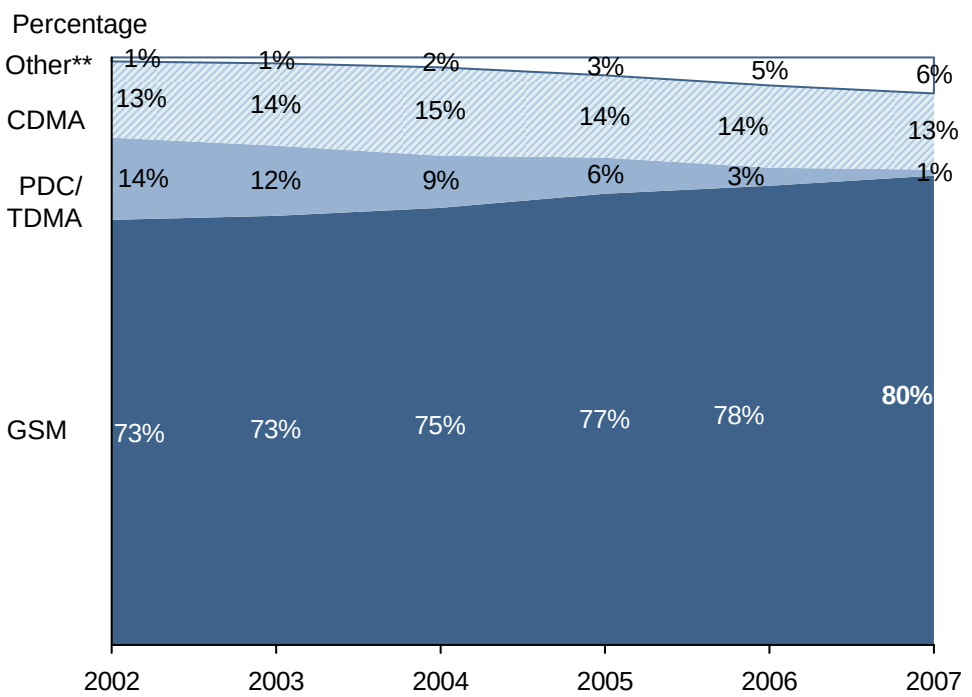
By the end of 2007, 80% of handsets in Asia-Pacific were using GSM

Percentage

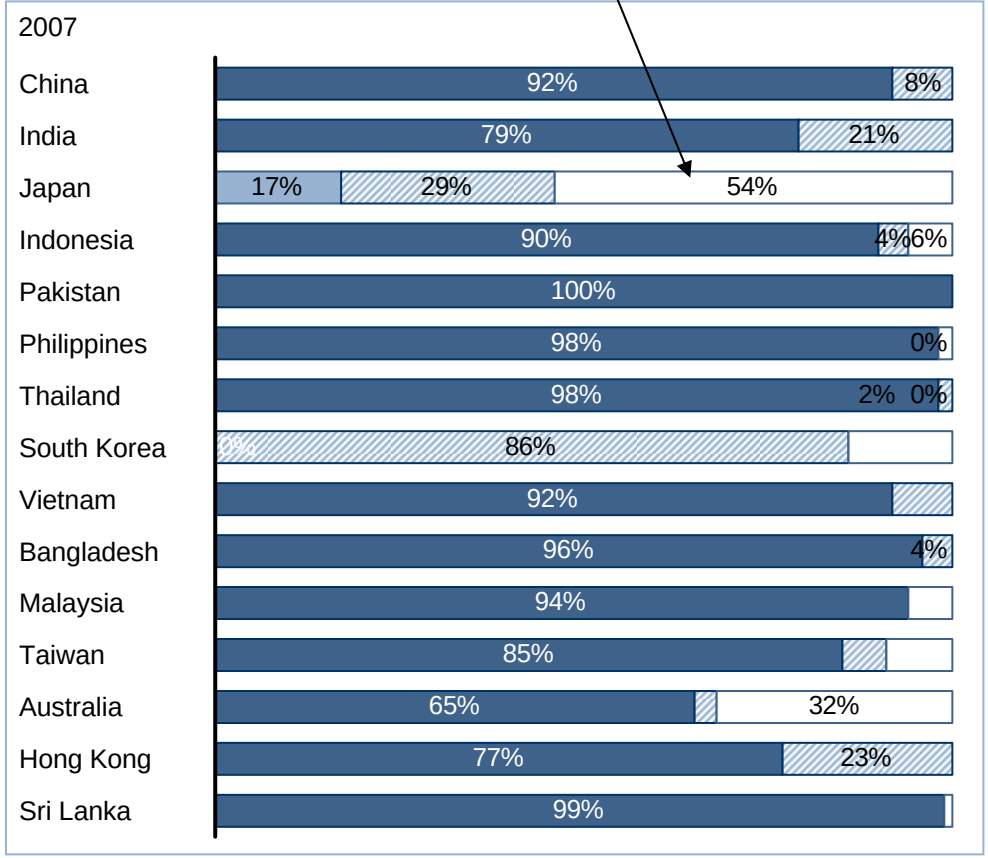
Japan differs from the rest of the region with a strong focus on 3G (54% UMTS over the total)

GSM
PDC*
CDMA
Other**

Technology track in Asia-Pacific



Technology breakdown, per country



* Technology based in TDMA
** 3G (UMTS), TDMA, NMT, TACS, IDEN and analog
Source: Informa, WCIS, Work team analysis

Figure 68 - Main regional telecommunications regulation associations in Asia-Pacific

There are multilateral associations in the Asia-Pacific region,...

Associations	Type	Objectives	Member countries
APT (Asia-Pacific Telecommunity)	• Association of regulatory agencies and communication ministries	• Promote the development of telecommunication services and information infrastructure: - Cooperation to define technical standards - Market research - Facilitate coordination among members	 • Afghanistan • Australia • Bangladesh • China • India • Indonesia • Iran • Japan • North Korea • South Korea • Malaysia • Mongolia • Myanmar • Nepal • New Zealand • Pakistan • New Guinea • Philippines • Samoa • Singapore • Sri Lanka • Thailand • Vietnam • Others*
ASEAN (Association of Southeast Asian Nations)	• Association of governments and foreign ministries	• Accelerate economic growth, social progress and cultural development in the region • Promote regional peace and stability	 • Indonesia • Malaysia • Philippines • Singapore • Thailand
SAARC (South Asian Association for Regional Cooperation)	• Association of governments and foreign ministries	• Accelerate economic and social development in the region	 • Bangladesh • Bhutan • India • Maldives • Nepal • Pakistan • Sri Lanka

*Others: Bhutan, Brunei, Cambodia, Fiji, Maldives, Marshall Islands, Laos, Micronesia, Nauru, Palau, Samoa, Tonga

Source: Association web sites, Work team analysis

Figure 69 - Regulatory association initiatives relating to international roaming in Asia-Pacific

...although their performance in the international roaming market has been very limited

Associations	Initiatives related to international roaming	Description
APT (Asia-Pacific Telecommunity)	• Working groups for regional integration	• Highlight the need for the integration of network technical standards to facilitate the provision of roaming services
ASEAN (Association of Southeast Asian Nations)	• Hanoi Plan of Action (Dec. 1997)	• Plan for economic development in East Asia, including telecommunications • Determine the intensity of efforts to develop regional roaming
SAARC (South Asian Association for Regional Cooperation)	• Telecommunications Plan of Action (Nov. 2003)	• Determine that international roaming is fundamental to regional telecommunications integration... • ... and that member states should facilitate or encourage investment in roaming related equipment and infrastructure

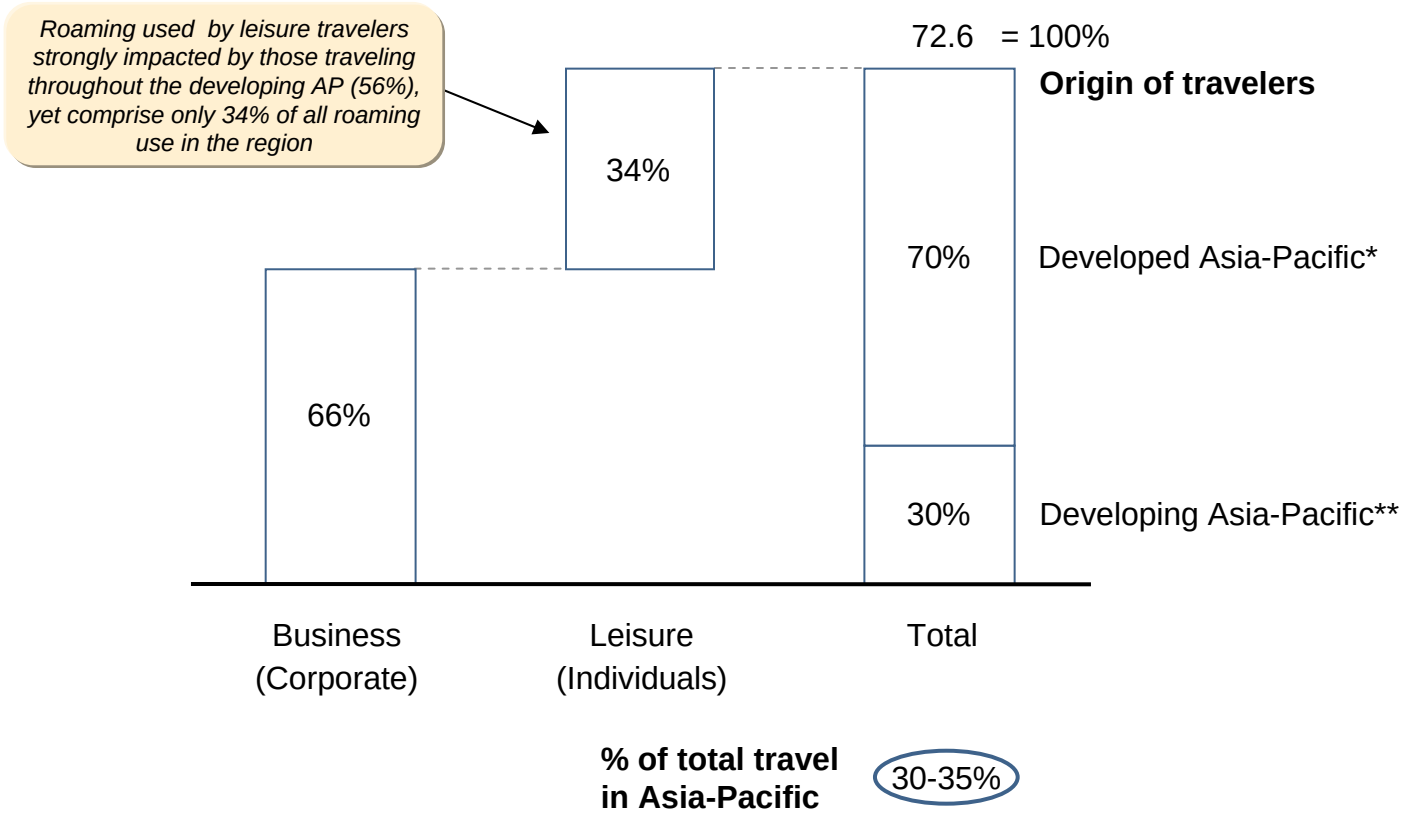
- The main measures from the Asian multilateral associations have been limited to:
  - Defining technical standards
  - Declaring intent to cooperate to increase roaming coverage in the region (but without significant practical results)

Source: Association web sites, Work team analysis

Document contents

Travelers from Asia-Pacific conduct ~73 million trips per year using roaming, which represents 30-35% of the total trips in the region

2008, Millions of roaming travelers, Percentage



* Includes Singapore, Taiwan, Australia, Hong Kong, Japan, South Korea and New Zealand

** Includes Bangladesh, Bhutan, Brunei, Cambodia, China, Cocos I., Cook I., East Timor, Federated States of Micronesia, Fiji, French Polynesia (ex-Tahiti), Guam, India, Indonesia, Kiribati, Laos, Macau, Malaysia, Maldives, Marshall I., Mongolia, Myanmar, Nauru, Nepal, New Caledonia, Niue, Norfolk I., North Korea, Northern Marianas, Pakistan, Palau, Papua New Guinea, Philippines, Samoa, American Samoa, Solomon I., Sri Lanka, Thailand, Tonga, Vanuatu and Vietnam

Source: Informa, Work team analysis

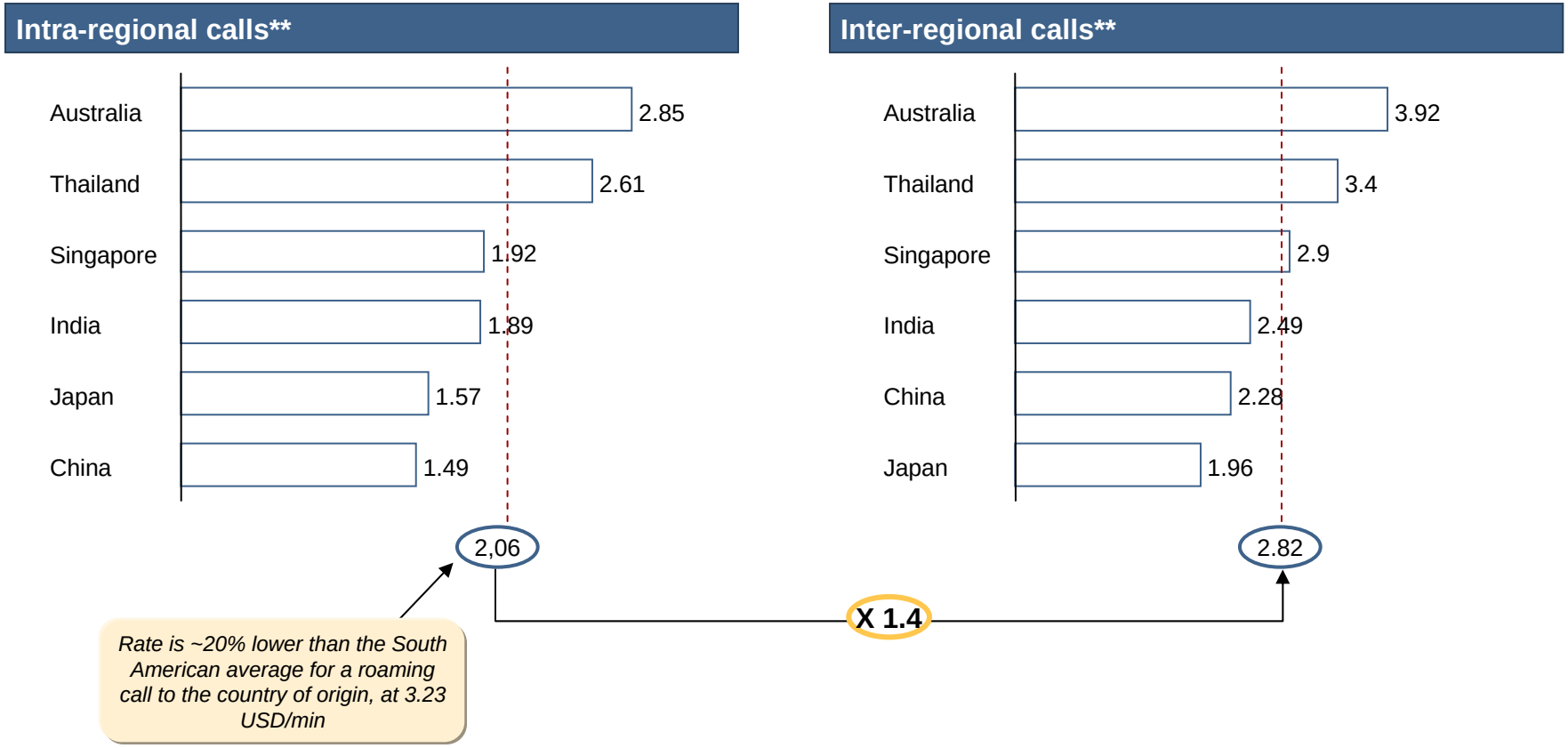
Figure 71 - Comparison of inter-operator tariffs for intra-regional and inter-regional calls in Asia-Pacific

The rates for roaming calls are cheaper than in South America (~20% lower)...

NON-EXHAUSTIVE

2008, USD per minute*

Average



*Net of taxes

**For basic postpaid roaming service, without considering special packages but including set-up fees for calls of at least 5 minutes

Note 1: Intra-regional calls are those between the countries listed in the chart

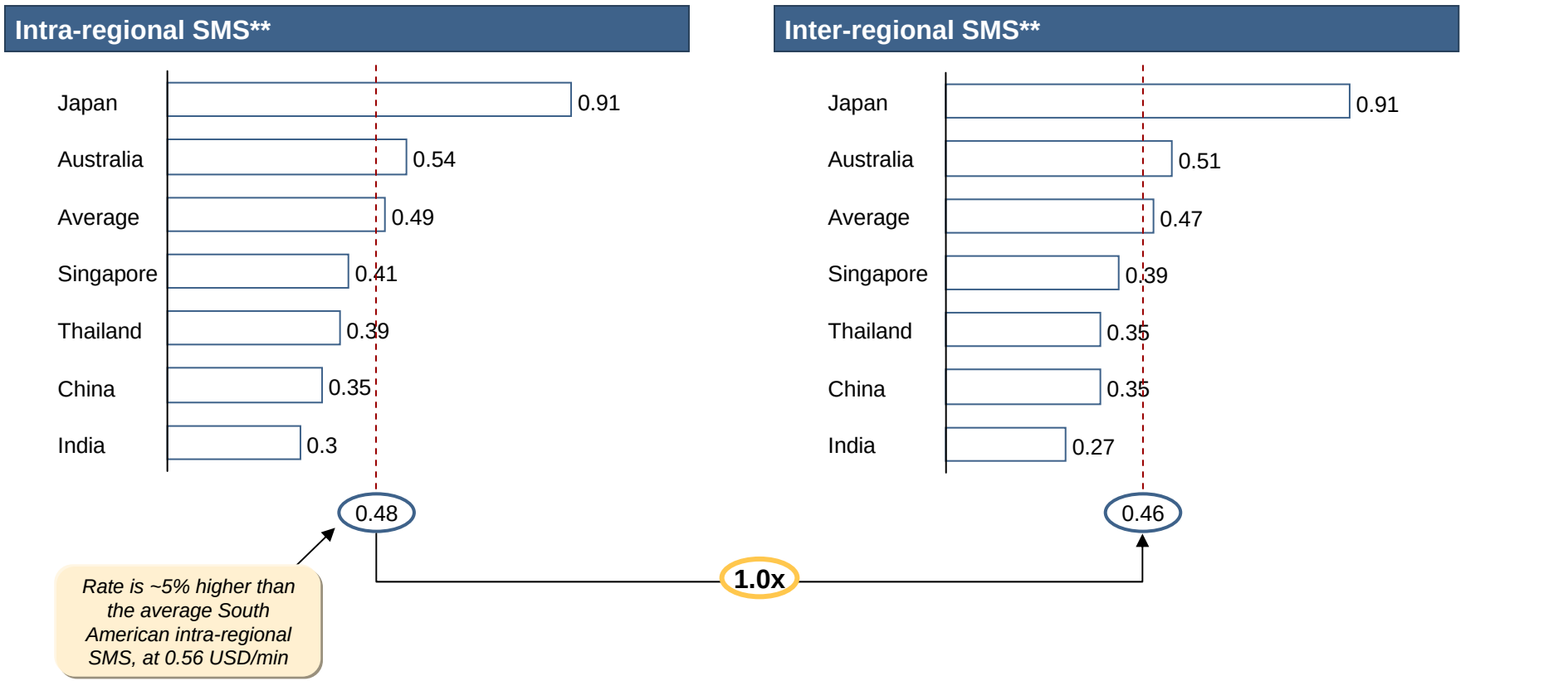
Source: Informa

Figure 72 - Comparison of inter-operator tariffs for intra-regional and inter-regional SMS in Asia-Pacific

...while the rates for SMS while in roaming are slightly higher than in South America (~5% higher)

NON-EXHAUSTIVE

2Q08, USD per message*



*Net of taxes

**For basic postpaid roaming service, without considering special packages

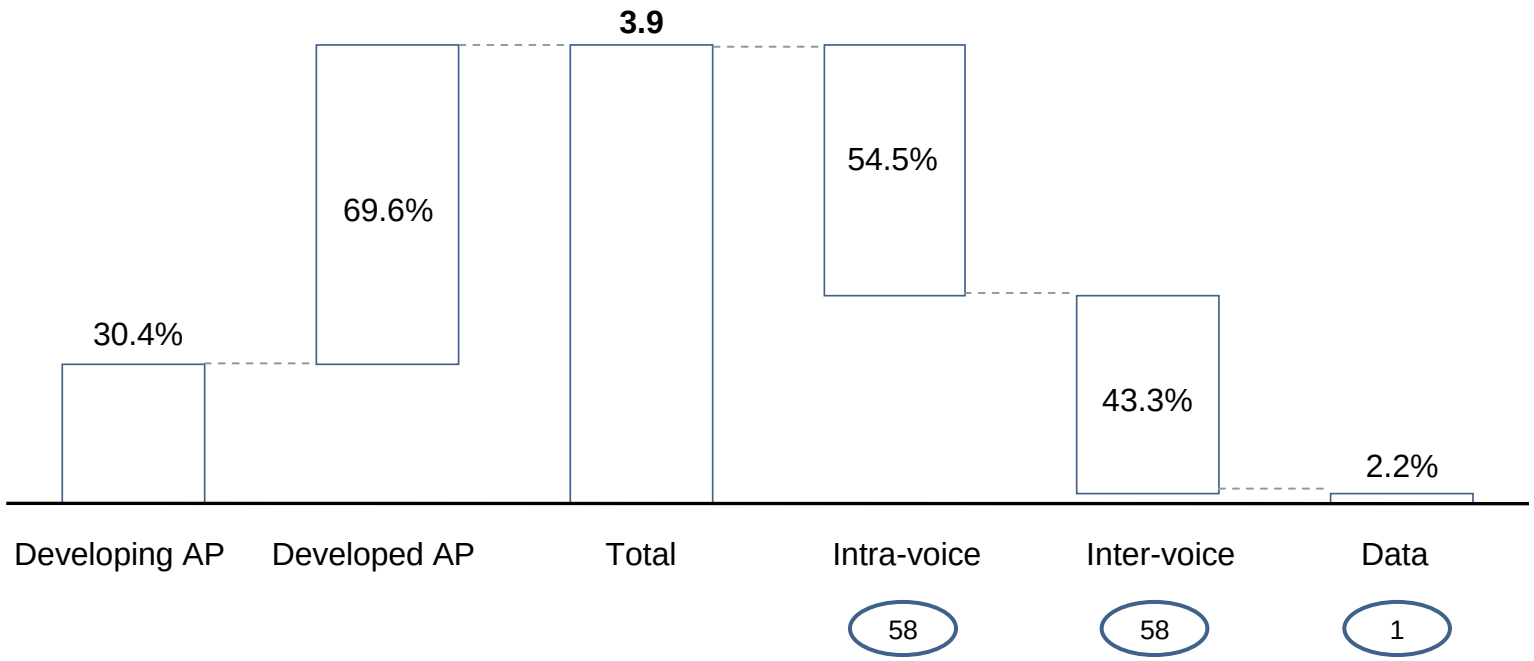
Note 1: Intra-regional SMS are those between the countries listed in the chart

Source: Informa

Figure 73 - Revenue from travelers using roaming in Asia-Pacific, by type of service

Roaming revenue from Asians while traveling (outbound) reached USD 3.9 billion, with 70% derived from the developed Asia-Pacific countries

2008, USD billions, Percentage

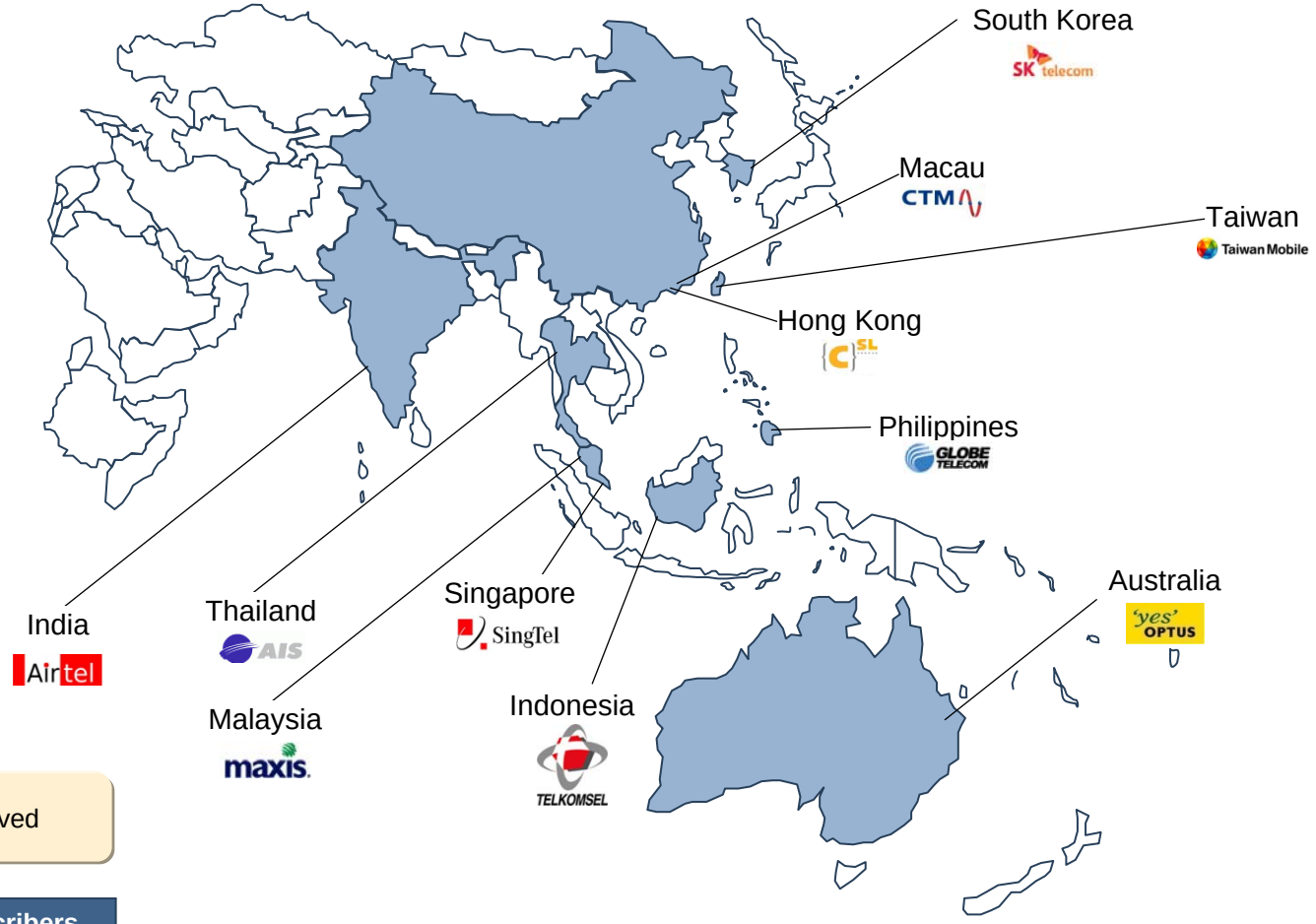


Source: Informa, Work team analysis

Document contents

Figure 74 - Regional alliances: Bridge alliance - coverage and member operators

The Bridge alliance is led by Singtel, and covers 11 countries with 207M subscribers,...



