



Information Paper

Overview of International Mobile Roaming

25 June 2012

The GSMA represents the interests of the worldwide mobile communications industry. Spanning 219 countries, the GSMA unites nearly 800 of the world's mobile operators, as well as more than 200 companies in the broader mobile ecosystem, including handset makers, software companies, equipment providers, internet companies, and media and entertainment organisations

Content

1. Executive Summary.....	3
2. What is IMR?.....	4
3. How does IMR work?.....	4
4. Global comparison of roaming prices.....	6
5. Economics of IMR pricing.....	8
6. Demand-side factors.....	10
a. Per-capita Income.....	10
b. Mobile penetration rate.....	11
c. Percentage of population that travel internationally.....	12
7. Supply-side factors.....	13
a. Prepaid route availability.....	15
b. Network coverage.....	15
c. International gateway monopolies.....	16
d. Double taxation.....	18
e. Fraud.....	19
8. Roaming market trends and opportunities.....	20
a. Roaming price declines.....	20
b. Roaming tariff innovation.....	21
c. Strong substitutes.....	22
d. Consumer protection and transparency.....	23
9. Regulatory intervention and unintended consequences.....	24
10. An appropriate approach to regulatory intervention.....	25
ANNEX.....	26

1. Executive Summary

This information paper provides a comprehensive overview of the basic facts about the operation and economics of international mobile roaming (IMR) in order to inform the dialogue between policymakers, regulators and industry on matters related to IMR.

Regulators and policymakers have communicated significant concerns regarding consumer “bill-shock”, transparency, and have focused on higher international mobile roaming prices. However, the resulting dialogue between regulators, policymakers and industry has at times become challenging due to the significant economic, commercial and technical complexity of international mobile roaming. This paper endeavours to address this challenge by providing a general reference paper for these discussions.

The scope of the paper is limited to the IMR service. It is not a market and competition analysis of communications services available to consumers while travelling abroad. A selection of other communication services available to consumers while travelling abroad is presented later in the paper to provide a sense of the scope of the market for these services.

This paper starts with a brief description of the IMR retail service. Next, wholesale roaming arrangements between a roaming customer’s home operator and visited operator are explained. These wholesale arrangements are important as they put in place the technical and commercial components necessary to allow a customer to seamlessly connect to and roam on another network while visiting another country.

This is then followed by a discussion about IMR prices. The level of some higher IMR prices has been raised as a concern of regulators and policymakers around the world. A simple global survey of IMR prices highlights that while there are some higher IMR prices there are also lower IMR prices. This raises a question regarding the reason for this variation, globally, which is explained in terms of economics of the structure of prices within the bundle of mobile services. An important point that economic literature makes is that the structure of these prices is often more important than the level of the prices in a bundle.

The economics points to key demand and supply side factors which help explain the observed differences in IMR prices. The level of these factors differs between countries around the world. So, it should not be surprising that the level of IMR prices also differs. It is also observed that international mobile roaming operates in a market that is dynamic, changing, and challenging.

Mobile operators are introducing tariff innovations and reducing the level of IMR prices, while at the same time the demand for competing products and services are growing. Furthermore, mobile operators are proactively promoting the transparency of information about roaming services to consumers. For instance, the GSMA announced in June 2012 the launch of an initiative that will provide consumers greater visibility of their roaming charges and usage of mobile data services when travelling abroad. The details of the initiative are provided in the GSMA press release, attached as an Annex. This initiative signals the commitment being made by operators to promoting and ensuring transparency of roaming services to consumers.

The fact that the market is dynamic, changing and challenging raises a question regarding the effect of regulatory intervention. Regulators are concerned about the level of higher IMR prices. However, in such a dynamic market, involving a complex service, the risk of regulatory intervention leading to unintended, adverse consequences is high.

2. What is IMR?

International Mobile Roaming (IMR) is a service that allows customers to seamlessly continue to use their mobile phone or other mobile device, to make and receive voice calls and text messages, browse the internet and receive emails, whilst visiting another country.

IMR effectively extends the coverage of a roaming customer's home operator's retail voice and SMS services, allowing the customer to continue to use their home operator phone number, and data services while in another country. This seamless extension of coverage is enabled by a wholesale roaming agreement between a roaming customer's home operator and the visited network in the visited country, which addresses the technical and commercial components required to enable the service.

IMR is one service offered to consumers within a wider market of communications services while travelling abroad. The selection of communication services while travelling includes hotel services, public / private WiFi, single SIM multiple number products, national "travel" SIMs, and visited operator SIMs, amongst others. This paper does not directly address these other services. However, these other services need to be recognised as a part of any more robust analysis of the market for communication services while travelling abroad.

3. How does IMR work?

A large number of commercial and technical elements are required to support IMR. The following diagram illustrates how the key elements come together. The illustration is based on the scenario where "you" (on the left hand of the diagram) are roaming abroad, and you make a call to "your friend" (on the right hand side of the diagram) who is in your home country. Furthermore, your friend is the customer of a mobile operator other than your home operator. This call scenario is common and more straight-forward than many of the other possible call scenarios, which is useful for later discussions regarding some of the costs to provide IMR. Furthermore, it incorporates the general elements common to SMS and data services.