11 operators involved

Countries	Subscribers
• 11	• 207M

Source: Bridge alliance web site

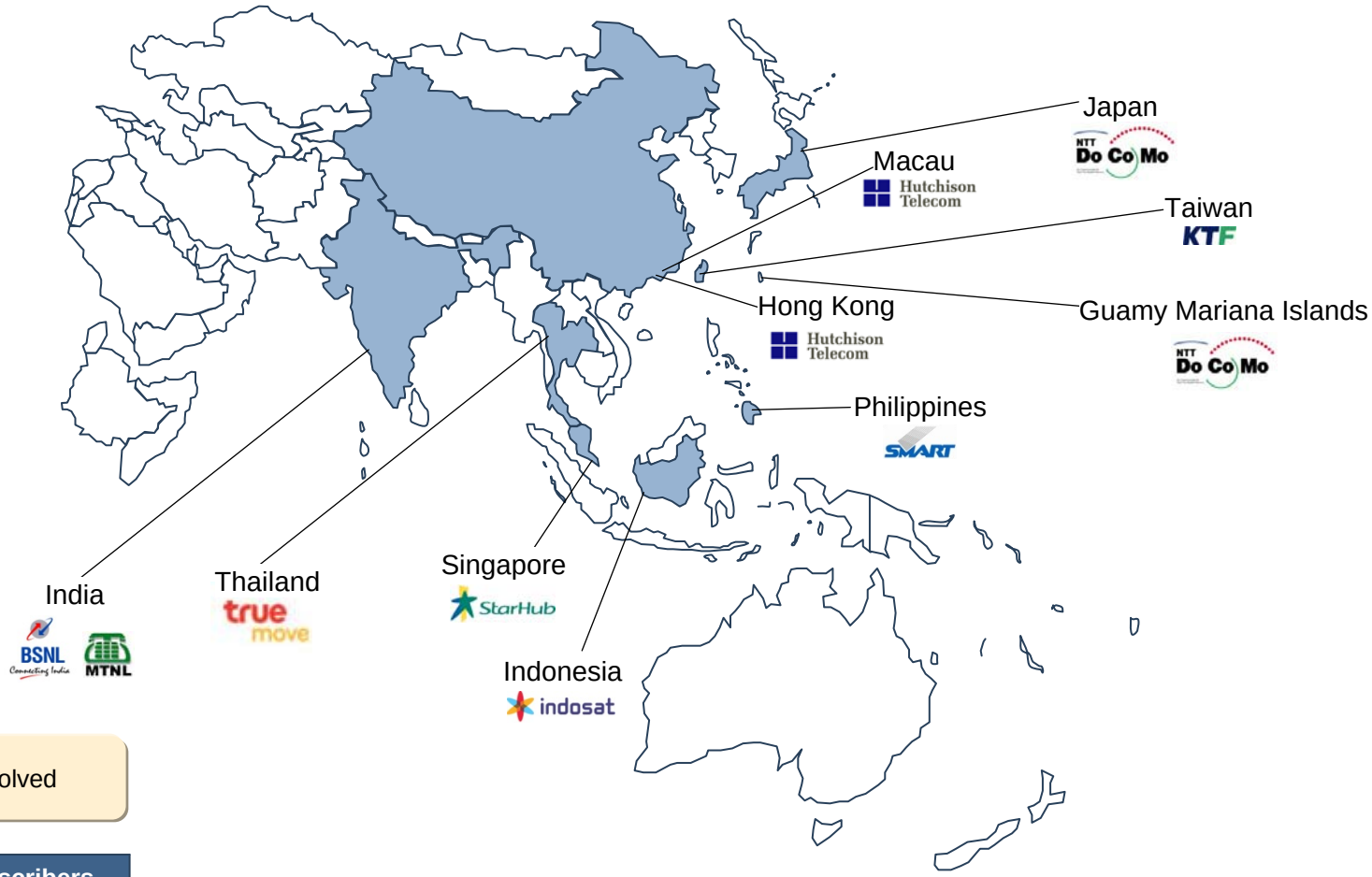
...offering diverse voice and data roaming services to both business and leisure travelers

		Description
Type of alliance		• Established in Singapore in 2004 as a joint venture company, in which members have equal representation • Board consisting of CEOs and directors of member operators
Brand and positioning		• Bridge brand incorporated by operators in the form of co-branding (own + Bridge) • Services oriented toward individual and corporate customers • The terms of the alliance are: - Any operator may have a preferential arrangement with any member of the alliance - Members are required to provide technological assistance to offer services that enable the customer to perceive roaming service as if it were a local service
Main features of the offer	**Convenience**	• Special access code for voice mail and customer service • International customer service positions for: - Replacement of SIM card if lost or stolen - Adding credit to prepaid using local currency - Responding to doubts about roaming service
	Special prices	• Discounted rates for voice calls and messages • Flat fee for data roaming service: - Options for rates with distinct duration periods: daily, weekly, monthly ... - ... with traffic limits of: 5, 15 or 40MB
	Global management	• Affiliate Program with discount benefits (eg. rental cars, hotels) for members • Mobile portal with tourist information of the visited country

Source: Bridge alliance, Optus and CSL Hong Kong web sites

Figure 75 - Regional alliances: Conexus alliance - coverage and member operators

The Conexus independent alliance was formed by competitors in response to the Bridge alliance,...



11 operators involved

Countries	Subscribers
• 11	• 190M

Source: Conexus web site

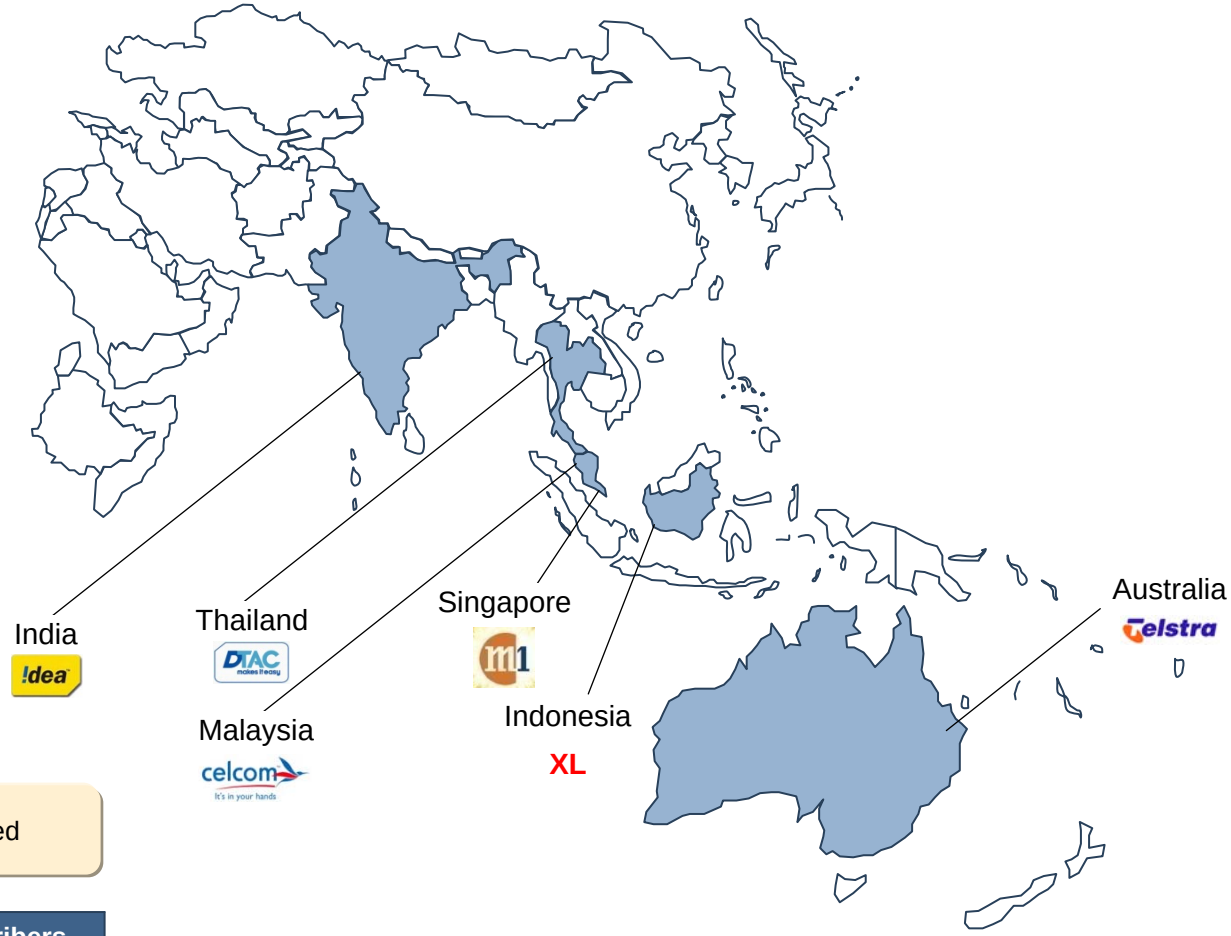
...but is more focused on corporate clients and data roaming services

		Description
Type of alliance		• Independent operators alliance • The main members at present are Smart Communications (Philippines) and NTT DOCOMO (Japan)
Brand and positioning		• The Conexus brand is not used commercially • Alliance with focus on corporate customers (multinationals)
Main features of the offer	**Convenience**	• Special access code for voice mail and customer service • Replacement of SIM card if lost or stolen, only for corporate customers
	Special prices	• Flat fee for data roaming service and a daily limit of unlimited or 2, 5 and 9MB, depending on carrier • Special packages for corporate clients with discounts for intra-group calls
	Special services	• Affiliate Program with discount benefits (eg. airline tickets, hotels) for members
	Global management	• Global account manager for multinationals • Consolidated service usage reports for users in various countries (employees of subsidiaries of multinational companies)

Source: Conexus alliance, Smart Communications and NTT Docomo web sites

Figure 76 - Regional alliances: AMI alliance - coverage and member operators

The alliance of independent operators, AMI (Asia Mobility Initiative), was the first Asian alliance, but it is losing members...



6 operators involved

Countries	Subscribers
• 6	• 77M

Source: Informa

...and only has a moderately differentiated offer

		Description
Type of alliance		• Alliance of independent operators formed in 2003 • The main current members are Idea Cellular (India) and XL (Indonesia) • Established in 2003, the alliance was weakened by the departure of key members: CSL (Hong Kong), Maxis (Malaysia), Smart (Philippines) and Telstra (Australia)
Brand and positioning		• The AMI brand is not used commercially • Alliance focused on: - Voice and data roaming with IOTs at differentiated discounts - Bulk purchases of handsets, SIM cards and content
Main features of the offer	**Convenience**	• Interoperability for MMS and data services (GPRS) • Caller ID
	Special prices	• Each operator has its own offer with lower prices for voice and data roaming on the networks of alliance members

Source: MobileOne, Idea and XL web sites

Document contents

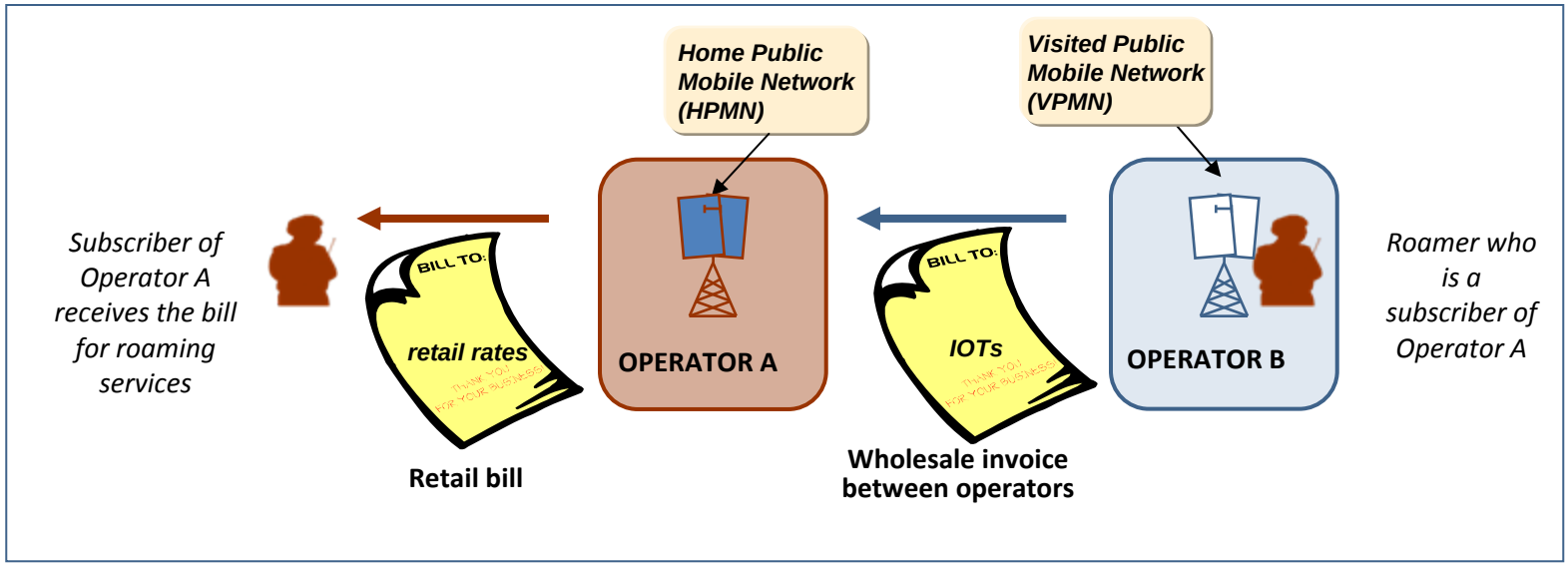
Introduction

- Stage I of this Report described the integral components of the rates and the wholesale cost of roaming in both incoming and outgoing roaming scenarios as well as methods for transferring these costs to retail rates.
- The methods described in Stage I cover the different international alternatives
- This Stage compares inter-operator tariffs in the EU to those in the South American region

The home operator charges the user for international roaming using its own retail pricing that includes the wholesale charges by the visited network operator

CONCEPTUAL

Voice roaming



1. The operator visited by the roamer bills the home operator for the related use of the visited network
2. The roamer is credited by the home operator and it is the home operator that bills this subscriber for the roaming services

- Inter-operator tariffs
  - The standard wholesale tariffs or IOTs (inter-operator tariff) are defined by the visited operator and are non-discriminatory, confidential and apply to all operators
  - Special agreements between operators may include discounts on the standard rates
- Retail rates
  - Independent of, but based on IOT charges

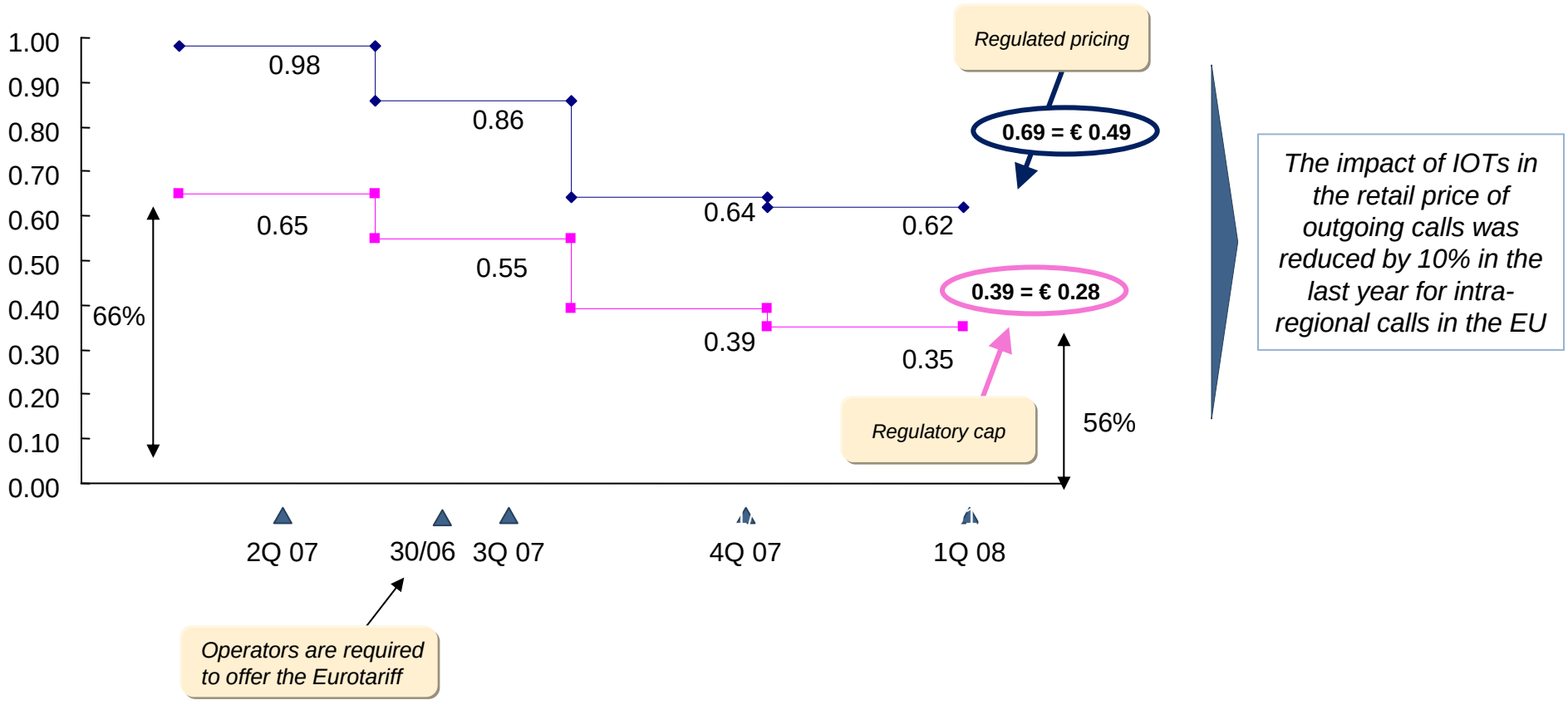
Figure 77 - Comparative analysis of inter-operator and retail rates for roaming in the EU

An important component in the retail rate of outgoing calls is IOTs, which in the EU represent 56% of the final rate

USD per minute, prices without taxes within the EU/EEA

Outgoing calls
IOT (inter-operator tariff)
1 Euro = USD 1.4039

Comparison of inter-operator and retail rates for outgoing calls

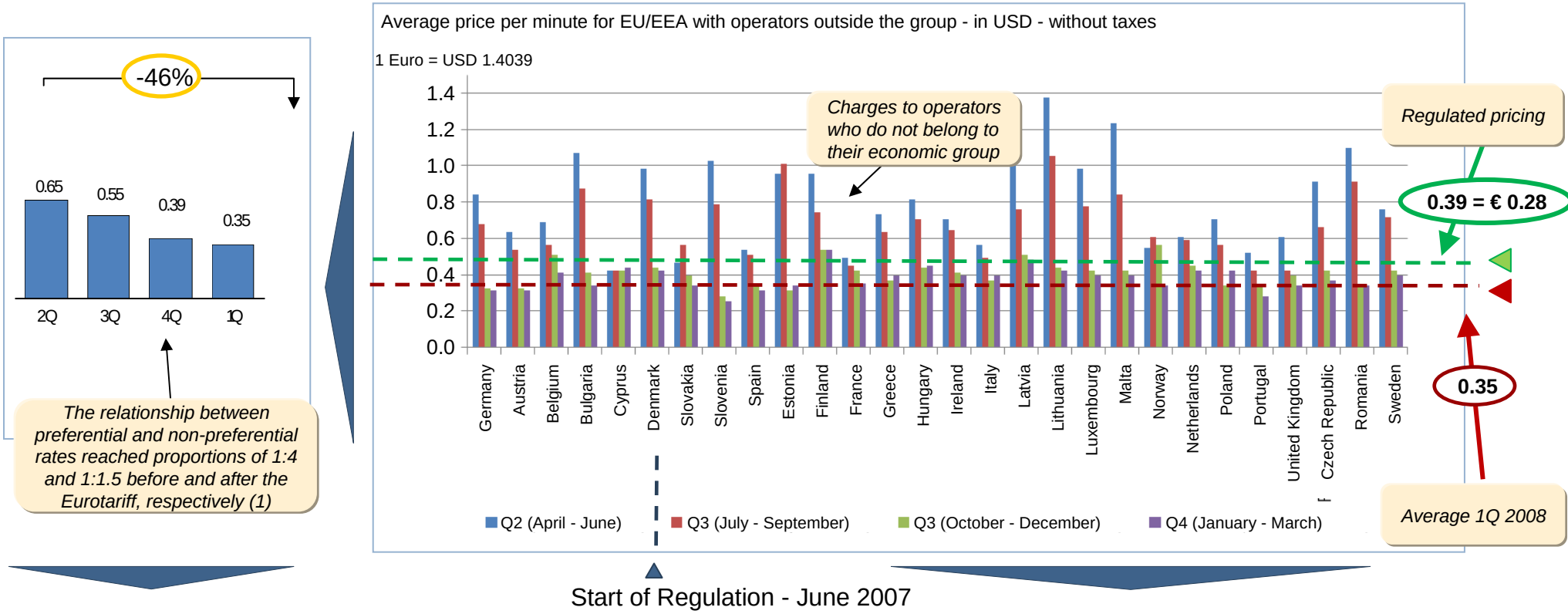


Source: ERG Benchmark Data Report for October 2007 - March 2008

Figure 78 - Inter-operator tariffs for voice services in the EU

During the last year the average EU IOT was reduced by 46%, to an average of USD 0.35 per minute for voice

Average IOT per minute of voice for the EU between April 2007 and March 2008



Tariffs were reduced by 46% in the past year

European IOTs to operators outside the same economic group, are on average below the cap set by regulation

Source: ERG Benchmark Data Report for October 2007 - March 2008 (1) Connect2roam Study - Roaming Data Services - June 2008

Information on IOTs in the EU is contained in an ERG* comparative report in order to support the Eurotariff

Characteristics of the report	• The report provides information on the evolution of wholesale and retail services for voice, SMS and data • The first round of data collected information from the period April to September 2007 and the second round from October 2007 to March 2008 • The subsequent rounds will collect information in periods of 6 months
Aim	• The purpose of the report is to: - Provide evidence of results from regulation - Give information for the revision and/or extension of regulation
Methodology and survey sample	• More than 140 operators (including MVNOs) provided information - The ERG estimates that the report covers 95% of international roaming users in the EU • Using the IOTs of each operator (inbound): - Based on the billing of each visited operator, through IOTs, to the home operator for the use of roaming by its subscribers on the visited network • The criteria used are: - Information is based on the amount of and billed minutes of voice, messaging and data (MB) - Traffic is divided into: EU/EEA and the rest of the world. EU/EEA is further divided into traffic within and outside the economic group to which the operator belongs - Utilized IOTs of operators of other groups are published - For retail there is a with or without the Eurotariff subdivision - The information was originally reported in Euros (€) - The information is before VAT and includes volume discounts

* European Regulation Group

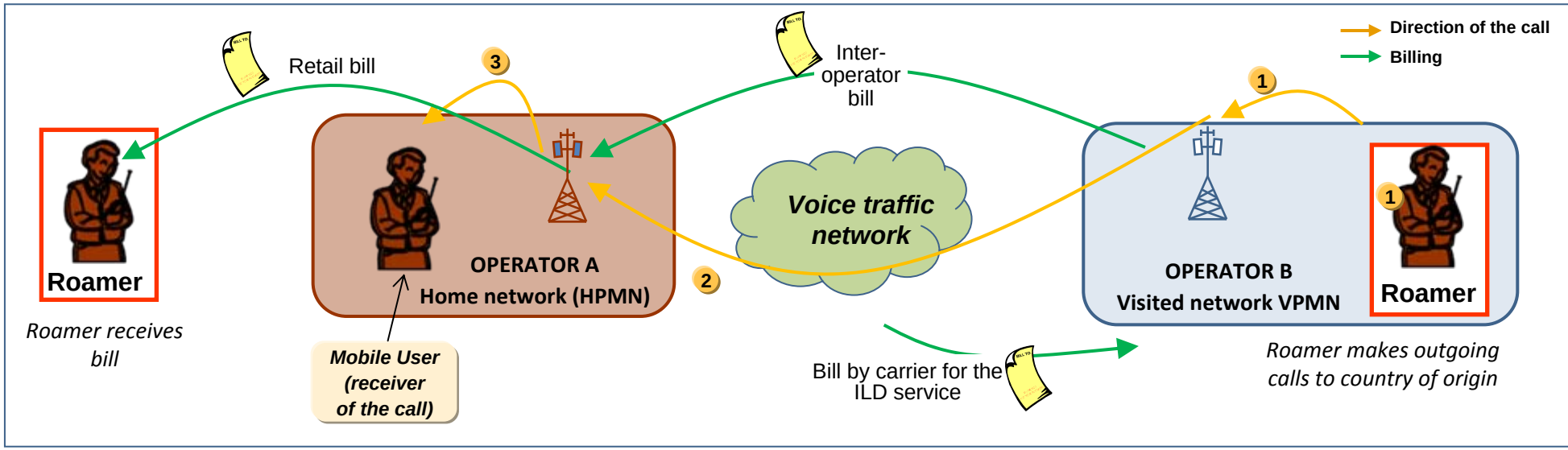
Source: ERG Benchmark Data Report for October 2007 - March 2008

Figure 79 - International long distance roaming service

A significant cost in the IOTs of outgoing roaming calls is International Long Distance (ILD) service...

CONCEPTUAL

Outgoing calls



Outgoing calls in roaming:

1. Originate in the visited public mobile network (VPMN)
2. Are transported via a voice network consisting of interconnection carriers and international long distance (ILD)
3. Terminate in the mobile or fixed network of the destination country

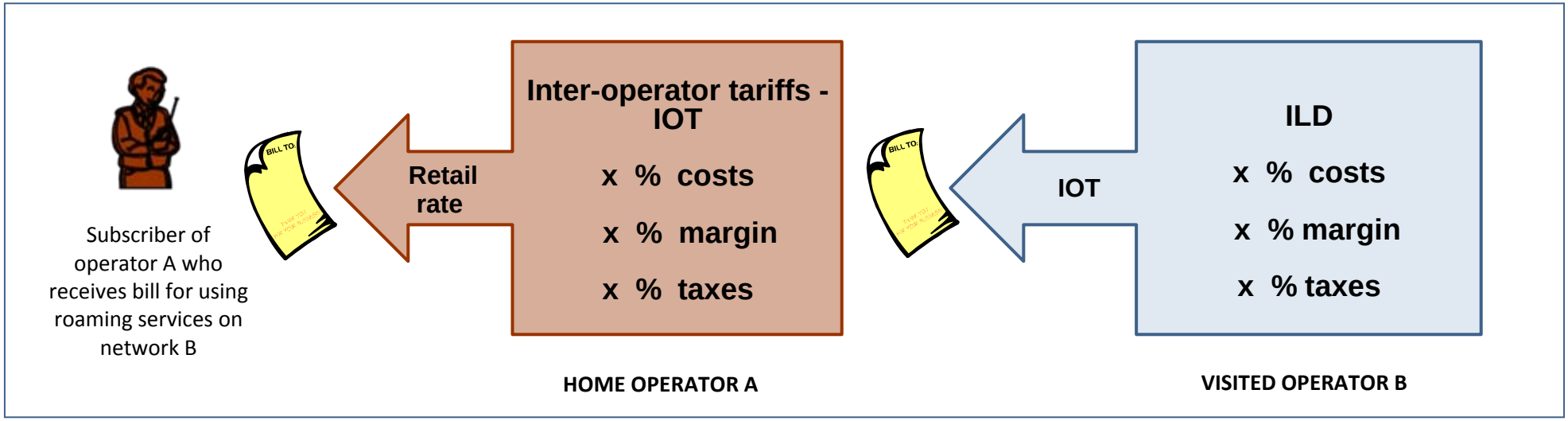
The interconnection carrier is a provider of the visited operator whose service costs affect the IOTs charged to the home network operator

Figure 80 - Double taxation of VAT on international long distance roaming service

...which can be affected by the double taxation of VAT depending on the country's legislation

CONCEPTUAL

Pricing structure for outgoing calls



Retail rate = IOT * % costs * % margin * % taxes =

(I LD * % costs * % margin * % taxes) * % costs * % margin * % taxes

The service is contracted by the operator to an interconnection carrier

Double taxation of VAT

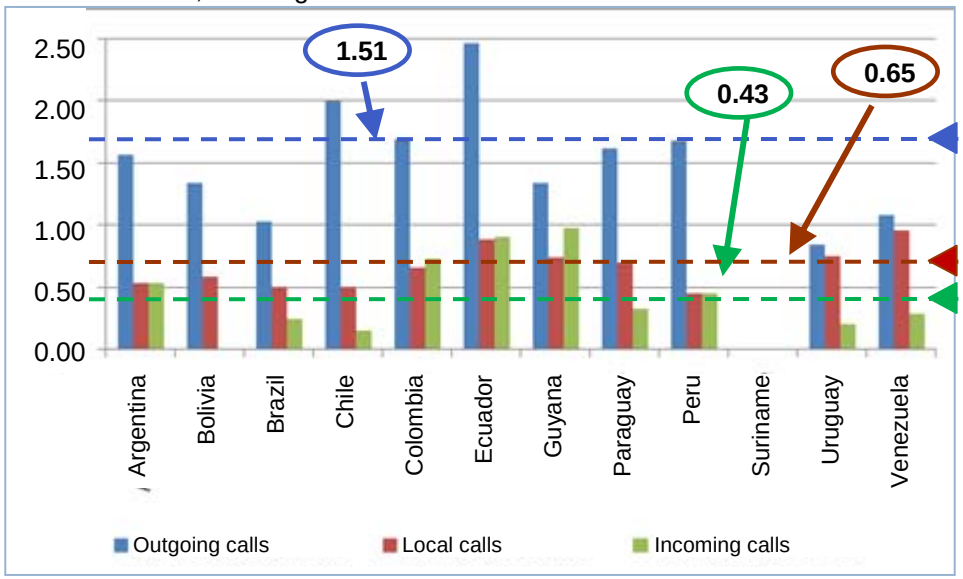
The IOT has a high impact in the double taxation of VAT and high prices for international long distance (ILD) and is a relevant cost in outgoing calls to the home network or a another country

Figure 81 - Inter-operator tariffs for voice services in the EU vs. South America

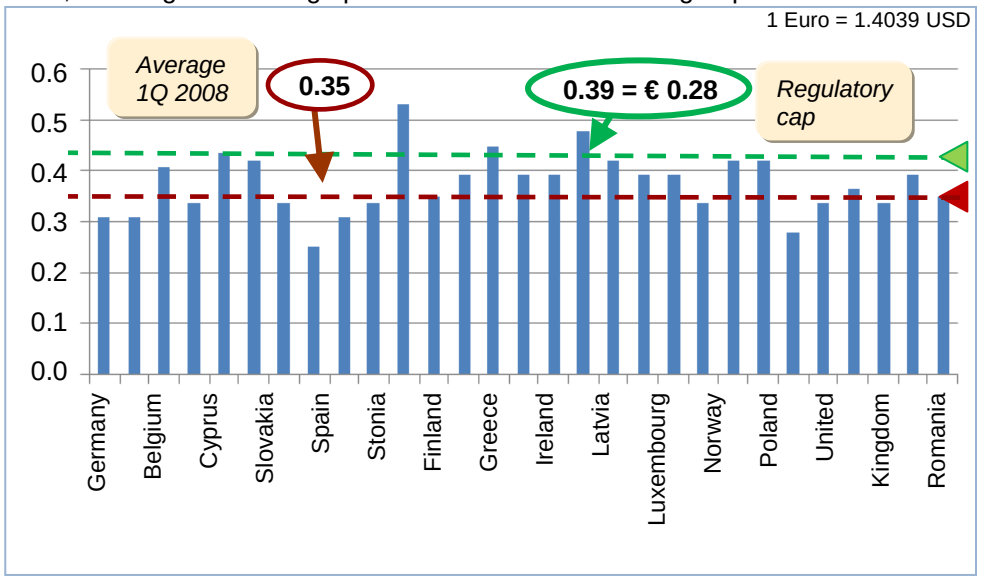
Voice IOTs are higher in South America than in the EU and are affected by VAT, which is not applied in the EU

Average IOT per minute of voice

South America, intra-regional — USD, without taxes



EU, intra-regional among operators of distinct business groups — USD, without taxes



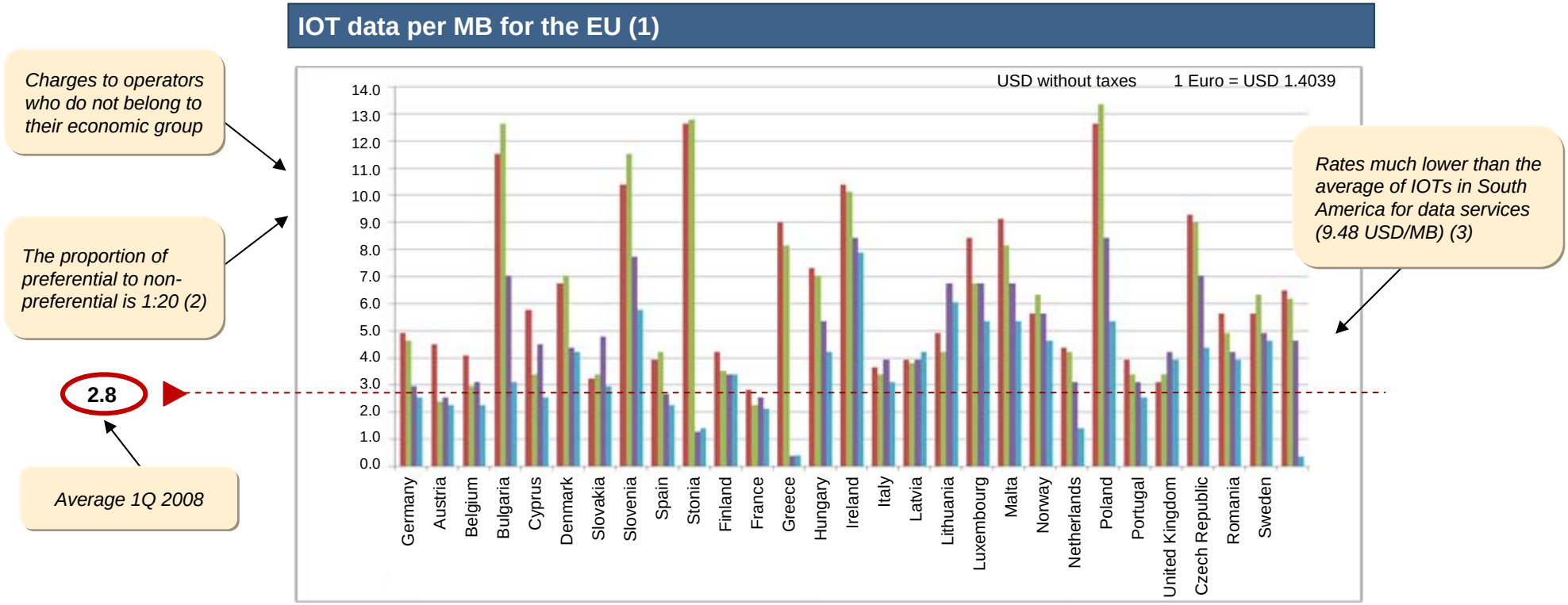
Information based on estimated data

- Information on IOTs is not public in South America; instead estimated values (1) of the average tariff standards have been used. The information published by ERG focuses on the charges that operators apply to other operators outside their economic group. Within alliances and the same economic group differential pricing is applied:
  - In the EU, the difference between preferential and non-preferential rates for voice before the regulation was approximately 1:4 and after, nearly 1:1.5 (2)
- An important factor in South American IOTs is ILD costs. Low traffic volume is a disadvantage when negotiating prices and quality
- Unlike South America, the EU does not apply VAT on IOTs, which, in effect, lowers the retail price

RXD Source: (1) Imobix estimation for South America, ERG for EU (2) Connect2roam Study - Data Roaming Services - June 2008

Figure 82 - Inter-operator tariffs for data services in the EU

Data services are not regulated by the Eurotariff and enjoy the same exemption regarding the application of VAT



- Data services in the EU are not covered by the Eurotariff
- As with voice service, the ERG collects information on inter-operator tariffs for data service in the EU, while in South America this information is not public; although estimates are not precise, they are sufficient to confirm that rates are higher
- The information published by ERG shows the rates charged to operators of other groups
  - The proportion of preferential to non-preferential tariffs in the EU is significant, at 1:20
  - Tariffs for preferential partners are estimated at ~0.70 - 1.4 USD/MB. In exceptional cases the fee is less than 0.70 USD/MB (2)

Sources: (1) ERG International Roaming - Benchmark Data Report from April to September, 2007 (2) Connect2roam Study - Roaming Data Services - June 2008 (3) Imobix estimation

Figure 83 - Methods to form IOTs for data services

Europe is beginning to use more sophisticated billing methods for data services that involve a flexible price per MB based on fixed ranges

Billing methods for data services

- IOT agreements define standard tariffs for data services using two methods:
  - Method 1: A fixed rate per MB that is billed per KB and charged at an established increment.
  - Method 2: A variable rate per MB, which varies according to fixed ranges. This method is shown in the example:

Sample pricing per range ceiling

Ceiling (in KB)	Accumulated volume in MB	Increment in KB	Price per MB (USD)	Charge per ceiling (USD)	Accumulated charge (USD)
50	0.05	50	14.04	0.69	0.69
150	0.20	10	7.02	1.03	1.71
800	0.98	10	1.40	1.10	2.13
4000	4.88	10	0.70	2.74	3.84
5000	9.77	10	0.35	1.71	4.46

- Regarding IOTs for data, there is no difference between volume of data or services used. In this sense they are disconnected from the concerns of retailers who seek better rates for periods with high-volume transmission of data

Figure 84 - Inter-operator tariffs for messaging services in Europe

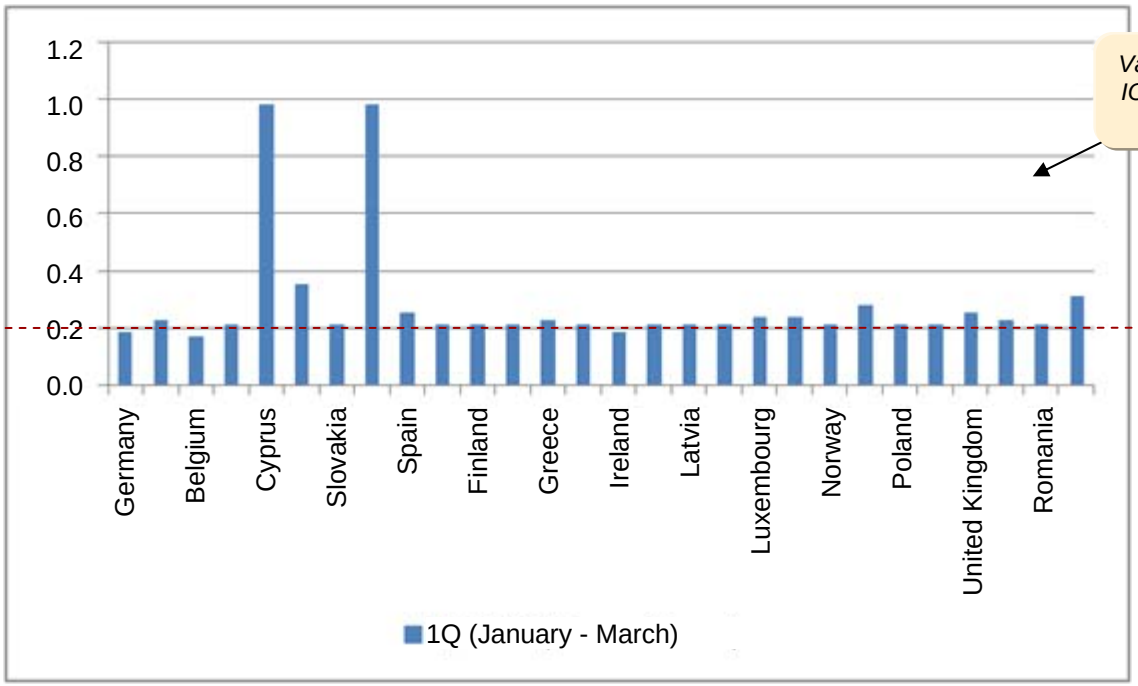
IOTs charged for messaging in the EU have remained constant in the last year, at prices similar to those in South America

Pricing data for messaging in the EU

Charges to operators who do not belong to their economic group

April - September 2007. Cost per SMS in USD - without taxes

USD without taxes 1 Euro = 1.4039 USD



Values aligned with the average IOTs charged in South America for SMS (0.23 USD/SMS)

0.2

Average 1Q 2008

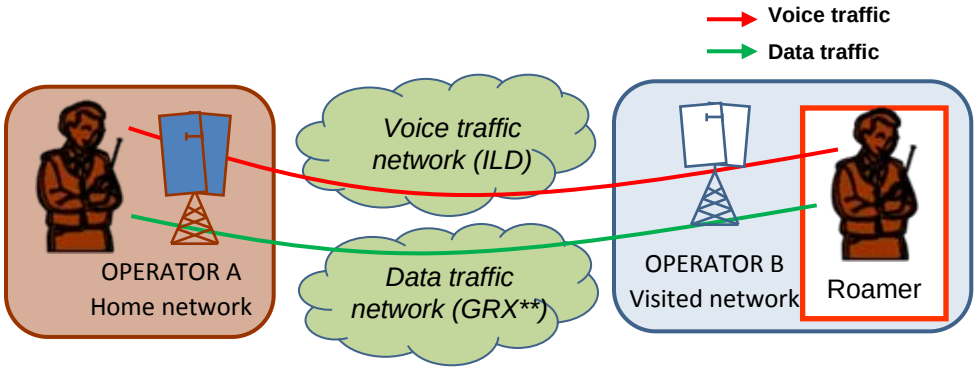
- IOTs for SMS in Europe have remained constant over the past year
- The Eurotariff is not applied for messaging
- VAT does not apply to inter-operator billing

Source: ERG International Roaming - Benchmark data report, Imobix analysis

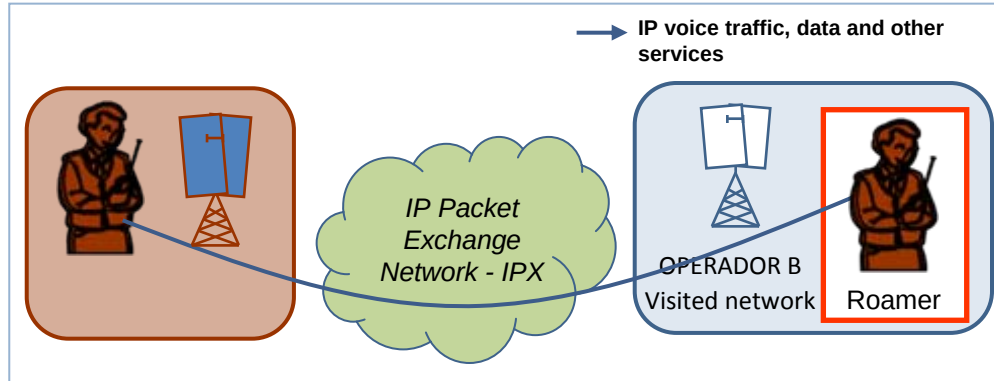
Figure 85 - Voice and data traffic: new generation networks

Currently roaming operators use different providers and networks for voice and data traffic delivery

Current situation: Separated voice and data traffic



New Generation Networks (NGN): IP Packet Exchange - IPX*



- The GSMA launched the IPX initiative as a new generation network based on IP transport
- The initiative, especially with respect to voice service transmission, is in a testing phase
- Convergence regulation is a challenge that regulators face

* IPX = IP exchange
** GRX = GPRS exchange

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In border zones, roaming service faces the challenge of avoiding inadvertent service activation for users who don't cross the border

Key areas		Issues	Potential solutions
Techniques	**Overlapping coverage**	• For technical reasons it is not possible to limit the radio frequency coverage within country borders • Main cause of border zone roaming	• Coordination among regulatory associations or operators to limit the reach of radio frequencies
	International rates	• Automatic billing at the international rather than local level	• Eliminate roaming charges • Change the billing system in these special cases
Consumer information		• Client has limited knowledge of roaming charges • Customer service centers far from border zones • Poorly trained roaming representatives • Lack of or poor customer service	• Welcome SMS • Marketing campaigns for consumer education

- A comprehensive solution should consider
  - Definition of special border zones so that calls in these areas receive agreed upon processing/treatment and special rates
  - Control of border zone roaming using special software, although this option is limited to large companies due to associated high costs

In international experience, there are cases where the resolution of problems from overlapping coverage created opportunities to develop border zones with special treatment for roaming

	Trouble	Entity	Solution
USA-Mexico	• Overlapping coverage due to geographic conditions • More critical along the border in recent years, due to the increase in mobile use among border town inhabitants	• Operators	• Identified specific zones where special IOTs apply • Left retail rates and customer service to each operator
Republic of Ireland - Northern Ireland	• Much overlapping coverage due to geographical characteristics	• Regulatory association	• Eliminated international roaming charges on both sides of the border

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Users are demanding more operator responsibility for the quality of roaming service, which represents a great challenge for operators...

Challenge for mobile operators

- One of the biggest complaints from roaming users is the lack of service quality monitoring or responsibility by operators
- It is a major challenge for operators who have little or no control over the quality of service offered to its clients while in roaming
- As service offerings become more complex, especially with the advent of 3G services, end-to-end quality becomes increasingly more important
  - Moreover, given that some 3G services are billed based on quality, it is necessary to validate the user experience based on the fee charged

The importance of calling line identification (CLI)

- The identification has a high impact on the service offered:
  - It is an enabler of the call
    - Allows for call filtering, especially because there is an additional surcharge while roaming
  - Without it, development of improved services for roaming is difficult:
    - To give transparent/clear/quick access to voice mail
    - To create an environment in which roaming is similar to the local environment (Virtual Home Environment) providing the same range of services and quality
  - The problem occurs mainly at the international level because CLI services are only randomly provided when third party networks are involved in the process of delivering the call, leaving the quality of service beyond the control of the mobile operator

...and in response, the GSMA has launched the GRQ initiative to test a neutral framework that could provide a solution to the quality issue

Initial developments

- GSM operators in Europe have been concerned with the international quality of voice roaming for several years. In 2002 the GSMA interconnection group began working on this key issue. The group was originally part of the "European Interest“ group but quickly turned into a global group in the interest of its members
- The international quality of a voice calls is one of the most important issues to roamers especially when 70% of roaming calls are to the country of origin (that is, are international calls)
- Concern is mainly in the following areas:
  - Service availability
  - Opportunity to complete the call
  - Calling Line Identity (CLI)
  - Voice quality

GRQ initiative - Global Roaming Quality

- Shortly after, the international roaming community began focusing on quality, and the first meeting of the Global Roaming Quality (GRQ) group was held in December 2006
- The GSMA GRQ initiative expects to resolve this key issue by providing a standardized framework for controlling the quality of service (QoS)
- The initiative has focused on:
  - Definition of a set of quality measurements
  - Developing ways to measure the quality of roaming services
  - Administration of a pilot test (trial)
- The objective is to prove that the GRQ methodologies function properly and that the new service level agreements (SLA) can be administered on a mass market scale

Source: Documents available in the Infocentre to GSMA members .
- IN.01: Guidelines for Service Level Agreements Between Carriers and Mobile Operators.
- IN.02: Use of Gateways for Mobile Communications.
- IN.03: Information on CLI Delivery

The initiative was completed successfully and it is expected that operators will quickly adopt the new service quality framework

Results of the initiative

- The pilot test was completed during 2008:
  - Shows that the framework used to measure quality works
  - Two different testing methodologies were used during the pilot test: passive and active testing, with positive results for both methods when tested against the other.
  - The formal documentation is being finalized. (1)
  - The GRQ group has been dissolved and implementation is to be carried out by the subgroup "Go to Market" of the Open Connectivity (OC) group.
- A group for Latin America is being created with the purpose of helping 5 operators in the region to sign service level agreements with a group of selected roaming partners for roaming quality
  - Service levels should be attached to the existing roaming agreements and the operators can take measurements in the networks of each partner, controlling performance against the agreed upon standards

Growth expectations from the initiative

- It is expected that within 2-3 years most operators will have monitoring tools for quality and service level agreements (SLA) with roaming partners and the international carriers with whom they are connected
- It is expected that a critical mass of 50 operators will join the program through one of the certified GRQ suppliers
- The costs associated with customer complaints and resolution of failures will be reduced.
- It is still too early to anticipate how well the GSMA operator community will adopt the initiative, however a tendency towards its transformation into a standardized commodity has been shown.
- It is expected that service quality will be constantly measured, and not just through isolated measurements:
  - Daily measurements for key services with key operators

Source: (1) PRD (IR.81)

The use of unauthorized voice and low quality routes (bypass) are concerns in the South American region that have been elevated by the GSMLAA, and regulators may have a key role in this area

Other initiatives related to service quality

- In addition to the GSMA initiatives, some operators are developing their own solutions to control service quality
- In the Americas, Caribbean and Europe, operators are installing testing equipment called probes or test probes, which can simulate the behavior of a roamer using key operators or services
- Service providers provide a wide range of quality testing solutions based on probe networks. These services are in their early stages of development and therefore the results from the GSMA group will be very important in coordinating the initiative worldwide
- In South America and the Caribbean there is an additional concern with the quality offered by long distance carriers, which significantly affects roamers. Additionally, due to the high cost of terminating calls in the region, there is a high propensity to use unauthorized bypass routes, which result in a significant loss of quality and billing for the operator. These key aspects have been raised by the GSMLAA

ANACOM, Portugal. Example of regulator participation regarding quality

- ANACOM, the Portuguese regulatory authority, conducted a study to measure the service quality of its 3 operators in main urban areas and highways in 2006
- The study was conducted using automated drive test technology that can simulate the behavior of users through the main routes used
- The measurement is not intrusive in any network and therefore does not require authorization by the operators to be conducted
- The indicators analyzed were:
  - Network coverage - availability of the GSM and UMTS networks of the 3 operators
  - Accessibility to the service - probability of carrying out the call
  - Call set up rate - time for the network, after sending the required number correctly, to establish communication
  - Call completion rate - probability of maintaining a call over a period of time, after communication has been established
  - Quality of audio and video - reception quality of the conversation and/or video during a call

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Anti-fraud initiatives

Introduction

• This section will address:

- The first two initiatives currently launched by the GSMA to combat fraud:
  . NRTRDE: exchange of billing records in near real time
  . CEIR: handset registry to combat theft

- The NRTRDE initiative is ongoing and, therefore, only its current state of progress is presented

- The CEIR initiative is also ongoing. The GSMLAA has determined that the Latin American region should join the GSMA. This section shows the countries that have already adopted this initiative.

- New techniques used for fraud:
  . Based on infrastructure with test probes (or probes) in each country/operator to simulate the behavior of a roaming user

- New trends in fraud management systems (FMS) that incorporate identification systems for IP network intrusion (IDS)

- The possibility to promote fraud infrastructure in the region using platforms with probes, as a complementary service to measuring service quality (QoS)

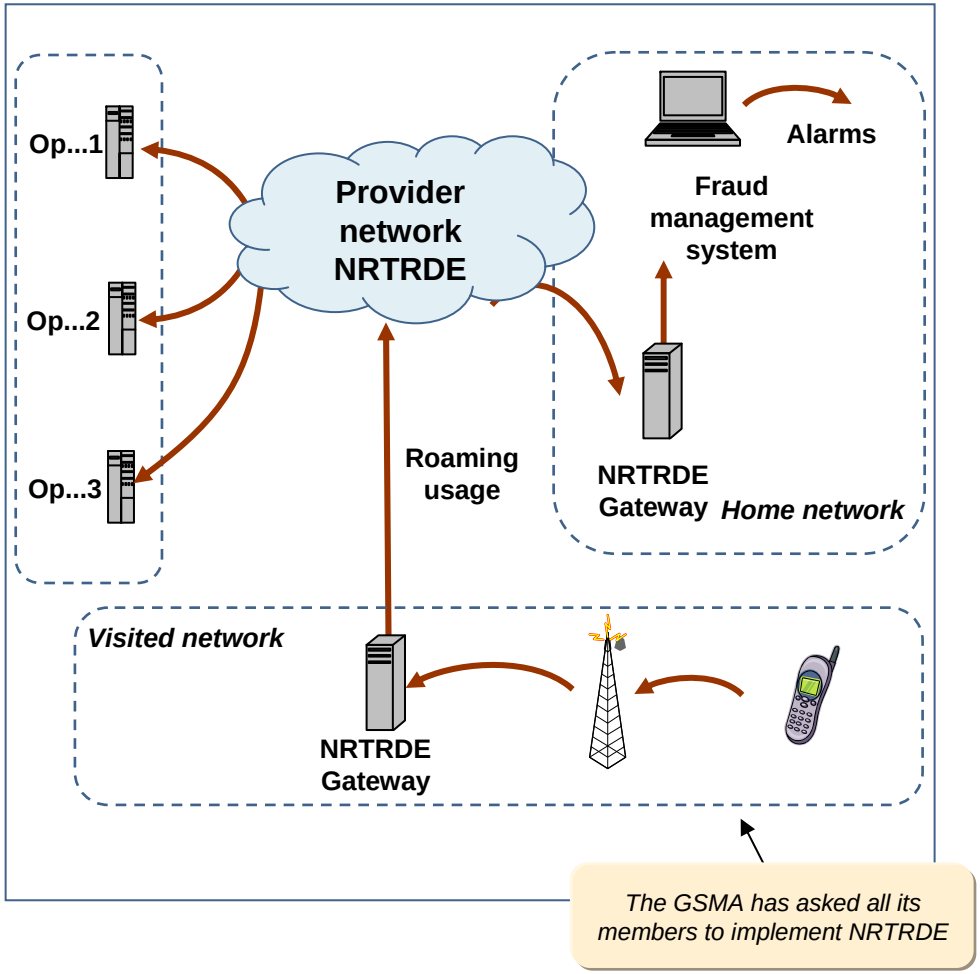
- The possibility, among the alternatives for South America, to support the GSMA in implementing the CEIR initiative in the region

Figure 86 - Flow of consumer information traffic in NRTRDE

The GSMA launched the NRTRDE* implementation to combat organized fraud by reducing the delay in the exchange of information between operators of subscribers using roaming

CONCEPTUAL

Flow of usage information traffic with NRTRDE*



Important considerations

Date of implementation	• October 2008
Time required for the exchange of information	• Reduction to 4 hours vs. the current 24 hours • In practice, can be reduced to 1 hour
Description	• Transmission of usage information in near real time - 4 hours required, 1 hour expected • Not mandatory to send information on usage charges. It is best to send only usage information to facilitate quicker processing. Providers offer a mock-fee to interested home operators • Operators enter the information into their fraud systems to detect abnormal patterns • Requires the updating of roaming agreements

* Near-Real-Time Roaming Data Exchange

Source: GSMA

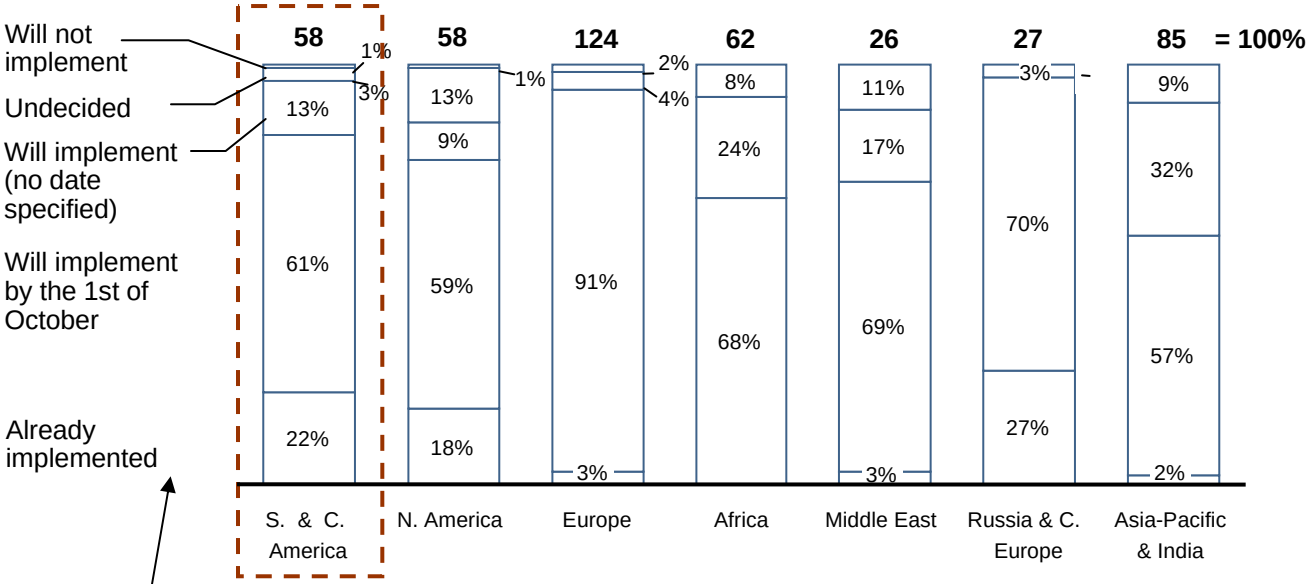
Figure 87 - Status of NRTRDE global implementation, February 2008

In February 2008, the GSMA conducted a survey, in order to anticipate the results from the NRTRDE implementation, which showed ~83% of the operators were "on-track"

February 2008, Interviewed operators, Percentage

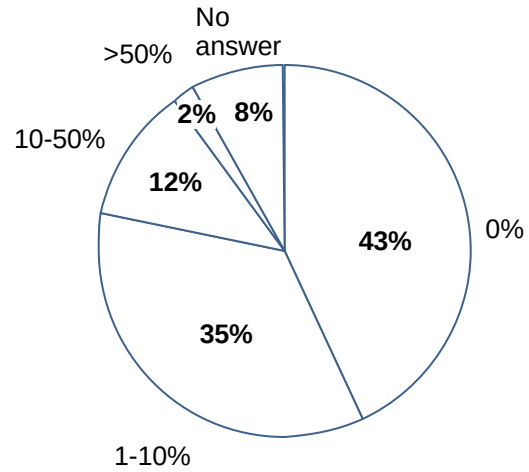
On track

Regional plans to implement NRTRDE



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

Proportion of roaming agreements that support NRTRDE (worldwide)



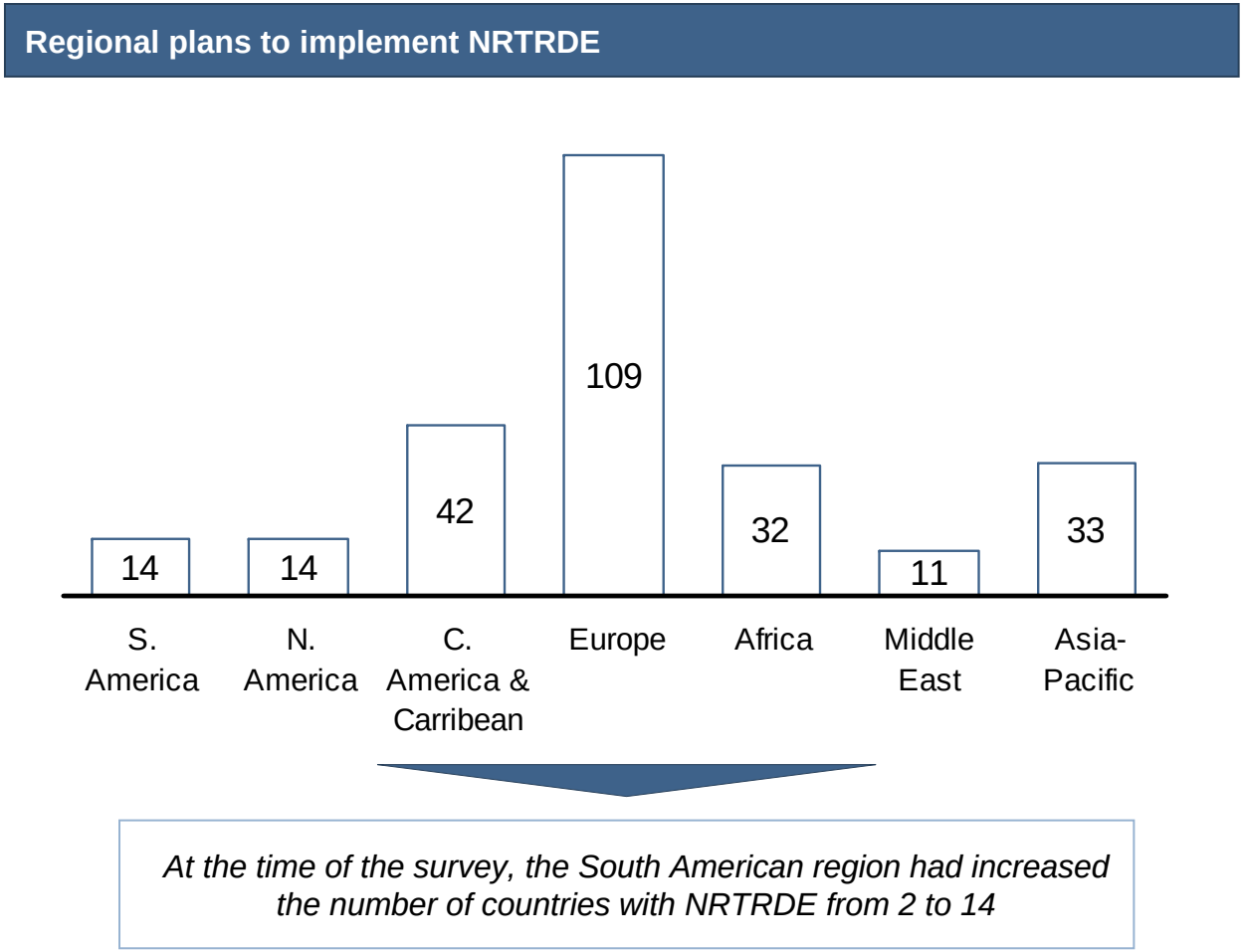
The biggest challenge is on updating the roaming agreements to support NRTRDE, which requires coordination among operators

* Statistic includes Central America

Source: GSMA

From that point, the South American region grew from 2 to 14 countries

January 2009, Interviewed operators, Quantity



Source: GSMA

Figure 89 - Percentage of legitimate handsets over total sales

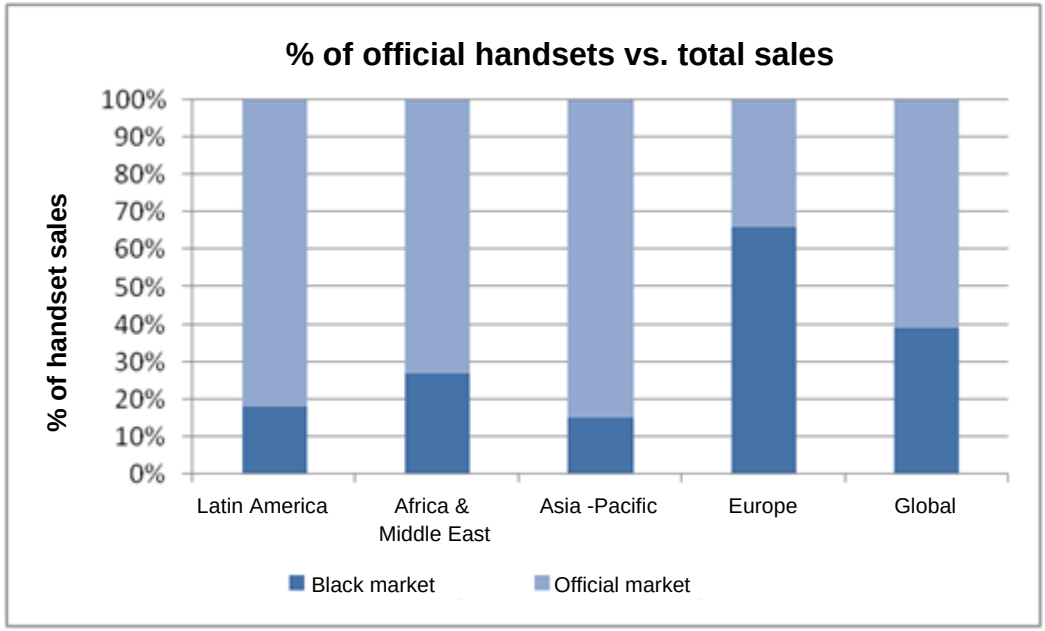
According to studies by the GSMA in 2006, ~39% of handsets were sold on the black market

Mobile handset theft

- The GSMA considers handset theft a very important fraud:
  - An average of between 150,000 and 500,000 handsets are stolen per country per year
  - The mobile phone theft is estimated at 28% of total thefts compared to 8% in the previous 3 years
  - 20% of thefts involved violence

- According to a 2006 GMSA study, the higher the price of the handset in the retail market, the higher the percentage of unofficial sales

- Of the 54 countries surveyed in the 4 regions, ~39% of handsets were sold on the black market



GSMA 2006 study

Source: GSMA

http://gsmworld.com/our-work/programmes-and-initiatives/fraud-and-security/imei_database.htm#nav-6

Handset Theft Industry Initiatives - March 2007

To combat handset theft the GSMA launched the CEIR initiative, with greater adherence by European operators

The GSMA CEIR initiative

- The GSMA launched the CEIR initiative, which consists of a central registration of equipment identities (IMEI*) that can be accessed by operators to avoid use of stolen handsets
- Together with the Fraud and Security working group:
  - Evaluated the possible tools to facilitate the exchange of blacklists of equipment identities (IMEI) between operators
  - The initiative currently involves more than 54 operators in ~20 countries, with ~85% from participating European countries

Regulatory support for handset theft

- The GSMA analyzed the need for regional regulatory agreements to coordinate the implementation of initiatives
  - Regional regulation was first attempted, but given the resulting complexity in government coordination, bilateral agreements between operators were recommended instead
  - The UK and French governments have passed legislation to make it a criminal offense to change the international mobile equipment identity (IMEI) of mobile phones.
  - In Argentina, the 2004 Law No. 25891 (known as the "Blumberg Act"), recommends the sharing of blacklists among operators and regulatory agencies, with prison terms for those who commit fraud
  - In Colombia, the 2007 CRT resolution No. 1732 provides for the exchange of handset black lists

• International Mobile Equipment Identity

Source: GSMA

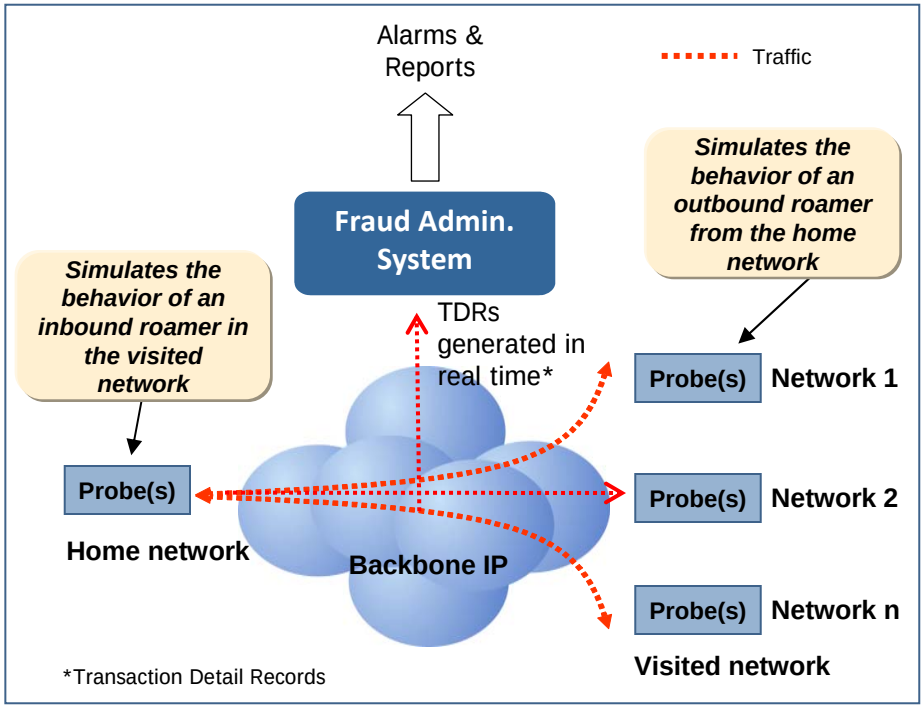
Handset Theft Industry Initiatives - March 2007

Figure 90 - Independent platforms for fraud detection

Equipment called probes allows for the simulation of user behavior and fraud detection in a non-intrusive manner, including the case of bypass or use of unauthorized voice routes

Operation

- Each pair of probes can simulate the behavior between two mobile subscribers in different locations around the world
- The platforms are not intrusive and can, therefore, be installed without requiring authorization from the different operators
- Allows an operator to capture the traffic of its clients outside its network and of clients of partners on its own network, in real time



Benefits

- Over other techniques that analyze the records (CDRs) from the central mobile switching center (MSC), probes are also capable of detecting:
  - Fraudulent calls that do not generate CDRs, such as when the MSC is manipulated
  - Network scans by hackers, involving several short calls (less than 5 seconds) that do not generate CDRs
  - Information that is transmitted in real time through the band via tone signaling (dual tone multi frequency - DTMF) for easy identification and future prevention
  - Changes in user profile configurations, such as when the configuration is changed during the night to redirect calls to premium numbers
  - Bypass situations, when using unauthorized routes to transmit voice calls
  - Fraudulent SMS activity, such as:
    - . SMS SPAM - Unsolicited messages
    - . SMS Spoofing - Using the SMSC of the operator while manipulating the source address
    - . SMS Flooding - Sending mass SMSs to a network to cause it to crash

4G technology will address the fraud issue through a combination of IP security systems and fraud management systems (FMS)

- IMS* architecture and IP telephony will have a major impact on future trends in fraud.
- The intrusion detection system (IDS) functionality used on IP networks and the functionality of the systems for administration of fraud, must be combined to meet the new requirements.

Fraud Management System (FMS)	Intrusion Detection System (IDS)
• Permits: - Detection of fraudulent acts or manipulation of the company's services - Monitoring of the use of the IP service - Analysis of traffic logs or service events - Analysis of patterns of fraud • Several technologies are used to detect fraud, such as "Rules and Thresholds" and "Neural Networks"	• Permits: - Detection of tampering with or hacking into computer network systems, service platforms or applications - Monitoring of web access and IP transport - Analyzing the flow or events in the network traffic • Does not include client identification or additional information on prices or services. • Two IDS methods are used to detect intrusion, "Signature-based Detection" and "Anomaly-based Identification"

- The trend towards integration of both systems:

Client profile	• When not possible through the IDS, it can be achieved by combining the two functionalities: security signatures and threshold detection
Fraud detection	• When combined, FMS / IDS can provide a unique and singular view of fraud and issues related to IP security. Each signature intrusion IDS can be isolated even if it is not combined with the IP service profile
Intelligent detection	• IDS only detects the IP based on technical configurations of signatures while the FMS neural systems also allow for detection of other potential cases of fraud. Neural systems can also be programmed to resolve some IP security issues
Data combination	• IDS has no information about IP service use (pricing information, customer name, address and digital fingerprint, service and user data, and handset location). Because this information exists in FMS, both can complement each other.

*IP Multimedia Subsystem

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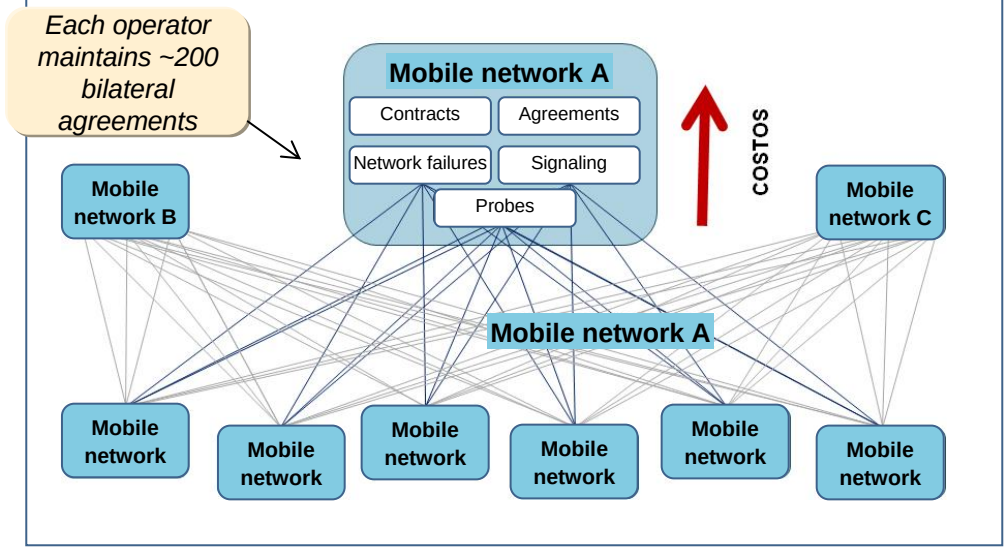
Figure 91 - Graph of bilateral agreements and open connectivity

The GSMA Open Connectivity (OC) initiative seeks to centralize roaming agreements for the operators into hubs to reduce the number of one-to-one or bilateral agreements

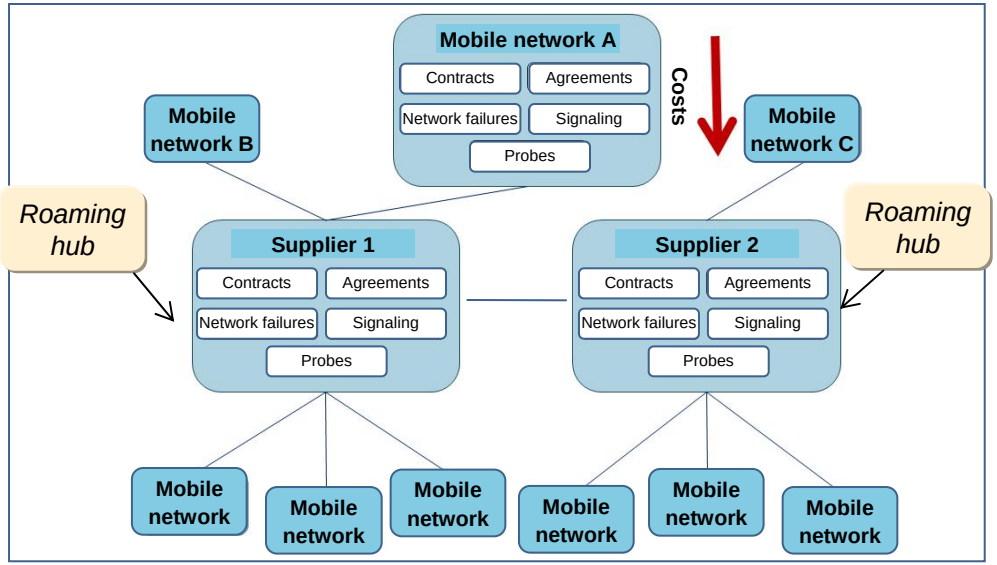
CONCEPTUAL

Outline of bilateral agreements



- Operators currently establish bilateral agreements for each roaming relationship, requiring a major effort to establish each one-to-one relationship

Open Connectivity (OC)



- The Open Connectivity network providers operate as centers (hubs) for the roaming relationships
- Operators connected to a roaming hub have access to operators in the same and other hubs

- The aim of the GMSA Open Connectivity (OC) initiative is to provide a global GSM roaming service for subscribers
- Reduce the costs associated with the launch of a new operator and increase coverage by allowing roaming agreements with the hubs instead of with each individual mobile operator

In February 2007, the GSMA completed testing on OC roaming "hubbing", with widespread support from operators and providers

Major findings of the roaming "hubbing" trial

- The evaluation has demonstrated the competence of the solution, ensuring interoperability and co-existence with the current bilateral roaming mechanisms
- Additionally, it allows participants to experiment with roaming hub solutions directly and prior to market implementation
- Both the initial assessment and the conceptual trial have been finalized

Trial participants

"Hub" providers

- Syniverse
- Belgacom
- Roamware
- Worldcell
- N-TEL
- Teleglobe/Cybernet
- CITIC
- WSI

Operators

- Bharti
- Proximus
- P4
- Cellcom
- Teletalk
- Viking Wireless
- Rogers Wireless
- C&W Panama
- Tele2 Sweden
- Hutchison Essar
- CTM Macau
- Hong Kong CSL
- Dobson
- Manx Telecom

Key activities planned by the GSMA

	Phase 1 (end of 4Q 2005)	Phase 2 (end of 2Q 2006)	Phase 3 (end of 1Q 2008)	Phase 4 (4Q 2008)
Short-term • Improve the efficiency of bilateral roaming and integration agreements	- Identification of efficiency savings	- Implementation of efficiency savings		
Long-term • Investigate, evaluate and implement new solutions that enable the quick establishment of roaming agreements and integrated efforts	- Investigate solutions and current market situation	- Define solution requirements	- Feasibility studies and evaluation of new solutions	- Commercial implementation of new solutions

The next level in this process is a "go-to-market" trial with a start date planned for the end of September 2008

Objectives of the "go-to-market" trial	**Business**	• 3 self-certified roaming hubs before December 2008 and 8 before December 2009 • 25 operators subscribed to OC roaming hubs before April 2009 and 75 before December 2009
	Marketing	• Market awareness with respect to OC solutions and communication of the associated benefits between relevant mobile operators and equipment vendors • Communication of trial completion and the availability and launch of key deliverables, such as roaming hubs • Generation of marketing activities to support the adoption of OC compatible solutions among operators and vendors • Acceleration of the implementation of OC compatible solutions through joint marketing efforts between OC compatible providers • Development of mechanism to monitor the OC initiatives carried out by operators and vendors • Development of the OC ecosystem through the introduction and management of a self-certification system for roaming hub providers

Roaming "hubbing" has potential advantages but still has to overcome significant challenges

Potential benefits from roaming "hubbing"	• Will allow fair competition to new members in the market, who will not need to devote years to the development of a model, and enable them to form an equivalent number of bilateral agreements as achieved by the first integrators of the market • Will improve the quality of end-to-end service, from the home operator to the handset operator • Lower cost for maintaining agreements (eliminating redundant capital expenditures, outsourcing O&M activities) • Improve global reach to operators in Latin America • Allow for the easy addition of new services to the roaming environment (eg. 3G services) • Ability to reach non-3G GSM-based networks • Will substantially improve the time-to-market for the implementation of roaming agreements for new services • Revenue assurance: The hub will be responsible for service billing, as much "in" as "out" of the network (ie. all exchanged traffic) • Better Visibility of IOT partners, which will help in choosing the roaming partner that will most benefit subscribers
Challenges for the GSMA	• Achieve the critical mass of operators needed for the OC hubbing model to work, both at the commercial and operational level • The migration of bilateral roaming operators to the hub model will take a few years • Not all billing and fraud aspects have been completely solved yet • The "go to market" trial could uncover some operational and commercial issues that have not yet been identified, which could mean further delays in service implementation

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  - Africa and the Middle East
  - Asia-Pacific
  - Analysis of inter-operator roaming tariffs
  - **Technology**
    - . Border zone roaming
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- Chapter II: Comparison of the international and South American context

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While GSM technology dominates the market in all regions, there has been significant overall growth in 3G technologies, such as WiMax and UMTS

Key technologies used in the regions

- Currently, there are a wide variety of technologies used by mobile operators worldwide
  - GSM and CDMA are the most common technologies...
  - ...however, there has been strong growth in the application of 3G technologies and WiMAX
- **North America**
  - The market is dominated by CDMA and GSM, with ~55% vs.~45% respective market share
  - Additionally, there has been strong growth in UMTS and WiMAX technologies
- **Latin America and the Caribbean**
  - While GSM dominates the region, there are CDMA networks for roamers, especially North American roamers
  - UMTS and WiMAX networks are being implemented in several countries
- **Europe**
  - GSM and UMTS are the key technologies in Europe, with recent notable growth of WiMAX networks
  - CDMA 450 is mainly present in Eastern Europe, where the technology and spectrum band is ideal to meet the needs of large rural grids
- **Africa and the Middle East**
  - GSM is the dominant technology but there is also an important development in CDMA networks
  - WiMAX is seen as a strong competitor in emerging markets where fixed broadband services are generally scarce
- **Asia-Pacific**
  - While GSM and UMTS are the dominant technologies, there are CDMA networks...
  - ...while Japan has developed its own technology, PDC

The different frequencies used by GSM imply the need for multi-band handsets for roamers

GSM frequencies

- The frequency band used by an operator can have a significant impact on business opportunities for roaming
  - Among operators that provide their services on different bands, roamers need to have multi-band handsets.

- The network selection process for handsets can also cause problems for some operators
  - When the roamer enters the visited network, they will first seek the operators having the same band as that of its origin, creating a competitive disadvantage for companies that use other bands.

- The implementation of the 450 MHz band in South America could offer significant advantages in coverage and investment, but the limited availability of necessary handsets could restrict the number of new potential roamers.

GSM Frequency	
North and South America	850 MHz and 1900 MHz
Central America and the Caribbean	850 MHz, 900 MHz and 1800 MHz
Europe and the rest of world	900 MHz and 800 MHz

Note: Although not common, GSM is also available in 450 MHz band

Figure 93 - CDMA global implementation

CDMA technology continues to be used by a significant proportion of handsets worldwide...

Global implementation of CDMA

- Worldwide, CDMA is used mainly in the 800 MHz and 1900 MHz bands, with some limits in 850 MHz
- CDMA 450 (450 MHz band) has grown the past 3 years, especially where spectrum has been released by previous radio systems. Eastern Europe, Russia and Asia are examples where there has been high development of this technology
- The availability of spectrum in the 450 MHz band is due to the release of previous analogue radio systems:

CDMA 450 developments

	Asia-Pacific	North America	The Caribbean and Latin America	Europe and Russia	Africa and Middle East	World
Operators	24	0	12	46	19	99
Countries	17	0	5	12	17	51
Commercial networks X1	24	0	10	41	19	94
Commercial networks EV-DO Rel 0	5	0	0	34	3	42
Commercial networks EV-DO Rev. (red) A	0	0	0	11	1	12
Developments X1 (in progress)	3	0	3	6	1	13
EV-DO Rel Developments 0 (in progress)	6	0	0	4	7	17
EV-DO Rev Developments A (in progress)	3	0	4	6	2	15
Trials X1	0	0	0	1	1	2
EV-DO Rel Trial 0	0	0	0	0	0	0
EV-DO Rev. Trial A	0	0	0	1	0	1

Source: CDMA Development Group

...and CDMA 450 offers advantages in rural areas

CDMA 450

- CDMA 450 offers significant advantages over large rural areas with distributed population because it uses larger cells:
  - It has superior propagation characteristics and better penetration compared to commonly used frequencies (800/900/1800/1900 MHz), allowing use of greater band ranges
  - The larger cell size helps to reduce the number of bases required to cover a given area

Size of cells by frequency

Frequency (MHz)	Cell radius (km)	Cell area (sq km)	Relative number of cells
450	48.9	7521	1
850	29.4	2712	2.8
950	26.9	2269	3.3
1800	14.0	618	12.2
1900	13.3	553	13.6
2500	10.0	312	24.1

Source: CDMA Development Group

CDMA 450 allows for significant savings that can be passed on to the retail pricing

CDMA 450

- The general rule is that doubling the frequency quadruples the number of base stations required
- CDMA 450 MHz reduces the investment required and is ideal for rural areas where operators are more sensitive to cost, given the low purchasing capacity and subscriber density. The savings can be passed on to users to encourage adoption of the technology
- South America could easily implement CDMA 450, especially in rural areas...
- ...however, the main disadvantage is the lack of roaming opportunities with global GSM operators and CDMA roamers who do not have handsets that operate in this band
  - GSM 450 has been implemented in Argentina and Peru, but its use is largely limited to fixed wireless access
- GSM can be implemented in the 450 MHz band, but there are still no commercially available networks with such characteristics

Figure 94 - WiMax Frequencies

WiMax has a broad spectrum coverage with a range of 2 to 6GHz...

Global implementation of WiMAX

- The most recent versions of the WiMAX standard have a broad spectrum coverage with a range of 2 to 6GHz...
- ...due to practical aspects of the market, however, the industry has established that the product should focus mainly on spectrum ranges that offer better sales potential

WiMax frequencies	
Region	**Frequency bands adopted by WiMAX**
South and Central America	2.5, 3.5 & 5.8 GHz
Europe	3.5 & 5.8 GHz and possibly 2.5 GHz
USA	2.5, 3.7 & 5.8 GHz
Canada	2.3, 2.5, 3.5 & 5.8 GHz
Africa and the Middle East	3.5 & 5.8 GHz
Russia	3.5 & 5.8 GHZ and possibly 2.3 & 2.5 GHz
Asia-Pacific	2.3, 2.5, 3.3, 3.5 & 5.8 GHz

...and is a technology easily extendible to lower frequencies, such as the 700MHz, 1.7 GHz and 2.1 GHz ranges

Global implementation of WiMAX (cont.)

- The products generally available are in the 2 to 6GHz band and it's likely that the number of bands will grow as they are used in different countries
- The technology appears easily extendible to lower frequencies, such as the 700 MHz, 1.7 GHz and 2.1 GHz ranges.
- There is enormous potential in the spectrum range, which eventually will be covered by WiMAX products
- New technologies, such as WiMAX, are typically first successful in developed markets where disposable incomes are higher and new equipment and services are adopted early
- In emerging countries, the growth of mobile WiMAX technology may be slower due to 2 factors:
  - Demand for flexible bandwidths and affordable prices, in addition to the lack of broadband cable
  - Ample 3G coverage, lack of spectrum and technology to support operators

Characteristics by type of frequency

Frequency Type	High frequencies	Low frequencies
Bandwidth (amount of information) carried	Higher	Lower
Range of propagation and penetration	Lower	Higher

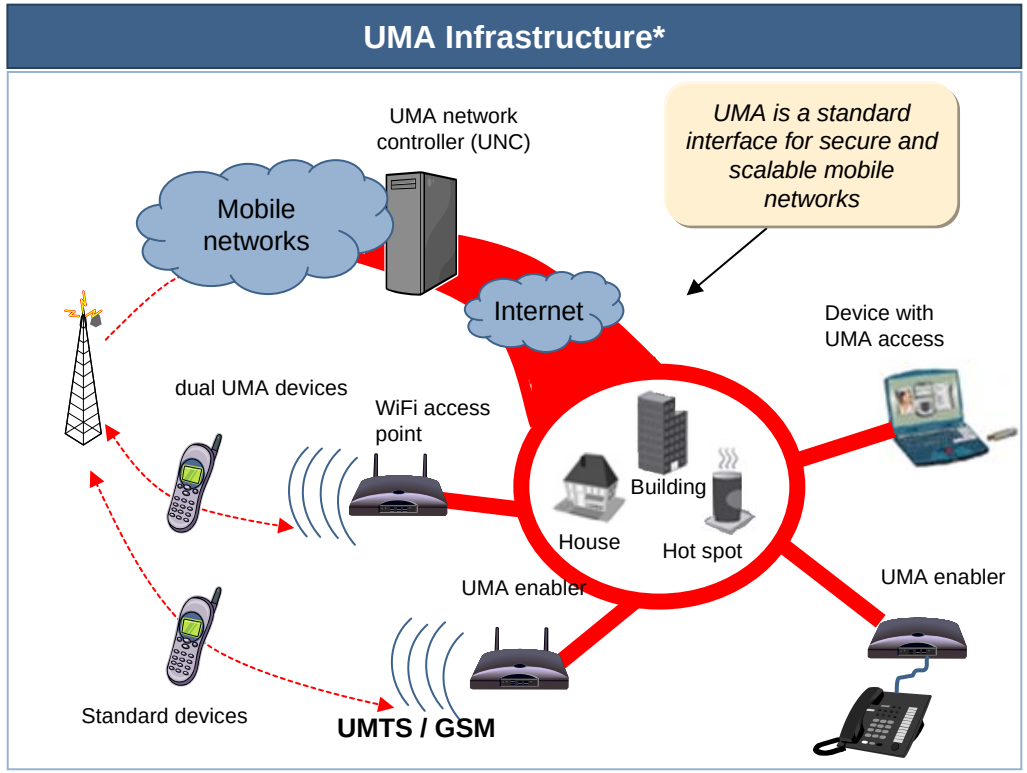
Most WiMAX networks provide fixed wireless access as an alternative to DSL or cable networks

Global implementation of WiMAX (cont.)

- Currently, most WiMAX networks provide fixed wireless access as an alternative to DSL or cable networks
- Mobile standards are being adopted, however, and mobile products are becoming more available, suggesting a significant growth in the WiMAX technology
- In the second quarter of 2008 there was a significant growth in profits of WiMAX mobile equipment from the major providers, indicating a clear market trend
- It has also been reported that there are 200 implemented networks and more than 100 trials in progress
- This development could be significant for South America, where WiMAX licenses are being issued

Figure 95 - Representation of the UMA mode of operation

UMA* technology allows access to GSM and GPRS mobile services over unlicensed spectrum technologies, including Bluetooth and 802.11



- With the implementation of UMA, service providers can allow subscribers to browse and operate in cellular networks and public and private wireless networks without licenses
- With UMA, subscribers experience a consistent voice and data service while switching between the different networks
- Additionally, this implies a major step towards convergence

* Unlicensed Mobile Access

Source: UMA Today, BT Services, Orange Unique, Convergence

UMA technology represents a significant savings for the customer and a challenge to the operator to implement convergence

Impact on international roaming

- This service creates a major impact on international roaming since roamers can change to 802.11 wireless networks (WiFi) when they are within range,...
- ...and carry VoIP calls over the internet, and then return to the gateway of the service provider

Benefits

- The cost of this service can be much lower than the cost of traditional roaming and very beneficial to the client:
  - For example, with a roaming rate of 2.50 USD/min, a customer could receive a total bill of USD 25 for a 10 minute call, but the flat monthly plan for UMA could be USD 20 in the region
- Customers could benefit from this service through increased use of and need for data services
- Avoids excessive battery usage in WiFi mode and lack of mobility in the original design of GSM networks

Availability

- Since the service requires the use of GSM and availability of WiFi handsets, it will take some time to penetrate the market
- The following network operators offer UMA:
  - T-Mobile USA - Fixed and Mobile
  - TeliaSonera (Sweden and Denmark)
  - Orange (United Kingdom, France, Holland, Spain)
  - BT (UK) - Only Fixed
  - Ono (Spain)
  - Netcom (Norway)
  - Rogers (Canada)
  - Cincinnati Bell (USA)

Source: UMA Today, BT Services, Orange Unique, Convergence

Convergence demands a review of spectrum management models

Impact of convergence on spectrum regulation

- The current spectrum management model in use in most developed countries was developed in a stable market and aimed at solving two basic problems: scarcity of the resource and the potential and actual interferences among users
- This centralized model, applied based on rigid norms and ex ante management, is not suitable in the context of today's markets with convergence requirements

Key aspects of the rules of spectrum allocation

1. Orienting regulation to the competition: establish similar competitive conditions
2. Prospective spectrum management: attitudes of the regulator rather than a regulation or law. Implies an action to adopt, analyze and resolve the present events with a forward-looking vision
3. Technology neutrality: Free use of any wireless network access technology
4. Service neutrality: Free provision of services
5. Applied spectrum management models: There are 3 main spectrum management models, in order according to their evolution over time:
   a) Control and command model: detailed terms of use and control to avoid harmful saturation and interference
   b) Exclusive rights model: use of exclusive licenses, mainly oriented to geographical area, to avoid interference with other bands
   c) Commons model: allows "unlicensed access" (no license required to operate in this band) to any user (Open Access or Spectrum Commons)
6. Secondary spectrum market: Purchase and sale of equipment licenses or laws about the spectrum, after its initial allocation
7. Spectrum cap: procedure to prevent excessive spectrum accumulation
8. Regional coordination. Standardization of spectrum use between different countries and/or regions, allowing for economies of scale at the regional or global level
9. Transparency, publication of signatories: Transparency is reflected in the precise and complete access to information on current users of the spectrum, the functions performed, and the conditions of allocation and use

Source: Fundamentals and Best Practices of spectrum management and proposal for implementation in Latin America - June 2007 AHCIET - Omar de León

The full analysis of spectrum allocation in Latin America, Europe and USA can be found in the Annex "Comparison of spectrum allocation"

Document contents

European Union legislation on VAT eliminates the double taxation levy for all member countries

International agreements on roaming taxation

- International agreements on taxation are required between governments
- In this way there are benefits on a multilateral level and from the existence of mature regional integration processes. The European Union process is considered a global benchmark
- There is no record of specific agreements at the government level on the taxation of roaming. The tax treatment of roaming, and telecommunications in general, are under the framework of global agreements on taxation

EU Sixth Directive on VAT

- European Union regulation constitutes the main and only effectively used directive in terms of international roaming agreements
- The Eurotariff makes no reference to the tax treatment of wholesale or retail rates
- The basic rule governing VAT in the EU is the Sixth Directive (1) and is mandatory for all member countries
- For the supply of services: The country where the service is taxed is determined by where the supplier is established
  - Where transactions involve companies from the EU member states, the exportation of the service is exempt. The exporting country applies a 0% rate and the importer determines the aliquot
  - Telecommunications services, broadcasting, and electronic service delivery to countries outside the EU do not apply for exemption from VAT

Source: COUNCIL DIRECTIVE 2006/112/EC of 28 November 2006 on the common system of value added tax – http://eurlex.Europe.eu/LexUriServ/site/en/oj/2006/l_347/l_34720061211en00010118.pdf

In the remaining international context, only 23% of countries do not apply VAT to inter-operator billing for roaming services

Impact of VAT legislation on roaming in the EU

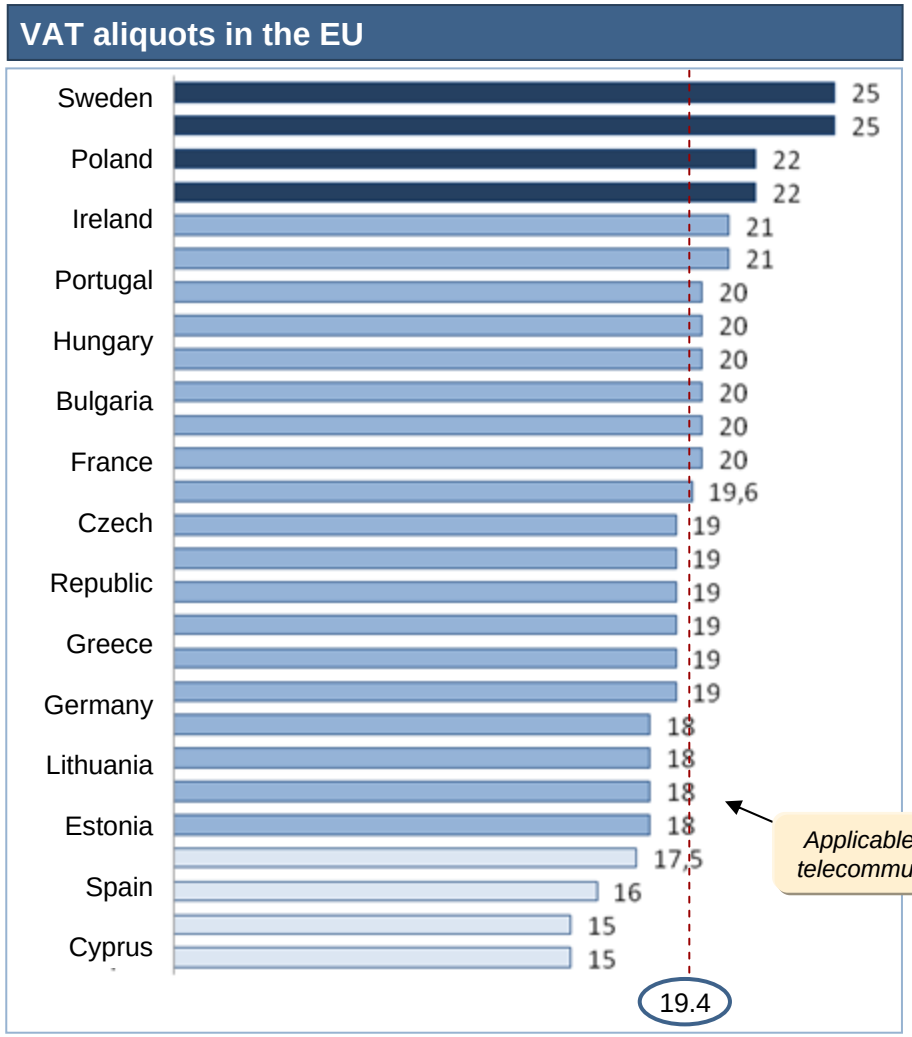
- In the particular case of roaming in the EU, the specific treatment for telecommunication services anticipates the non-implementation of VAT at the wholesale level (IOT). The service will be taxed only in the home country in the retail invoice to the consumer
  - This avoids double taxation in roaming
  - The European region is different in the international context in the treatment of the indirect tax, VAT
  - Outside the context of the EU, only 23% of countries do not tax incoming roaming (from a sample analysis of 52 countries)
  - The key issue in the EU is the possibility of tax coordination through a mandatory system of supranational legislation
  - The EU VAT legislation does not standardize aliquots (tariffs), but applies uniform tax treatment on sales of goods and services

ECOFIN VAT package agreement

- ECOFIN (Economic and Financial Affairs Council of the EU) signed an agreement in December 2007 to change the rules of the EU community VAT:
  - The package consists of two projects known as the "VAT package"
  - The aim is to ensure that transactions are always levied by the VAT of the country of usage, except in the general case of services to end consumers of another country
  - These rules are scheduled to take effect on January 1, 2010

Figure 96 - VAT Rates in Europe

The average VAT in the EU is 19.4%. For transactions with the rest of the world VAT is applied to wholesale billing



- There are different VAT rates, ranging between 15% and 25%
- While there are reduced rates that can be as low as 5%, they do not apply to telecommunications
- VAT only applies to the billing of roaming at the retail level; wholesale billing is tax exempt
- When involving countries outside the EU, the elimination of double taxation from VAT does not apply

Source: European Commission (2008) VAT Rates Applied in the Member Status of the European Community, http://ec.Europe.eu/taxation_customs/resources/documents/taxation/vat/how_vat_works/rates/vat_rates_en.pd

Figure 97 - VAT applied to inbound IOTs outside Europe and South America

Of the 52 countries surveyed outside the EU and South America, VAT is applied to wholesale billing in 73% of cases

Application of VAT or similar to IOT for inbound (inter-operator roaming service in the visited country)

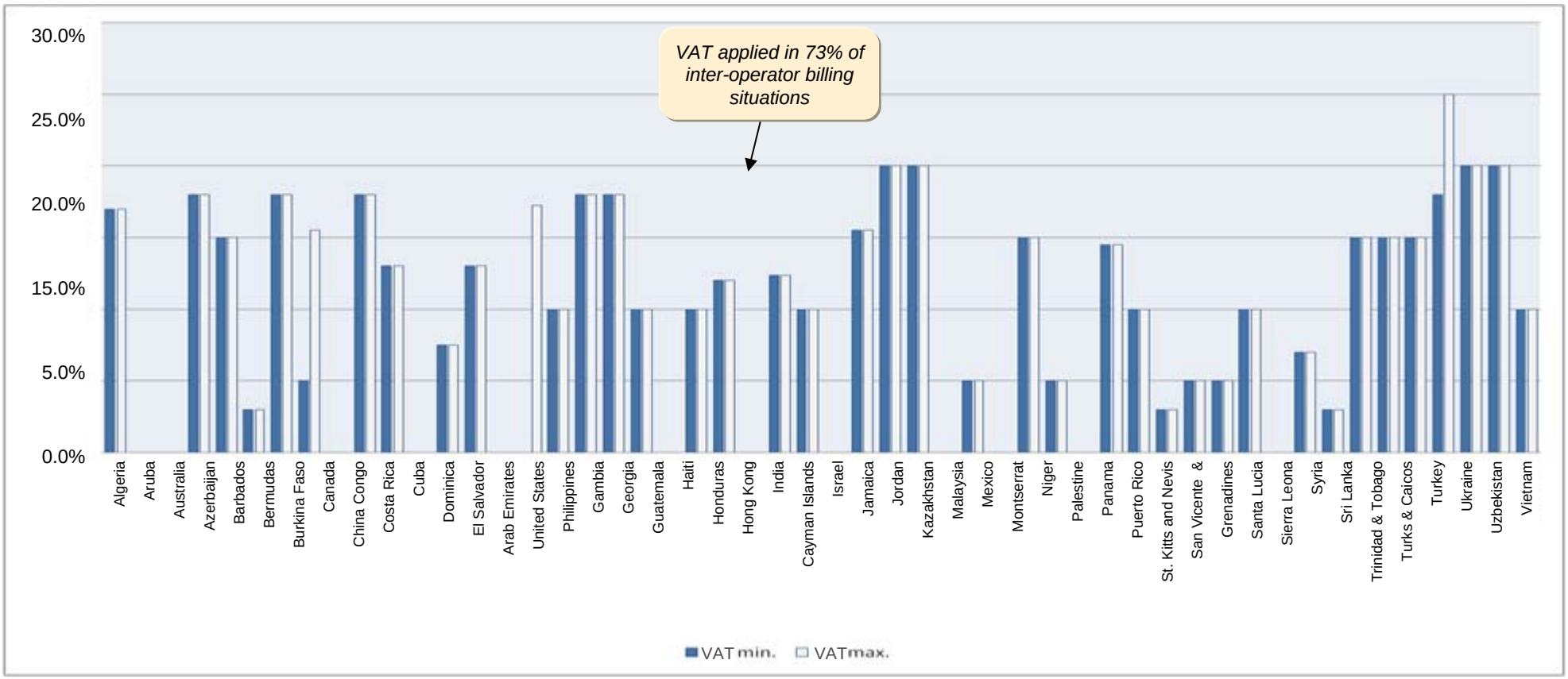
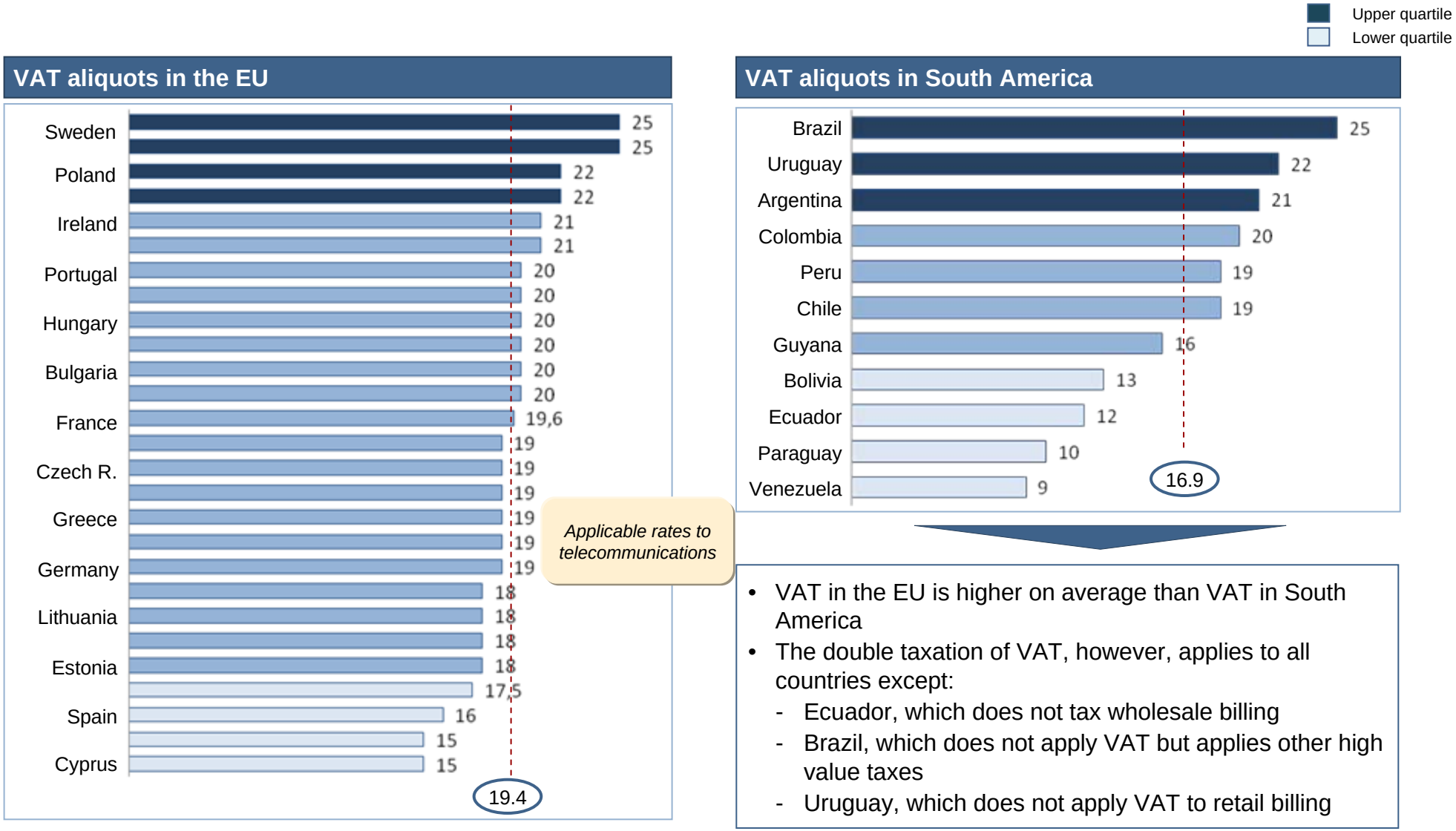


Figure 98 - Comparison of VAT rates in the EU and South America

The South American region has a lower average VAT than the EU but suffers from double taxation of VAT



- VAT in the EU is higher on average than VAT in South America
- The double taxation of VAT, however, applies to all countries except:
  - Ecuador, which does not tax wholesale billing
  - Brazil, which does not apply VAT but applies other high value taxes
  - Uruguay, which does not apply VAT to retail billing

In India, taxation was analyzed specifically for roaming using the residency criterion, which leads to double taxation

Tax analysis in India for roaming

- India has a specific statement of tax authority on roaming taxation, which clearly illustrates the interpretation typically adopted by the various states regarding the application of indirect taxes under the locality criterion, particularly for VAT
  - Circular No.90/1/2007* Department of Revenue of the Ministry of Finance of India says:
  - “During the period of roaming, the Indian telecom service provider provides telephone service to an international in-bound roamer. This service to in-bound roamers is delivered and consumed in India and, therefore, it is not an export of service. International practice treats the telephone service provided to an in-bound roamer by the visited network, for purposes of taxation, in the same manner as a telephone service provided to any home subscriber”.
  - Here the tax administration applies the principle of "used and enjoyed” Using this principle, roaming is not considered as an exportation of services and therefore the tax is not applied, regardless of whether billed as an external wholesaler
- This interpretation leads to situations of double taxation at the international level, which can only be resolved with tax coordination or standardization agreements

* Service Tax http://www.servicetax.gov.in/circular/st-circular07/st_circ_90-2k7.htm

Figure 99 - Scale of regional integration in Balassa (1961)

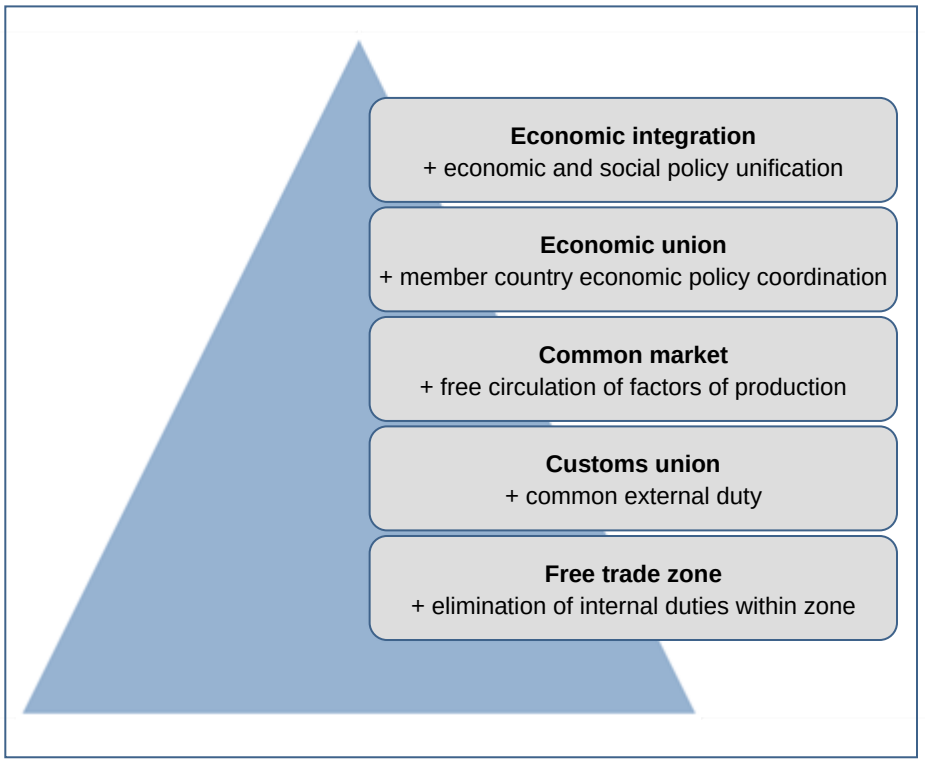
The possibility of reaching multilateral agreements on taxation depends on the level of regional integration

CONCEPTUAL

Multilateral agreements on taxation and the level of regional integration

- The chance of reaching multilateral agreements on taxation is strongly correlated to the formal development of regional integration agreements, in that the need for tax coordination is greater when tax disparities inhibit business and fair competition in the integration block

Scale of regional integration in Balassa (1961):



One of the regional integration initiatives in Latin America is CAN,...

Regional integration and taxation coordination in South America

- With customs unions, a broader market can be created that fosters fair competition between producers and suppliers from various countries for production and also foreign investment, which requires tax policy coordination, particularly for indirect taxes. For these taxes, it will be vital to not "export" indirect taxes on both goods and services and that imports are taxed at the same rates and conditions as domestic goods and services
- Customs unions (1) in Latin America include the Andean Community of Nations (CAN), the Caribbean Community and Common Market (CARICOM), MERCOSUR and the Central American Customs Union (currently being formed) (2)
- The supranationality of the integration schemes, is key to assessing the possibility of formulating rules that, in practice, are effective in all countries of the agreement; this represents a crucial time to make certain specific regulations, such as those which would form parts of roaming agreements, such as multilateral taxation agreements
  - Supranationality can be defined as having the power to legislate over national laws (3)
  - This authority is decisive for the fate of supranational arrangements such as those examined in the Europe (Eurotariff and EU VAT)

(1) Fusion of several customs territories into one, with the purpose of consolidating the free transit of goods regardless of the origin, if within the member states, or after being nationalized in one of the member states if coming from a third-party country. SIECA (2006), Current State of Economic Integration in Central America

(2) CARICOM: Treaty establishing the Caribbean Community (Chaguaramas Treaty), August 1, 1973, establishing a common external tariff. Was revised in 2001, including certain commercial, tariff and tax aspects (double taxation agreement for direct taxes)
CAN. Cartagena Agreement, 1969. Currently comprised of Ecuador, Colombia, Peru and Bolivia. Common External Tariff: Decision 370 of 1995
MERCOSUR: Treaty of Asuncion, March 26, 1991, and Decision 22/94 of the Common Market Council (CMC) of Mercosur (in Ouro Preto), establishing the common external tariff and exceptions
Comprised of Argentina, Brazil, Paraguay and Uruguay
The Central American Customs Union is currently being established, with a founding document (approved at the international treaty level), several important resolutions from the Finance Ministers of the Central American System Integration (SIECA) member countries and technical groups

(3) Véase Velayos F., Barreix A., Villela L.(2007)

...which has advanced more in indirect taxation agreements

Regional integration and taxation coordination in South America (Cont.)

- When supranationality is weak, coordination initiatives will be subject to the signing of traditional international treaties, which will require ratification to be binding in each state
  - Some transfer of authority or sovereignty to supranational bodies will help the viability of a tax coordination process, which would otherwise be too easily influenced by the legislation of each state
- CAN has been the most advanced with respect to reaching agreements on indirect taxation
  - CAN is a step ahead compared to MERCOSUR, CARICOM and the Central American Customs Union, in that any CAN decision is binding and directly applicable in all member states (1)
- Agreements to avoid double taxation from direct taxes have been developed in the CARICOM (2) and CAN (3) frameworks
- Worldwide agreements to avoid double taxation have been developed regarding this kind of tax, following the OCDE and/or UN models
- Indirect tax rates, which have the greatest impact on the cost of roaming, coordination or compatibility, are less widespread and are always linked to multilateral agreements within the regional integration process framework (eg. European Union and Andean Community)

(1)Treaty establishing the Andean Community Court of Justice (1996).
Article 2 .- The decisions are binding for the member countries from the date on which they are approved by the Andean Council of Ministers...
Article 3 .- The decisions of the Andean Council of Ministers for External Relations or the General Secretary of Commissions and Resolutions will be directly applicable in the countries ...
(2) Caricom agreement on tax incentives - 1973 multilateral treaty to avoid double taxation and prevent fraud and tax evasion, CARICOM (1994)
(3) Decision 578, 2004, with an antecedent from 1970

Document contents

- Chapter I: Study of international roaming markets

- **Chapter II: Comparison of the international and South American context**
  - Comparison of the examined regions vs. South America
  - Key success factors of the initiatives in other regions and their applicability in South America

- Annexes

Comparison of the international and South American context: Executive summary

Comparison of the examined regions vs. South America

- South America, in terms of economic and telecommunications markets, is more like Africa and the Middle East than other regions:
  - South America is a region of average earnings:
    - South America has a PPP adjusted per capita GDP of USD 10,400, which is similar to that of the Middle East (USD 9,600)...
    - ...while Africa presents the lowest per capita GDP (USD 5,300)
    - ...and Europe remains well above the examined regions, at USD 21,900
  - Travel in South America is low vs. the other regions studied:
    - South America has a low proportion of intra-regional travel vs. population, with values similar to those in Africa (2-3%)...
    - ...while intra-regional travel in Europe reached 42% of the total population, given the region's high socio-economic integration
  - The South American mobile market has a high percentage of prepaid subscribers with low ARPU and also the lowest number of GSM handsets in use among the regions analyzed:
    - The proportion of prepaid mobile subscribers in South America is high (85%), second only to Africa…
    - …yet South America has one of the lowest ARPU levels among the regions studied, at USD 14.1 per month, higher only to Africa, at USD 13.2 per month
    - South America has the lowest level of GSM compatibility, although 83% of the handsets use GSM or UMTS
- The South American mobile market is in an intermediate stage of growth as compared to the fully mature European market, and the newly developing markets of Asia-Pacific and Africa and the Middle East
- The challenge of regulatory coordination among the South American countries is also evident in other regions, with the exception of Europe, which has been able to coordinate regulation with all of its EU members

Comparison of the international and South American context: Executive summary (cont.)

Key success factors of the initiatives in other regions and their applicability in South America

- Four types of initiatives for the development of international roaming we identified:
  - Regulatory: regulations on tariffs, services, transparency, spectrum and tax; or industry self-regulatory initiatives the
  - Informative: Web sites established by regulators or industry associations to share information on rate comparisons, roaming in border zones, and on Quality of Service (QoS)
  - Roaming alliances: operator groups that provide differential rates and roaming services
  - Technical and industry innovation: aimed at improving service in terms of security, availability, coverage and quality
- There are 6 types of stakeholders that can lead such initiatives: regional regulators, national regulators, industry associations, operator groups, individual operators and service providers.
- The analysis of the initiatives concluded that:
  - In the case of regulatory initiatives, the greatest impact is on pricing transparency
    - The Eurotariff had a strong impact on price reductions and served as inspiration for the proposed AREGNET regulation
  - For informative initiatives, the greatest impact also comes from web sites on transparency
  - The roaming alliances that are able to offer more benefits and innovations are those from large business groups, in particular, Zain and Vodafone
    - The One Network alliance, led by the Zain mobile group, is of particular importance to South America, because it innovated the user experience by offering domestic rates for clients in international roaming on the networks of its affiliated operators
  - The innovative technical and industry initiatives are aimed at improving service in terms of security, availability, coverage and quality
- The most common key success factor among successful initiatives is the ability of the initiative leader to control or coordinate the other stakeholders
- For each type of initiative the following key success factors were identified:
  - Regulatory: enforcement capacity, which proved crucial in Europe's case to secure initiative leadership, facilitate coordination between the member countries, and allow for uniform implementation

Comparison of the international and South American context: Executive summary (cont.)

Key success factors of the initiatives in other regions and their applicability in South America (cont.)

- Informative: rate comparison web sites:
  - . Active role of industry associations to ensure proper updating of rates and completeness of information
  - . Threat of regulation, which in the past led operator associations to generate own sites with information on regional roaming rates
- Roaming alliances: strong leadership by a group of operators allows for coordination of the various national operators, and can generate more aggressive pricing offers
- Technological and industry innovation:
  - . Coordination at the operator association level, which ensures implementation by members
  - . Economic and financial attractiveness of the initiative (high return and/or early payback)

• Some of the international initiatives could be considered for implementation in South America:
- Regulatory: launch attempt similar to that of AREGNET with Regulatel o Citel, although without certainty of effectiveness in practice
- Informative:
  - Rate comparison web sites:
    - . Create an independent price comparison site for Regulatel or Citel, similar to the one by the European Commission
    - . Persuade the GSMLAA to make a web site similar to those designed in Europe and the Arab World
  - .Web sites for quality of service:
    - . Persuade the GSMLAA or the governments to make a web site similar to ANACOM, which details operator quality of based on their services
- Roaming alliances:
  - . Persuade América Móvil, Movistar and TIM to have better rates, services and transparency in their alliances, which so far are not as developed as the other analyzed alliances
  - . Recommend governments to assist in the creation of an on-net network at the international level for regional operators (eg. open up long distance, open up international links) in the same manner as was the case with One Network

Executive summary of the comparison of international and South American context (cont.)

Key success factors of the initiatives in other regions and their applicability in South America (cont.)

- Technological and industry innovations:
  - . Initiatives such as border zone roaming have a positive social impact on border communities and the most disadvantaged working class of neighboring countries
  - . Initiatives such as the analysis of international long distance services regulation have an important impact on the effective monitoring of competition and the price-quality relationship of the service offering
  - . Other initiatives such as providing support to service providers to promote open connectivity hubs, prepaid services, or fraud detection, can promote regional integration, service coverage expansion, and specific contract models
  - . It is worth mentioning that there are initiatives nonspecific to roaming (or even to mobile services in general), such as spectrum regulation and convergence, which are of key importance for regional integration, optimization of competition, and expansion of service coverage to lower income segments.
  - . The key factor for the implementation of industry initiatives is in the formation of a regulatory agency able to understand the mobile market in general, and in particular, related to roaming

Document contents

- Chapter I: Study of international roaming markets

- **Chapter II: Comparison of the international and South American context**
  - **Comparison of the examined regions vs. South America**
  - Key success factors of the initiatives in other regions and their applicability in South America

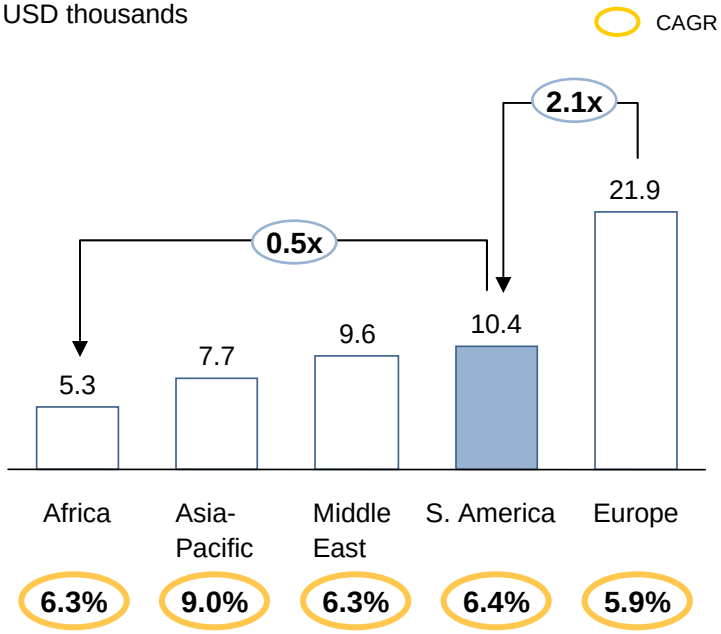
- Annexes

Figure 100 - Comparative analysis of PPP adjusted per capita GDP and intra-regional tourist trips between regions

South America is a region of average earnings and a low proportion of intra-regional travel vs. the other regions studied

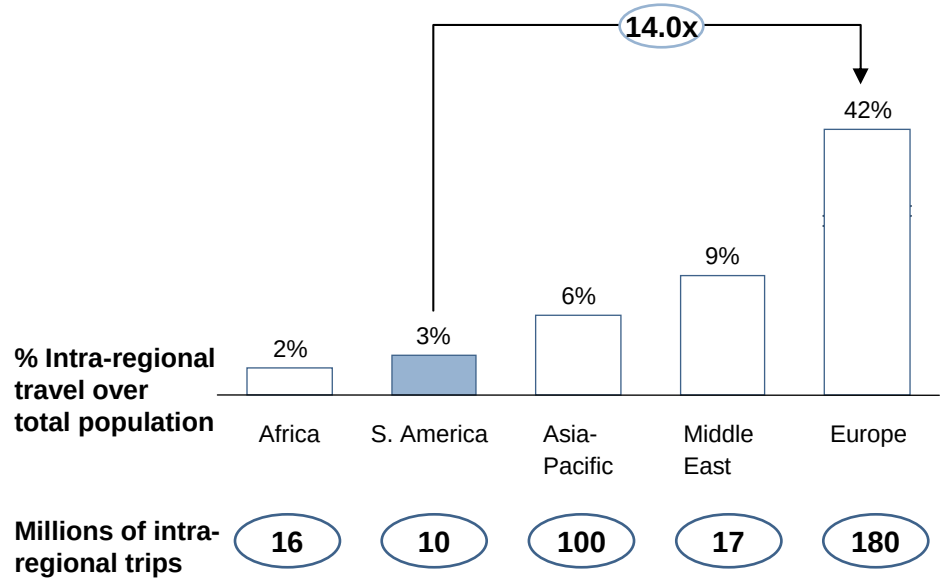
Per Capita GDP adjusted for PPP

2007, USD thousands



Intra-regional travel vs. total population

2006, Percentage, Millions per year



- South America has a low per capita GDP, similar to that of the Middle East...
- …and higher than that of Africa…
- …but much lower than Europe, which ranks way above the rest, at almost double what is found in South America

- South America has a low proportion of intra-regional travel vs. population, with values similar to those in Africa, of 2-3%..
- ... while the proportion of intra-regional travel vs. population in Europe is 42%, given the region's high socio-economic integration

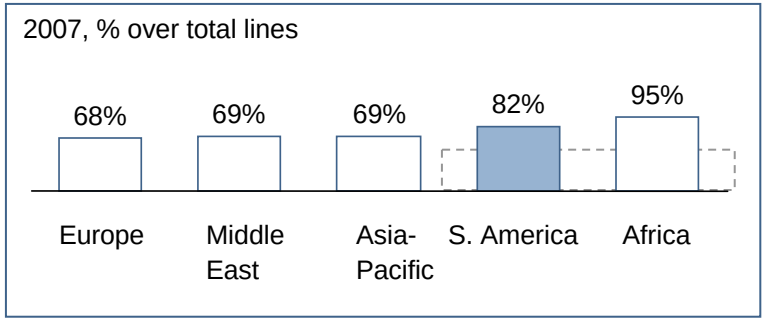
* Intra-regional travel over total outbound travel

Source: ARCEP, Interviews, Work team analysis

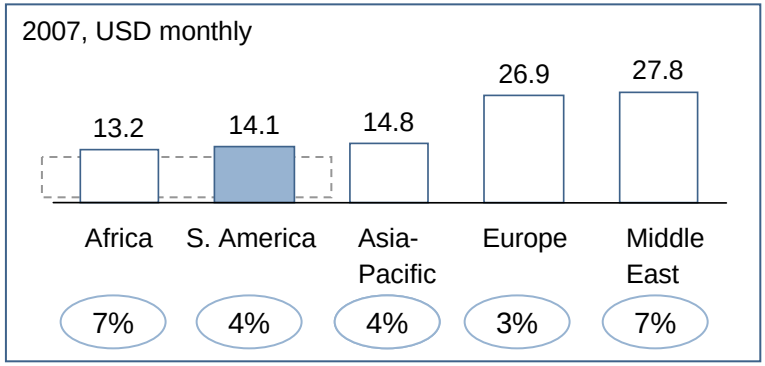
Figure 101 - Comparative analysis of the regional mobile telecommunications markets

The South American mobile market has a high percentage of prepaid subscribers with low ARPU, and also the lowest number of GSM handsets in use among the regions analyzed

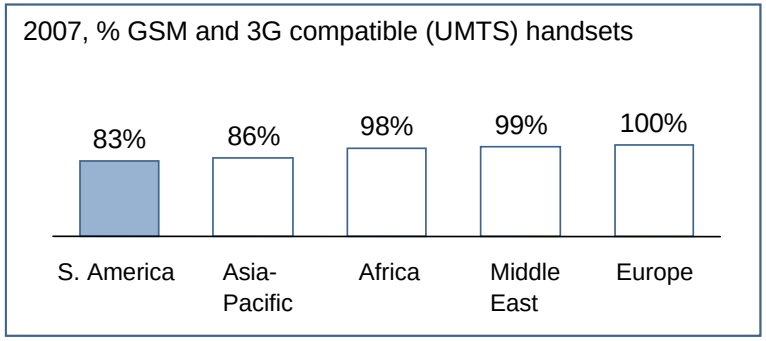
Relative weight of prepaid



Mobile market ARPU



GSM compat-ibility



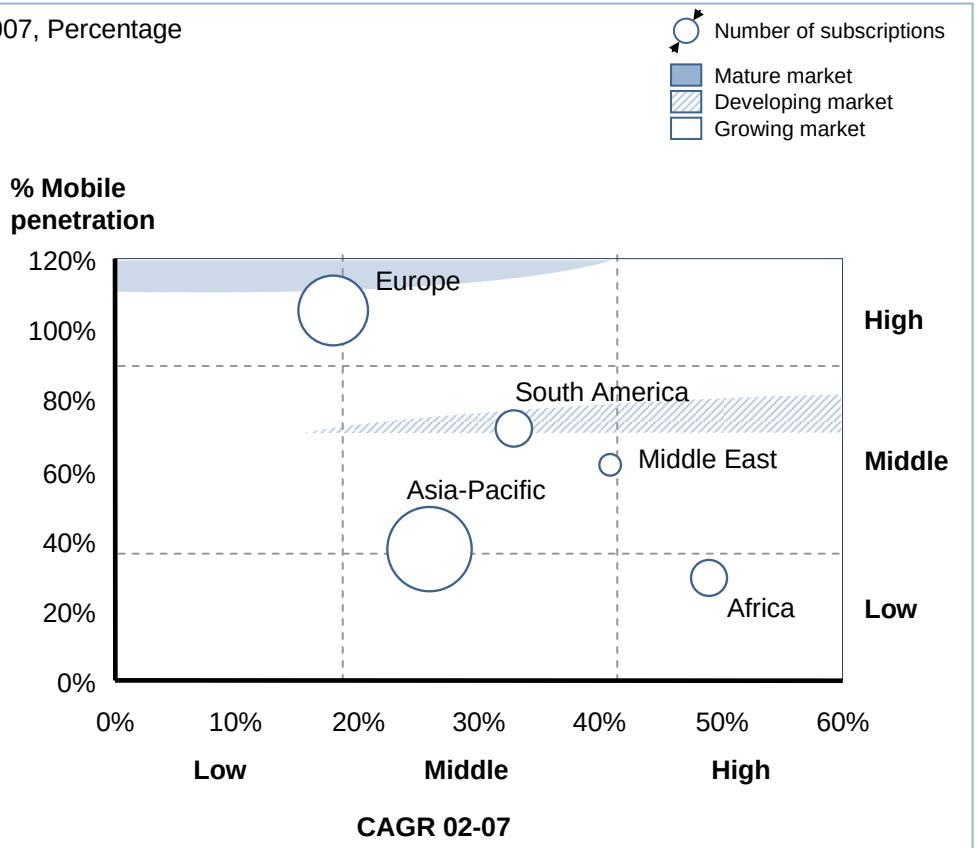
- High proportion of prepaid mobile subscribers in South America (85%), second only to Africa
- South America has one of the lowest ARPU levels among the regions studied, at USD 14.1 per month, higher only to Africa, at USD 13.2 per month
- South America shows low levels of GSM compatibility, although 83% of handsets use GSM or UMTS

Source: IMF, Yankee Group, Work team analysis

Figure 102 - Comparison of the regional mobile telecommunications market lifecycles

The South American mobile market is in an intermediate stage of growth, as compared to the fully mature European market and the newly developing markets of Asia-Pacific, the Middle East and Africa

Regional mobile telecommunications market lifecycle



- The mobile market in South America is at an intermediate stage of growth with an above average penetration level relative to other regions
- In Europe the mobile market is becoming saturated, with a relatively low growth rate and a penetration level exceeding 100% of the population
- The Asian mobile market is in a transitional phase between strong development and growth due to countries like China and India which have low levels of mobile penetration
- In Africa the penetration level is still very low, but the market is in full development with average growth rates of 50%

Source: IMF, Yankee Group, Work team analysis

Figure 103 - Comparative analysis of regional regulatory institutions

The challenge of regulatory coordination among the South American countries is found in other regions, with the exception of Europe, which has been able to coordinate regulation with all its EU members

Region	Regulatory association	Role of association	
		Direct creation of laws with regional scope	Coordination of efforts to implement uniform national laws
Europe	• European Commission	✓	
	• European Parliament	✓	
Africa and the Middle East	• AREGNET		✓
Asia-Pacific	• APT		✓
	• ASEAN		✓
	• SAARC		✓
South America	• Regulatel		✓
	• Citel		✓
	• Mercosur		✓
	• CAN		✓

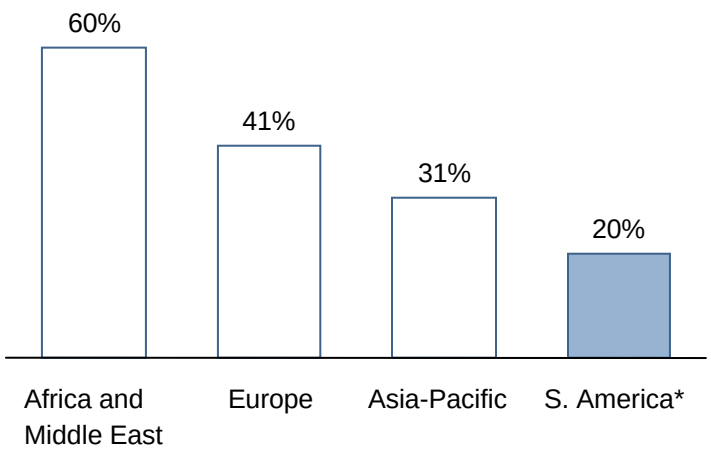
To implement regional regulation initiatives in Europe, the enforcement capacity of the European Commission was essential

Figure 104 - Comparative analysis of regional roaming markets

The South American roaming market appears to be the least developed worldwide, with a low proportion of roaming travelers and low ARPU levels...

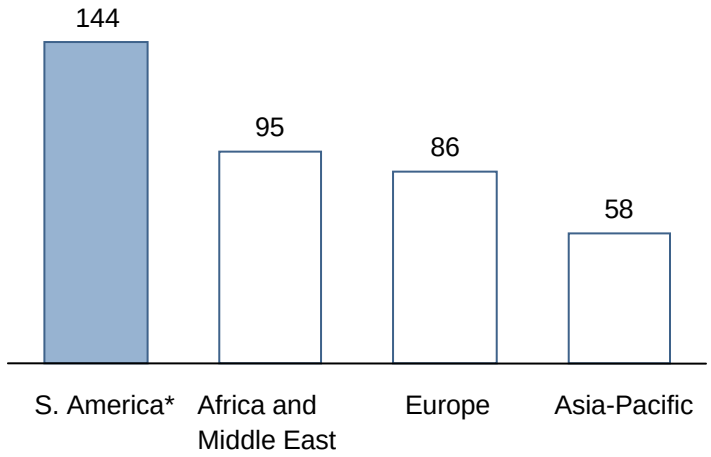
Percentage of travelers who use roaming services

2008, Percentage, Millions of trips



ARPU per trip in roaming

2008, USD per trip



- The low level of roaming usage in South America confirms the elite nature of this service...
- ...which is reflected in the high ARPU levels for the service, largely due to high tariffs
- While further investigation is needed, more affordable rates are expected to reduce ARPU but increase the number of users, thus partially offsetting the negative effect on total income

* Values for travelers who use roaming during intra-regional travel in South America

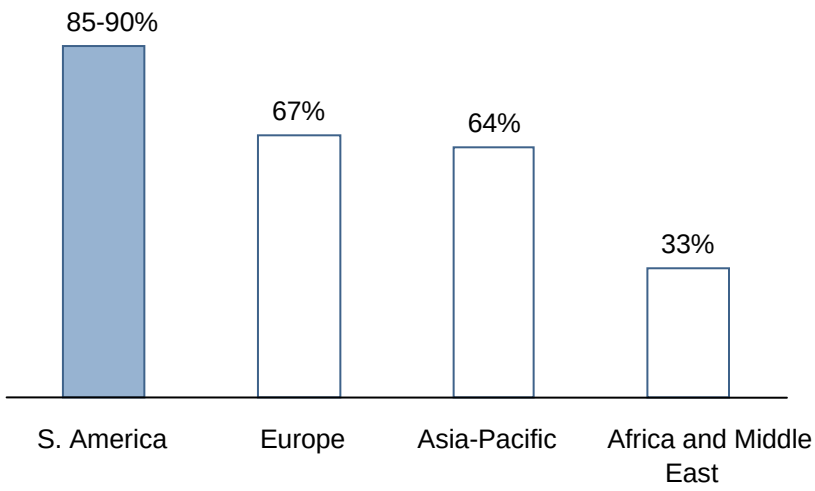
Source: Informa, Interviews with operators, Work team analysis

Figure 104 - Comparative analysis of regional roaming markets (cont.)

...given the higher percentage of business travelers who use roaming and the high rates charged in international terms

Proportion of roaming business travelers...

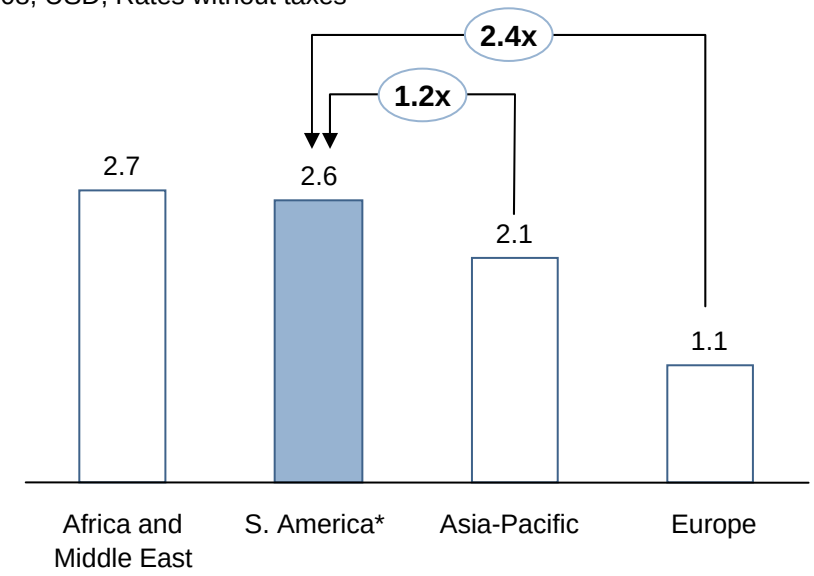
2008, Percentage of business roamers vs. total roamers



- South America has the highest percentage of roaming business travelers...
- who are the heaviest users of the service and the least price sensitive vs. leisure travelers using roaming

Roaming rates for intra-regional calls

2008, USD, Rates without taxes



- Rates for intra-regional calls in South America are 2.4 times higher than in Europe and 1.2 times higher than in Asia-Pacific
- While Africa and the Middle East have higher rates, they have a lower percentage of business travelers using roaming

* Considers the outgoing calls to the country of origin

Source: Informa, Interviews with operators, Work team analysis

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Four types of initiatives were identified...

Type of initiative	Definition	Cases
Regulatory	• Regulations on rates, services and transparency	• Eurotariff (Regulation EC717/2007) • AREGNET regulatory proposal
	• Industry self-regulatory initiatives	• The GSMA Europe Code of Conduct • The GSMA Arab World Code of Conduct
	• Initiatives for tax coordination of indirect taxes (VAT) in regional integration	• Coordinated VAT in Europe, EU (VAT Sixth Directive)
	• Initiatives for spectrum regulation	
Informative	• Rate comparison web sites: web sites created by regulators or industry associations to compare roaming rates of visited network operators	• European Commission web site • GSMA Europe web site • GSMA Arab World web site
	• Quality of service (QoS) web sites: sites created by the governments, regulators, and industry associations, to compare the quality of the various services offered by each operator	• ANACOM web site

Source: Work team analysis

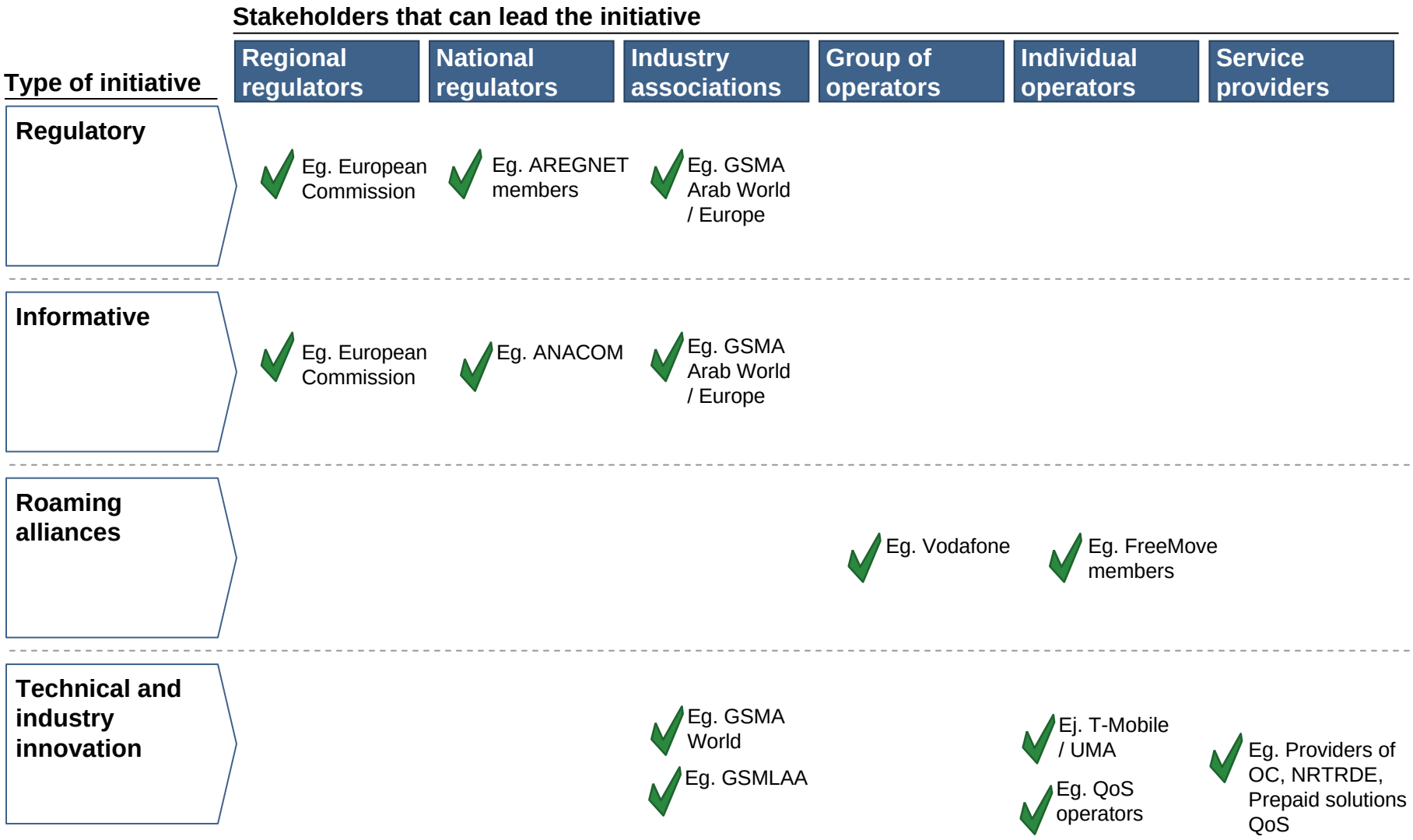
...for the development of international roaming...

Type of initiative	Definition	Cases
Roaming alliances	• Operator alliances that provide differential rates and roaming services	• Major business groups: Vodafone, Zain and Etisalat • Equitable representation: Bridge and FreeMove • Independent operators: Conexus AMI, Kama Kawaida
Technical and industry innovation	• Initiatives to: - Reduce fraud	• NRTRDE - CEIR • Independent platforms with probes
	- Improve the quality of service	• Global roaming quality • Anti-fraud services with probe platforms
	- Improve the efficiency of operations and coverage	• Open Connectivity
	- Prepaid platforms	• Prepaid hub platforms • Hubs for adding prepaid credit
	- Fixed - Mobile convergence	• UMA - T-Mobile
	- Facilitate border zone roaming	• Republic of Ireland and Northern Ireland - United States and Mexico

Source: Work team analysis

Figure 105 - Classification of regulatory initiatives expected to be implemented by stakeholders

...and 6 types of stakeholders can lead such initiatives: regional regulators, national regulators, industry associations, operator groups, individual operators and service providers



Source: Work team analysis

To analyze the impact of the initiatives, price, service and transparency aspects were considered

Pricing

- Amount of tariff reduction for roaming services
- Scope of the initiative to lower prices:
  - By type of subscription (postpaid and prepaid)
  - By segment (individuals and corporate)

Services

- Incorporating virtual home environment features:
  - Special access codes
  - Voice mail
  - Caller ID
  - Prepaid credit
- Roaming coverage expansion:
  - Prepaid
  - Geographical Area
  - Operators and services
- Technical improvements for operators:
  - Countering fraud
  - Roaming hubs
  - Quality of service
  - Convergent solutions
  - Border zone roaming
  - Regional prepaid credit

Transparency

- Design of standardized rates, examples:
  - Standardized rates in specific country zones
  - Data plans with flat rate
  - Border zone roaming
- Communication of rates applicable to services:
  - Free SMS when entering roaming
  - Web site
  - Customer service
- Communication of rate updates
- Information on available services and coverage

* Effective impact of realized initiatives and desired impacts for ongoing initiatives
Source: Work team analysis

Figure 106 - Diagram of impact on prices, services and transparency, by regulation

In case of regulatory initiatives, the greatest impact is on pricing transparency...

Regulatory cases	Impact*		
	Pricing	**Services**	**Transparency**
Eurotariff (Regulation EC717/2007)	• Price reduction of 40-60% for European users • Applies only to voice services	• Without obligation regarding coverage, quality, etc..	• Standardized rates • Free SMS with applicable charges • Immediate notification of any rate update
AREGNET regulatory proposal	n.a. • Impact heavily dependent on implementation capacity	• Without obligation regarding coverage, quality, etc..	• Free SMS with applicable charges • Obligation to publish rate updates on a web site
Code of Conduct for information on GSMA Europe roaming rates	• No definition on pricing	• No definition on services	• Commitment to information available at: - Customer service - Corporate web site
Code of Conduct for information on GSMA Arab roaming rates	• No definition on pricing	• No definition on services	• Commitment to information available at: - Customer service - Corporate web site - Text message

- The Eurotariff had a strong impact on price reductions, and served as inspiration for the proposed AREGNET
- Codes of conduct covering the GSMA are limited mainly to transparency issues

* Effective impact of realized initiatives and desired impacts for ongoing initiatives

Source: Work team analysis

Figure 106 - Diagram of impact on prices, services and transparency, by regulation (cont.)

...and while elimination of the double taxation of VAT would have a greater impact, it is difficult to replicate in South America

Regulatory cases	Impact		
	Pricing	**Services**	**Transparency**
Regulation for a uniform VAT (EU VAT): tax treatment, namely the double taxation of indirect taxes	• Application of VAT in only one country for roaming cases, based on a destination criterion	• Without obligations regarding coverage, quality, etc..	• Transparency in the rules of VAT application and uniformity in the region.
Regulatory framework of the European Commission, 2002	• Indirect impact of having more efficient spectrum and technology coordination management	• Regulation on spectrum allocation and use	• Seeking greater transparency regarding spectrum allocation
The ITU World Radio Communication Conference - WRC			
The Telecommunications Act of 1996 and FCC resolutions			

Source: Work team analysis

Figure 107 - Diagram of impact on prices, services and transparency, by information source

For informative web site initiatives, the greatest impact is also on pricing transparency…

Cases from web sites	Impact*		
	Pricing	Services	Transparency
European Commission site for comparing roaming rates	○ • No definition on pricing	○ • No definition on services	◔ • Rates for calls to the country of origin, calls received, SMS, and data • Non-exhaustive list of countries and operators • Rates updated every 6 months
Site to compare roaming rates within GSMA Europe	○ • No definition on pricing	○ • No definition on services	◑ • Rates for calls to the country of origin, local calls, calls received and SMS • Complete list of countries and operators • Prices always updated
Site to compare roaming rates within GSMA Europe	○ • No definition on pricing	○ • No definition on services	◑ • Rates for calls to the country of origin, local calls, calls received and SMS • Complete list of countries and operators • Prices always updated

- The European Commission site has little transparency given the lack of pricing updates...
- ...while the GSMA Europe and Arab world sites are more effective in publishing pricing updates for all of its member countries, they do not include rates for data roaming services

* Effective impact of realized initiatives and desired impacts for ongoing initiatives

Source: Work team analysis

Figure 107 - Diagram of impact on prices, services and transparency, by information source (cont.)

...and possibly service quality

	Impact		
	Pricing	**Services**	**Transparency**
Cases from web sites			
Web sites for quality of service in Portugal - Europe	• No definition on pricing • The trend, however, is that pricing will be linked to quality of service	• End users can compare the level of service offered by the various operators in the country	• Allows for the promotion of transparency, especially when pricing is linked to service quality

Source: Work team analysis

Figure 108 - Diagram of impact on prices, services and transparency, by roaming alliance

The roaming alliance initiatives that are able to offer more benefits and innovations are the those from large business groups, in particular, Zain and Vodafone

Cases of roaming alliances		Impact*		
		Pricing	Services	Transparency
Major business groups	One Network (Africa and the Middle East)	• Calls and messaging: - Outgoing with local price or 10% surcharge on local price - Free incoming	• Virtual home environment* • International sales positions for prepaid cards	• International roaming service with home user “virtual logic” and domestic rates/tariffs for voice and SMS
	Vodafone (world)	• Discounts from 10% to 30% on inter-operator roaming tariffs in special plans vs. regular inter-operator tariffs	• Virtual home environment* • Special access code to add prepaid credit in roaming • Centralized management of multinational corporate accounts	• For calls - Plan with domestic rates after the second minute - Standardized rates in specific country zones • Flat fee for data roaming
	Etisalat (Africa and the Middle East)	• Calls and messaging: - Outgoing at local rate - Free incoming	• Virtual home environment*	• International roaming service with home user “virtual logic” and domestic rates/tariffs for voice and SMS

• The case of One Network, led by the Zain group, is of particular importance to South America because:
- Established domestic rates for international roaming customers using affiliate operator networks,...
- ...has a mobile ARPU of 16 USD/month, which is comparable to the South American ARPU of 14 USD/month...
- ...and has a customer base of predominantly prepaid subscribers (97%), higher than in South America (82%)

* Ease of special access code for voice mail and customer service

Source: Work team analysis

Figure 108 - Diagram of impact on prices, services and transparency, by roaming alliance (cont.)

The roaming alliance initiatives that are able to offer more benefits and innovations are the those from large business groups, in particular, Zain and Vodafone (cont.)

Cases of roaming alliances		Impact*		
		Pricing	Services	Transparency
Equitable representation	Bridge (Asia)	• Non-standardized discounts from 5% to 20% vs. regular inter-operator tariffs	• Virtual home environment* • International positions for: - Customer service - Prepaid credit • Affiliate program	• Flat fee for data roaming
	FreeMove (worldwide)	• Special discounts only for multinational corporate clients	• Virtual home environment* • Caller ID • Centralized management of multinational corporate accounts	• Standardized rates in specific country zones
Independent operators	Conexus (Asia)	• Intragroup discounts for corporate clients	• Virtual home environment* • Centralized management of multinational corporate accounts • Affiliate program	• Flat fee for data roaming
	AMI (Asia)	• Discounts of 5 to 20%	• Caller ID	• No pricing standardization among alliance members
	Kama Kawaida (Africa)	• Calls and messaging: - Outgoing at local rate - Free incoming	• International sales positions for prepaid cards	• International roaming service with home user “virtual logic” and domestic rates/tariffs for voice and SMS

* Ease of special access code for voice mail and customer service

Source: Work team analysis

Figure 109 - Diagram of impact on prices, services and transparency, by technical innovation

The innovation initiatives are aimed at improving service in terms of security, availability, coverage and quality

Cases of technical and industry innovations	Impact		
	Pricing	Services	Transparency
Near-Real-Time Roaming Data Exchange (NRTRDE)	• No definition on pricing. • Impact on costs associated with the loss of roaming	• Mitigates the risk of fraud with the rapid exchange of information between operators	• No definition on transparency
Open Connectivity (OC)	• No definition on pricing, cost reductions or implementation time. • Expands the level of coverage	• Efficiency improvements to set new roaming agreements (bilateral or multilateral)	• No definition on transparency
Global roaming quality (GRQ)	• No definition on pricing	• Ensure end-to-end monitoring of the quality of roaming service	• No definition on transparency
Initiatives for infrastructure development	• No definition on pricing	• Interoperability improvements between networks and roaming technologies	• No definition on transparency

Although technical innovations usually result in cost reductions and operational improvements, there is no guarantee that these benefits are passed on to customers through reduced rates or increased transparency

Source: GSMA, Work team analysis

Figure 109 - Diagram of impact on prices, services and transparency, by technical innovation (cont.)

The innovation initiatives are aimed at improving service in terms of security, availability, coverage and quality (cont.)

Cases of technical and industry innovations	Impact*		
	Pricing	Services	Transparency
CEIR	• No definition on pricing	• Mitigating the risk of fraud related to handset theft	• No definition on transparency
Convergence of technologies (eg. UMA)	• Price reductions in Wi-Fi coverage areas	• Enables the convergence of services	• No definition on transparency
Border zone roaming	• Price reductions in border zones	• Allows a more efficient service in border zones	• Allows a more transparent service in border zones
Hubs for adding prepaid credit	• Pricing information for prepaid services and prepaid cards according to operator	• Possibility of improving the abilities for prepaid users to add credit	• No definition on transparency

Although technical innovations usually result in cost reductions and operational improvements, there is no guarantee that these benefits are passed on to customers through reduced rates or increased transparency

* Effective impact of realized initiatives and desired impacts for ongoing initiatives

Source: GSMA, Work team analysis

The most common key success factor among the successful initiatives was the ability of the initiative leader to control or coordinate the other stakeholders

Type of initiative	Key success factors
Regulatory	• Enforcement capacity, which proved crucial in Europe's case to secure leadership of the initiative, facilitate coordination between the member countries, and allow for uniform implementation • Supranationality; Legislative capacity at the regional level, within the framework of regional integration agreements, tariff regulation, taxes and technical issues
Informative	• Active role of industry associations to ensure proper updating of rates and completeness of information • Threat of regulation, which in the past led operator associations to create sites with information on regional roaming rates (eg. GSMA sites for rates in Europe and Africa and the Middle East, after roaming price analysis by respective regional regulators)
Roaming alliances	• Strong leadership by a group of operators, allowing for the coordination of the various national operators, and generation of more aggressive pricing offers
Technical and industry innovations	• Coordination at the operator association level, which ensures implementation by members • Economic and financial attractiveness of the initiative (high return and/or early payback)

Some international initiatives could be considered for implementation in South America

Type of initiative	Relevant or replicable initiatives in South America
Regulatory	• Attempt a launch similar to that of AREGNET with Regulatel o Citel, although without certainty of its effectiveness in practice: - AREGNET, without regional enforcement authority, seeks to coordinate initiatives among the member countries. It will be necessary to observe, in the medium term, whether the involved countries will be coordinated successfully • Implementation of agreements regarding coordination for roaming, developed in the scope of regional integration (customs unions), CAN, MERCOSUR or the recent UNASUR - This will depend on the progress of establishing the agreements in terms of supranationality, and mandatory legislation at the national level
Informative	• Web sites for rate comparisons - Create an independent pricing comparison site for Regulatel or Citel, similar to the one by the European Commission - Persuade the GSMLAA to make a web site with roaming tariffs like those designed in Europe and the Arab World - Include in the sites information about regional border zone roaming rates and applicable zones • Web sites for quality comparison - Persuade the GSMLAA or the governments to make a web site similar to ANACOM, which shows the quality of operators based on their services
Roaming alliances	• Persuade América Móvil, Movistar and TIM to have better rates, services and transparency in their alliances, which so far are not as developed as the other analyzed alliances • Recommend governments to assist in the creation of an on-net network at the international level for regional operators (eg. Open up long distance and international links in the same manner as with One Network)

Regulatel has expressed its intention to address the issue, trying to form a working group dedicated to roaming

Some international initiatives could be considered for implementation in South America (cont.)

Type of initiative	Relevant or replicable initiatives in South America
Technical and industry innovations	• Foundational: Promote the creation of a transnational body (or strengthen a current organization) to address roaming • Quality: Support service providers (both the GSMLAA and the governments) to offer mobile operators: - direct connections so as to ensure connection quality for their users - infrastructure to measure levels of service quality, with the costs for such infrastructure shared by the operators • Coverage: Financial support for service providers to provide hubbing and open connectivity services, with regional infrastructure that facilitates bilateral agreements, tariffs and interconnection techniques • Border zone roaming: Financial support to create a regional standard for the uniform treatment of border zone roaming within the region. This should consider radio frequency, engineering, billing, customer service and service quality issues in order to ensure the best experience for the end user. • Prepaid: Financial support to service providers so they can speed up the implementation of a regionally shared CAMEL infrastructure and share the high costs associated with the solution • Prepaid: Financial support to service providers so they can create sites to add credit to prepaid cards at the regional level • Fraud: Financial support for the GSMA CEIR initiative • Fraud: Financial support to service providers so they can offer, through regional platforms based on probe infrastructure, anti-fraud services at the regional level. Providers can use the same Quality of Service platform to reduce costs

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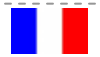
  - Regional alliances
  - List of acronyms
  - List of figures
  - Bibliography and information sources

Figure 110 - Telecommunications regulators in Europe

Telecommunications regulators in Europe

NON-EXHAUSTIVE

Country		Regulatory association		
	Germany	RegTP	Bundesnetzagentur	Telecommunications and Mail Regulatory Authority
	Austria	RTR	RTR	Regulatory Authority for Broadcasting and Telecommunications
	Belgium	IBPT	Belgian Institute for Postal services and Telecommunications	Belgian Institute for Post and Telecommunications
	Bulgaria	CRC	КОМИСИЯ ЗА РЕГУЛИРАНЕ НА СЪОБЩЕНИЯТА	Regulatory Commission of Communications
	Cyprus	NRA		National Regulatory Authority
	Czech R.	CTO	ČESKÝ TELEKOMUNIKAČNÍ ÚŘAD	Czech Republic office of Telecommunications
	Denmark	NTA		National Telecommunications Agency
	Spain	CMT	CMT	Commission for the Telecommunications Market
	Slovenia	APEK	APEK	Agency for Post and Electronic Communications
	Slovakia	Teleoff	Telekomunikačný úrad Slovenskej republiky Telecommunications Office of the Slovak Republic	Ministry of Transport, Post and Telecommunications
	Estonia	TJA	MAJANDUS- JA KOMMUNIKATSIOONI-MINISTEERIUM	Estonian Ministry of Transport and Communications
	Finland	TAC	Finnish Communications Regulatory Authority	Telecommunications Administrative Center
	France	ART	ARCEP www.arcep.fr	Telecommunications Regulatory Authority
	Greece	EETT	EETT	National Telecommunications and Post Commission
	Hungary	NHH		Communications Authority of Hungary
	Ireland	ComReg		Commission for Communications Regulations

Source: Web page of the regulators, Work team analysis

Telecommunications regulators in Europe (cont.)

NON-EXHAUSTIVE

Country		Regulatory association		
	Italy	AGCOM		Communications Regulatory Authority
	Latvia	LTSI		Latvia Telecommunications State Inspection
	Lithuania	RRT		Communications Regulatory Authority
	Luxembourg	ILR		Luxembourg Regulations Institute
	Malta	MCA		Malta Communications Authority
	Norway	NPTA		Norwegian Post and Telecommunications Authority
	The Netherlands	OPTA		Independent Authority of Post and Telecommunications
	Poland	UKE	Office of Electronic Communications	Office of Electronic Communications
	Portugal	ANACOM		National Authority for Communications
	Romania	ANRCTI		National Regulatory Authority for Communications
	Russia	Minsvay		Ministry of Communications and Information Technology
	Sweden	PTS		National Agency for Post and Telecommunications
	Switzerland	OFCOM		Federal Office for Communications
	Turkey	TK		Telecommunications Authority of Turkey
	Ukraine	NKRC		National Commission for Communications Regulation
	United Kingdom	OFCOM		Federal Office for Communications

Source: Web page of the regulators, Work team analysis

Figure 111 - Telecommunications regulators in Africa

Telecommunications regulators in Africa

NON-EXHAUSTIVE

Country		Regulatory association		
	Angola	INACOM		Angolan Institute of Communications
	Botswana	BTA		Botswana Telecommunications Authority
	Burkina Faso	ARTEL		Telecommunications Regulatory Agency
	Chad	OTRT	***OTRT***	Tchadiana Bureau of Telecommunications Regulation
	D. R. of Congo	ARPTC		Regulatory Authority for Post and Telecommunications of Congo
	Egypt	NTRA	NTRA	National Telecommunications Regulatory Authority
	Ethiopia	ETA	Ethiopian Telecommunication Agency	Ethiopian Telecommunications Agency
	Kenya	CCK		Communication Commission of Kenya
	Lesotho	LTA	***LTA***	Lesotho Telecommunications Authority
	Macau	ODTIT		Office of Telecommunications and Information Technology Development
	Madagascar	Omerta	OMERT	Madagascar Office of Telecommunications Studies and Regulation
	Malawi	MACRO	Communications	Malawi Communications Regulatory Authority
	Morocco	ANRT	ANRT	National Agency of Telecommunications Regulations
	Mauritius	ICTA		Authority for Information Technology and Communications

Source: Web page of the regulators, Work team analysis

Telecommunications regulators in Africa (cont.)

NON-EXHAUSTIVE

Country		Regulatory association		
	Mozambique	INCM		National Communications Institute of Mozambique
	Namibia	NCC		Namibian Communications Commission
	Niger	ARM	***ARM***	Multi-sectoral Regulatory Authority
	Nigeria	NCC		Nigerian Communication Commission
	R. Congo	DGACPT		Director General from the Central Administration of Post and Telecommunications
	Sierra Leone	NATCOM	***NATCOM***	National Telecommunications Commission
	Sudan	NTC		National Telecommunications Corporation
	Tanzania	TCRA		Tanzania Communications Regulatory Authority
	Uganda	UCC		Uganda Communication Commission
	South Africa	ICASA		Independent Communications Authority of South Africa
	Zambia	CAZ	COMMUNICATIONS AUTHORITY	Communications Authority of Zambia
	Zimbabwe	Potraz		Postal and Telecommunications Regulatory Authority of Zimbabwe

Source: Web page of the regulators, Work team analysis

Figure 112 – Telecommunications regulators in the Middle East

Telecommunications regulators in the Middle East

NON-EXHAUSTIVE

Country		Regulatory association		
	Bahrain	TRA		Telecommunications Regulatory Authority
	Iraq	ITPC	ITPC	Iraqi Telecommunications and Post Company
	Jordan	TRC		Telecommunications Regulatory Commission
	Saudi Arabia	CITC		Communications and Information Technology
	Kuwait	KNTC		Kuwait National Telecommunications Corporation
	Lebanon	TRA		Telecommunications Regulatory Authority
	Israel	MoC		Ministry of Communication
	Iran	CRA	irib.ir	Communications Regulatory Authority
	Afghanistan	MCIT		Ministry of Communications and Information Technology
	Oman	TRA		Telecommunications Regulatory Authority of Oman
	Qatar	ICT	ictQATAR	Supreme Council of Communication Information and Technology
	UAE*	TRA		Telecommunications Regulatory Authority

Source: Web page of the regulators, Work team analysis

Figure 113 - Telecommunications regulators in Asia-Pacific

Telecommunications regulators in Asia-Pacific

NON-EXHAUSTIVE

Country		Regulatory association	
Australia	ACMA		Australian Communications and Media Authority
China	NRA	SARFT	National Regulatory Authority
Hong Kong	OFTA	OFTA	Office of Telecommunications Authority
India	DOT	I&B	Department of Telecommunications
Indonesia	POSTEL		Director General of Post and Telecommunications
South Korea	MIC	KOREA COMMUNICATIONS COMMISSION	Ministry of Information and Communications
Malaysia	MCMC	SKMM	The Malaysian Communications and Multimedia Commission
New Zealand	CC		Commerce Commission
Pakistan	PTA	PTA	Pakistan Telecommunications Authority
Philippines	NTC		National Telecommunications Commission
Singapore	IDA	iDA SINGAPORE	Infocomm Development Authority
Taiwan	DGT	*DGT*	Director General of Telecommunications
Thailand	NTC	The National Telecommunications Commission	National Telecommunications Commission
Japan	MIAC	MIC Ministry of Internal Affairs and Communications	Ministry of Internal Affairs and Communications
Malaysia	KTAK	KTAK	Ministry of Energy, Water and Communications
Bangladesh	BTRC		Bangladesh Telecommunications Regulatory Commission
Vietnam	MIC		Ministry of Information and Communication

Source: Web page of the regulators, Work team analysis

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Comparison of spectrum allocation (Table 1 / 12)

	Latin America	Europe	USA
1 **Focus on regulating competition**	• In general, the current situation is dominated by ex-ante regulation, although initiatives are oriented towards change • In most countries, competition exists in the general allocation of spectrum - El Salvador and Guatemala: legislation strongly oriented to the ex post regulation based on competition - Argentina: Regimen of free competition although spectrum regulation is not very oriented to competition - Peru: Ex ante regulation; the government is open to deregulation - Chile: Known for favoring free competition	• The regulatory framework is oriented towards competition in all aspects, advancing aspects of the market that do not provoke side effects that outweigh the benefits • There is a strong tendency to open up the spectrum to market mechanisms, including the common use of certain spectrum bands	• Clear orientation towards the promotion and protection of competition, as in all other sectors of the economy

Source: Fundamentals and Best Practices of spectrum management and proposal for implementation in Latin America - June 2007 AHCIET - Omar de León

Comparison of spectrum allocation (Table 2 / 12)

	Latin America	Europe	USA
2 Focus on regulating competition	• The countries generally do not verify prospective spectrum management - El Salvador and Guatemala: Notable exception to this rule. In these countries, management is more prospective and mostly left to the market players - Chile, Peru and Mexico: Have identified an interest in prospective management - Mexico: The regulator has a "Prospective and Regulation Unit“ - Peru: Slight tendency towards declared prospective management, for example, through a single license	• Clearly prospective regulation • All of the proposals discuss the current conditions, expected developments, and how regulation should be adapted with flexibility and efficiency, and with market and technological evolution	• Marked prospective vision in the spectrum revision • The main concerns, in this regard, have to do with facilitating the introduction of technologies and services that have not yet been identified but are expected to be required by the market • Additionally, market dynamics are considered to ensure efficient use of spectrum • The flexibility that results from the progressive phasing out of the Control and Command model complements the application of a prospective vision

Source: Fundamentals and Best Practices of spectrum management and proposal for implementation in Latin America - June 2007 AHCIET - Omar de León

Comparison of spectrum allocation (Table 3 / 12)

	Latin America	Europe	USA
3 **Technology neutrality**	• Most countries have moved towards technology neutrality in spectrum use - Brazil: No specific provision is identified for technology neutrality	• Special emphasis on providing a regulatory framework of the highest level of technology and service neutrality This trend is observed in the focus given by the RSPG to the WAPECS initiative • In line with operator concern, there are limitations to share technology when it is necessary to protect acquired rights, but limits to these exceptions have been proposed on the principles of technological neutrality, justification of public interest objectives, among others	• There is a strong tendency towards neutrality, which ensures the implementation of technologies and services in any band

Source: Fundamentals and Best Practices of spectrum management and proposal for implementation in Latin America - June 2007 AHCIET - Omar de León

Comparison of spectrum allocation (Table 4/12)

	Latin America	Europe	USA
4 **Service neutrality**	• Almost all countries have, or are on track to have, service neutrality • Most countries make reference to the condition of corresponding authorization or qualifying title - Chile: The regulator is considering amending the current allocation of bands for a particular service - Argentina: Use of the agreement is still an issue, despite the progress in terms of granting licenses - Brazil and Colombia: Similar situations. Maintain the link of bands to services, but bands were opened for multimedia services - El Salvador, Guatemala, Peru: Have service neutrality - Mexico: Administrative practice is not as neutral as the law. There is a tendency to change this situation	• The proposal establishes the possible need for a transition period for the implementation of this principle to all bands of the spectrum • For both types of neutrality it is clear that, although they are found in current regulation, specific reconfirmation of them is important	• There is a strong tendency towards neutrality, which ensures the implementation of technologies and services in any band • The PCS case is noteworthy for originally being intended as a mobile telephone service, but whose spectrum is able to provide any fixed or mobile service, including television

Source: Fundamentals and Best Practices of spectrum management and proposal for implementation in Latin America - June 2007 AHCIET - Omar de León

Comparison of spectrum allocation (Table 5 / 12)

	Latin America	Europe	USA
5 Applied spectrum management models	• Control and Command model: Dominant in the region • Exclusive rights of use model: Not highly utilized • Common use model: used in several countries for certain bands (Argentina, Brazil, Colombia, Guatemala, Mexico) - El Salvador: Has a mix of the 3 management models - Guatemala: Applies the Common Use model only for ham radio bands, because of the difficulty assigning bands in a simple way for that type of access. There is a project to prepare the 2.4 band for common use - El Salvador and Guatemala: Apply a Exclusive rights of use model - Chile: Common use model in the implementation process	• Existing framework strongly liberal, with a tendency towards ex post regulation • There is a tendency towards spectrum management models where the issuance of individual licenses is the exception rather than the rule. There is no procedure that applies to all situations • The starting point is the granting of general authorizations that contain the conditions of use according to the regulatory framework. Assignment of individual licenses should be restricted only to cases that cannot be controlled by other means, eg. risk of harmful interference. The purpose of granting individual rights of use is to be least restrictive on the maintenance and characteristics of these rights, while simultaneously moving from administrative decisions to market-based ones and promoting the secondary market • ETNO proposes to include in this process the analysis of harmful interference and acquire stability in the regulatory framework	• Trend towards the Exclusive rights of use and Spectrum Commons models • Abandonment of the Control and Command model, which cannot respond to requests for flexibility and speed, towards management based on market forces • The Spectrum Commons model is also considered to apply to technologies that operate below the degree of interference threshold. This model has been extended to implement policies that enable licensees and lessees to develop and operate "spectrum commons" and allow for greater access to spectrum • Interference and its control are motives for analysis by the FCC, which considers the possibility that new technologies could reduce the requirements. In this regard, the STFR developed an advanced “degree of interference" model but has found it difficult to implement • In terms of technical aspects, the FCC has adopted a more market oriented path, allowing licensees to negotiate interference agreements when possible

Source: Fundamentals and Best Practices of spectrum management and proposal for implementation in Latin America - June 2007 AHCIET - Omar de León

Comparison of spectrum allocation (Table 6 / 12)

	Latin America	Europe	USA
6 Secondary spectrum market	• In general, there is no secondary market for general spectrum, except in El Salvador and Guatemala, where the secondary market is established by the Telecommunications Act • Mexico: After a frequency has been used for 3 years, it can be leased to a third party upon regulatory authorization. There are no characteristic methods, however, such as spectrum leasing and fractioning • Argentina: Transfer permitted only with permission by the regulator • Colombia: Implementation in study phase, but with legal difficulties • Chile: Considers implementation in the long-term agenda, which requires parliamentary approval • Peru, Mexico and Brazil: Not currently being considered; there are also regulatory constraints for implementation	• Strong tendency towards the implementation of a secondary market in the current processes of changing regulation • The directive framework states that member states can allow firms to transfer rights to use radio frequencies to other companies. The authorities will also oversee that the intents to transfer be public and adhere to established procedures • The Commission supports the introduction of coordinating spectrum markets in certain circumstances • The spectrum market will gradually replace the management of the administration of the individual rights model, maintaining certain authoritative rights to act in the public interest	• Extensive experience in a market focus regarding spectrum allotment, as well as academic positions on the use of market forces • In addition to the traditional transfer / assignment of rights, it is possible to opt for a variety of leasing options, including the "Private Commons“ • The process, which begins with the use of auctions for spectrum allocation, has been slow in practice. Today, the 3 players involved in the regulatory framework, Department of Commerce, GAO-Congress, and the FCC, understand the importance of introducing market dynamics in spectrum management • The FCC has issued orders regarding the implementation and advanced development of the secondary market. Previously, established rules that permitted access to licensed spectrum through agreements with licensees for most wireless services. This Order was one of the initial stages for implementing the secondary market of titles for the use of the spectrum. Other forms of leasing that allow speeds required by the market are also allowed • Currently spectrum is usually allocated using auctions • There is a debate between supporters of both the exclusive licenses and also unlicensed use under the concept of free and open access to "spectrum commons" and private control of licensed bands. In this order, there is the possibility of shared use under private control, which allows for the self-regulation processes that avoid the "tragedy of the commons"

Source: Fundamentals and Best Practices of spectrum management and proposal for implementation in Latin America - June 2007 AHCIET - Omar de León

Comparison of spectrum allocation (Table 7 / 12)

	Latin America	Europe	USA
7 Spectrum for multimedia services	• General tendency to favor the allocation of bands for multimedia services - Argentina: No impediments have been raised • El Salvador: The spectrum is freely allocated for use - Brazil: Has a bid in process for the 3.5 GHz frequency to deploy WiMAX networks • Chile: It's possible to bid on the 3.6 to 3.7 GHz bands (only free part of the 3.4 GHz band for the generic data transmission). The 10GHz band is currently being studied. SUBTEL could move occupied spectrum to equivalent bands • Colombia: In 2005, allocated the 3.5 GHz WiMAX band to long-distance operators, which can lend services to those with authorized title Guatemala: There is freedom in the allocation of spectrum; the SIT also has a project on the common use bands for WiMAX • Peru: Assigned 3.4 - 3.6 GHz frequencies to public telecommunications services using fixed wireless access systems. There are no plans for other types of assignments	• Clear position in supporting their development • In particular, the policy called WAPECS, was defined as a framework for the provision of electronic communications services in a set of frequency bands to be identified and agreed up by the members of the European Union, where a range of electronic communications networks and services can be offered on a basis of technological and service neutrality, subject to the fulfillment of certain technical conditions to avoid interference, ensure effective and efficient use of spectrum, and not distort competition The RSPG believes that multimedia services most urgently need access to spectrum, to allow for innovation and growth	• All assigned spectrum can be used for multiple services and technologies • This technology and service neutrality is accompanied with authorization to operate without restrictions • The success of that policy applied to mobile services and the transition from 2G to 3G is well-known • Since any service or technology can run in spectrum allocated for mobile services, the US has avoided the race for 3G spectrum as seen in Europe

Source: Fundamentals and Best Practices of spectrum management and proposal for implementation in Latin America - June 2007 AHCIET - Omar de León

Comparison of spectrum allocation (Table 8 / 12)

	Latin America	Europe	USA
8 **Spectrum Cap**	• Tendency to reduce restrictions that are not considered risks to competition • Argentina: There is a regulated Spectrum Cap and no formal initiative to raise it. The setting of this spectrum is to guide the application of rules on competition. There is possibility of raising the ex ante restrictions, given the introduction of 3G, the new services that require more bandwidth, and the existence of strong competition from 3 providers • Brazil: There is a spectrum cap at 50 MHz which could be increased to 80 MHz for 3G bids • Chile: Limit of 60 MHz per operator; in process of assigning 3 bands of 30 MHz for 3G • Guatemala: No limitation • El Salvador: No limitation. The regulator may limit the participation of some stakeholders on the basis of the law of competition • Mexico: No explicit limitation policy, although it has been previously applied. Unresolved issue between the authorities (COFECO and COFETEL) • Peru: Caps of 60 MHz by concessionaries for trunking, mobile and personal communications services; 25 MHz caps for A and B band concessionaries in 850 MHz; 50 MHz caps for assigning 3.400-3.600 MHz spectrum	• There is no limitation regarding the allocation of spectrum to a single operator • Implementation of the rights of competition, however, is very strong and effective, so that if one player acquires excess spectrum, it could be liable for anti-competitive activity	• A limitation on the total amount of spectrum one operator, whether of PCs, cellular or specialized radio services (SMR), could posses in a designated area was in force until November 2001The FCC then decided to implement the following rules: - Removal of the "Spectrum Cap" for the spectrum of Commercial Mobile Radio Services (CMRS) as of January, 2003 - Increase the cap to 55 MHz in all markets - Delete the rule of crossed-interests in cellular networks in Metropolitan Service Areas (MSA) and keep it in the Rural Service Areas (RSA). The rule refers to entities that could have property and other attributable interests in cellular spectrum licensees in distinct blocks in overlapping areas. These measures were implemented given that the existing conditions of competition did not justify maintaining this restriction ex ante. Assignments, transfers and spectrum leasing that can increase market concentration, especially in mobile services, are being studied by the FCC, to assess potential conflicts in competition. Excluded from the fast-track approval of all leasings that are long-term de facto transfers involving spectrum, which is or could be used to provide interconnected mobile voice and/or data services, and create a geographical overlap with another spectrum used to provide these services, in which the owner holds a direct or indirect interest

Source: Fundamentals and Best Practices of spectrum management and proposal for implementation in Latin America - June 2007 AHCIET - Omar de León

Comparison of spectrum allocation (Table 9 / 12)

	Latin America	Europe	USA
9 Regional coordination: Problems identified that affect business development	• In general, all countries follow the guidelines of the ITU and CITEL, whose resolutions are binding • This coordination mainly refers to spectrum bands to avoid interference and to the technical standards required for compatibility • Aside from these two major agencies, there are other regulatory bodies with different authoritative powers: CAATEL (Andean Committee of Telecommunications) and COMTELCA. AHCCIET and Regulatel also are conducting discussions on non-authoritative regulatory issues	• Strong coordination, accepted and supported by authorities and operators, achieves all aspects of regulation that may influence domestic market development and innovation, and create a strong competitive position against other markets • The Proposal for Changes states that implementation of the new direction of the regulatory framework might require decision processes that have binding results for member states • These should be sufficiently robust to produce results applicable in all member states, permit the rapid adoption of measures, and facilitate implementation nationwide. The strengthening of the legal framework to ensure coordination has also been proposed • In the spectrum market, coordination at EU level is being solicited for the identification of bands to be released and the management of common conditions	• All of the documents indicate the need to respect international agreements and the importance of coordination, taking into account that spectrum allocation in accordance with international coordination is sometimes appropriate to achieve economies of scale or allow for the international ubiquity of services • This precaution is mentioned in a manner that leaves little room for country coordination to push forward policies distinct from those currently in the USA – which is the case for most Latin American countries

Source: Fundamentals and Best Practices of spectrum management and proposal for implementation in Latin America - June 2007 AHCIET - Omar de León

Comparison of spectrum allocation (Table 10/12)

	Latin America	Europe	USA
10 **Cost focus**	• Predominant bidding procedure used for the initial allocation, to ensure a focus on costs in this stage. The situation varies regarding recurrent charges • Argentina: No explicit criteria for the recurring fees. In auctions, the bid is oriented towards opportunity costs • Brazil: There is no consideration of costs except in the initial allocation. Planning underway to implement a cost model for rates and interconnection • Colombia: There is no unified policy of cost orientation. There are free use bands, which can be used without payment. Mobile service providers pay 5% of their revenues each quarter for spectrum use; in the case of WiMax, it is a fixed annual amount • El Salvador: By law, the canon is geared towards costs. The initial assignation establishes the bid process • Guatemala: No recurring fees or charges for spectrum use, although the law provides that the charge must be in relation to the actual administrative costs. There is a focus on costs • Mexico: There is no clear guidance on costs. In particular, not currently being charged • Peru: Tends to charge to cover management costs	• It is common to find a cost focus in all aspects, given that it is necessary when oriented towards competitive conditions	• Cost regulation is considered in all instances where pricing must be determined • Regarding spectrum, however, the FCC has no regulatory obligations for specific pricing: • In the assignation process, the charges are set by market dynamics and, therefore, are oriented towards opportunity costs • The values of the application rights, which are adjusted for inflation every 2 years, and the criteria for calculating the regulatory rights are established in the Act

Source: Fundamentals and Best Practices of spectrum management and proposal for implementation in Latin America - June 2007 AHCIET - Omar de León

Comparison of spectrum allocation (Table 11/12)

	Latin America	Europe	USA
11 **Digital dividend**	• In most countries, with the exception of El Salvador and Guatemala, there is no precise definition regarding this matter • Argentina: The issue will not be in public discussion until the transition to digital television has been defined Brazil: VHF bands will be released and are expected to be used to deliver multimedia services • Colombia: No decision yet on the use of released spectrum. It is part of the work of a committee formed by the Ministry and the CNTV • Chile: It is exploring the development of a plan for Digital TV • El Salvador: Allocates spectrum for periods of 20 years under a franchise system, the digital dividend belongs to the concessionary • Guatemala: While there is free use of the spectrum, the digital dividend will remain in the power of the current service provider during the transition • Mexico: The SCT indicated that the spectrum allocated to broadcasting (television), which is released with "analog blackout", will be released for new services • Peru: Nothing is resolved with respect to excess spectrum, but through the law of single concession usage is granted to any signatory • On the other hand, bands have already been reserved for mobile TV use	• The document on the political fundamentals of the proposed changes establishes the need for coordination regarding the introduction of innovative pan-European uses for released spectrum when transitioning from analogue to digital terrestrial broadcasting • ETNO reinforces this position in its agreements • The RSPG adopts the position regarding spectrum allocation to those services that better serve demand, and recommends an analysis of the potential benefits of more flexible allocation in terms of the digital dividend	• The FCC allocated an additional channel to each TV broadcaster, allowing for continuous analog service while digital broadcasting was just beginning • Thus, the conversion to digital television will free up the scarce and valuable parts of the spectrum that have good propagation characteristics, of which may be used to support communications security and advanced wireless services (AWS: Advanced Wireless Services) • Until February 2009, stations may transmit in analog format (today, stations serving all markets are already transmitting digitally); after this date broadcasts on those channels will cease, and that spectrum will be reclaimed by the FCC and made available for other uses. Allocation provided through auctions

Source: Fundamentals and Best Practices of spectrum management and proposal for implementation in Latin America - June 2007 AHCIET - Omar de León

Comparison of spectrum allocation (Table 12/12)

	Latin America	Europe	USA
3 **Transparency, publication of signatories**	• Predominant publication of signatory frequencies, with varying degrees of accessibility for those who need it • Most of the regulators from the countries surveyed publicize information regarding operations on their web sites • Argentina: By regulation, it is required to publish information regarding signatories, fines, technical parameters, etc. On the other hand, vast amounts of information on operations is publicized on the CNC web site • Brazil, Colombia and Peru: There is public access to information about signatories and management of the regulator through different channels and with varying degrees of information • Peru: There is abundant information on the regulator's web site • El Salvador and Guatemala: Information about titles is often public • Mexico: While COFETEL does not provide public information on signatories, it is expected under the Federal Transparency and Access to Public Government Information Law. The COFETEL web site has extensive information on operations	• In general, not just in the telecommunications industry, there is a high degree of transparency • Takes into account that the attribution of specific bands for technology or services may result in restrictions that limit efficiency. For this reason, the allocation should be based on "objective, transparent, non-discriminatory and proportional criteria"	• The information system about spectrum signatories is very transparent

Source: Fundamentals and Best Practices of spectrum management and proposal for implementation in Latin America - June 2007 AHCIET - Omar de León

Comparison of spectrum allocation: Conclusions

- While Latin America, USA and Europe are at different stages of implementation of spectrum regulation models, in most of the points raised, the trend and implementation model is similar in all markets. The largest gaps are evidenced when comparing the secondary spectrum market to a focus on costs

- In general, Latin America is in the process of aligning itself with the regulations implemented in Europe and the United States regarding free competition, prospective management, spectrum cap elimination, neutrality and transparency

- Both Latin America and Europe are focused on the coordination of processes, of which the USA has performed poorly. Coordination at the international level is key for Latin America to overcome efficiency issues and generate the capacity to administer regional economies of scale

- Compared to the advanced US model, development of secondary spectrum markets in Latin America is absent. Europe is in an intermediate stage of development, only currently developing such markets

- Coordination and standardization of the rules and regulations on spectrum is key, not only between countries within a region but also worldwide, in order to best capitalize on the implementation of common policies

- Considering that each country has its special features and characteristics, structure and priority actions to implement a transition to the final model must be coordinated with the specific country models within the region, and they should be planned in coordination with the implementation of the initiatives recommended in this Report

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Objectives of the roaming alliances

Objective	Main features
Reach an international presence	• Alliances imply a significant advantage in terms of expanding the scope of services offered to users through the provision of new agreements with roaming partners • It also provides the opportunity to operate as a "pseudo branch" in the visited country through coordinated offers (eg. member operator trademark union)
Counter competitive measures	• These alliances form to counter successful international strategies from the large business groups such as Vodafone • All alliances are characterized by the joint development of roaming projects and competitive offers for end users... • ... their activities, however, are at risk of stagnation, as in the case of Starmap and FreeMove, due to mergers and acquisitions between operators, which create conflicts of interests at the regional level (eg. Orange/Amena/Telefonica/O2)
Increase roaming traffic and billing	• The alliances aim to create a market that allows them to offer users preferential pricing and services • Alliance members can serve customers roaming within partner networks, which maximizes profits and ensures service transparency • Many operators are now using redirecting tactics to route roamers to preferred networks

Objectives of the roaming alliances (cont.)

Objective	Main features
Generate savings and increase simplicity through joint purchases	• Operators can benefit from the economies of scale from services and network platforms through negotiation as a group. This contributes to the standardization of offers: - Signaling and interconnection services - Financial and data clearing - Service platforms (eg. Roaming value added services) - Marketing and advertising • By negotiating preferential roaming rates, the operator can have a simple and transparent pricing scheme that can serve as a powerful marketing tool
Generate attractiveness and simplicity through the collaboration of services and platforms	• Services can be standardized via the alliance to allow for their fluid use in the same roaming situation… • ...and the use of value added services can transform the user experience into something much more simple and user friendly, making them feel like they are virtually at home • In some alliances, roaming operations can be managed at the group level. This can be a significant advantage in terms of technical integration of new roaming partners and services and maximizing the profit potential from the partnership

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List of acronyms

3G:	Third generation mobile telephony
4G:	Fourth generation mobile telephony
ABR:	Brazilian Roaming Association
AHCIET:	Latin American Association of Research Centers and Telecommunications Companies
AIC:	Consensual Implementation Agenda
AMI:	Asia Mobility Initiative
AMPS:	Advanced Mobile Phone System
APT:	Asia Pacific Telecommunity
AREGNET:	Arab Regulators Network
ARICEA:	Association of Regulators of Information and Communications for Eastern and Southern Africa
ARPU:	Average Revenue Per User
ARTAC:	Association of African Telecommunications Regulators
ASEAN:	Association of Southeast Asian Nations
BEVC:	Bureau Européen des Unions de Consommateur
Bitkom:	German e-communications and new media association
CAGR:	Compound Annual Growth Rate
CDE:	Executive Steering Committee of IIRSA
CDMA:	Code Division Multiple Access
CEO:	Chief Executive Officer
CEIR:	Central Equipment Identity Register
CITEL:	Inter-American Telecommunication Commission
EARPTO:	The East Africa Regulatory, Postal and Telecommunications Organization
EAU:	United Arab Emirates
EIU:	Economist Intelligence Unit
ERG:	European Regulation Group
ETNO:	European Telecommunication Network Operator
HPMN:	Home Public Mobile Network
GB:	Great Britain

List of acronyms (cont.)

GRQ:	Global roaming quality
GSM:	Global System for Mobile
GSMA:	GSM Association
IDEN:	Integrated Digital Enhanced Network
IIRSA:	Integration of Regional Infrastructure in South America
IMF / IMF:	International Monetary Fund
INTVG:	International Telecommunication Users
IOT:	Inter-operator Tariff
ITU:	International Telecommunication Union
LD:	Long Distance
ILD:	International Long Distance
MMS:	Multimedia Messaging service
M:	Millions
MTN:	Operators in Tanzania
NA:	Not applicable
NMT:	Mobile Network Technology
NRA:	National Regulatory Authority
NRTRDE:	Near-Real-Time Roaming Data Exchange
GDP:	Gross Domestic Product
PPP:	Purchasing power parity
SME:	Small and medium enterprises
SARRC:	South Asian Association for Regional Cooperation
SIM:	Subscriber Identity Module
SLA:	Service Level Agreement
SMS:	Short message service
TACS:	Total Access Communications System
TDMA:	Time Division Multiple Access
IT:	Information technology

List of acronyms (cont.)

TRASA:	Telecommunications Regulators Association of Southern Africa
EU:	European Union
USB:	Universal Serial Bus: *Used as a port for connecting devices to a computer*
USD:	U.S. Dollar
US-TDMA:	TDMA United States
VPMN:	Visited Public Mobile Network
WATRA:	West Africa Telecommunications Regulators Assembly
W-CDMA:	Wideband-Time Division Multiple Access
WCIS:	World Cellular Information Service
WTO:	World Tourism Organization

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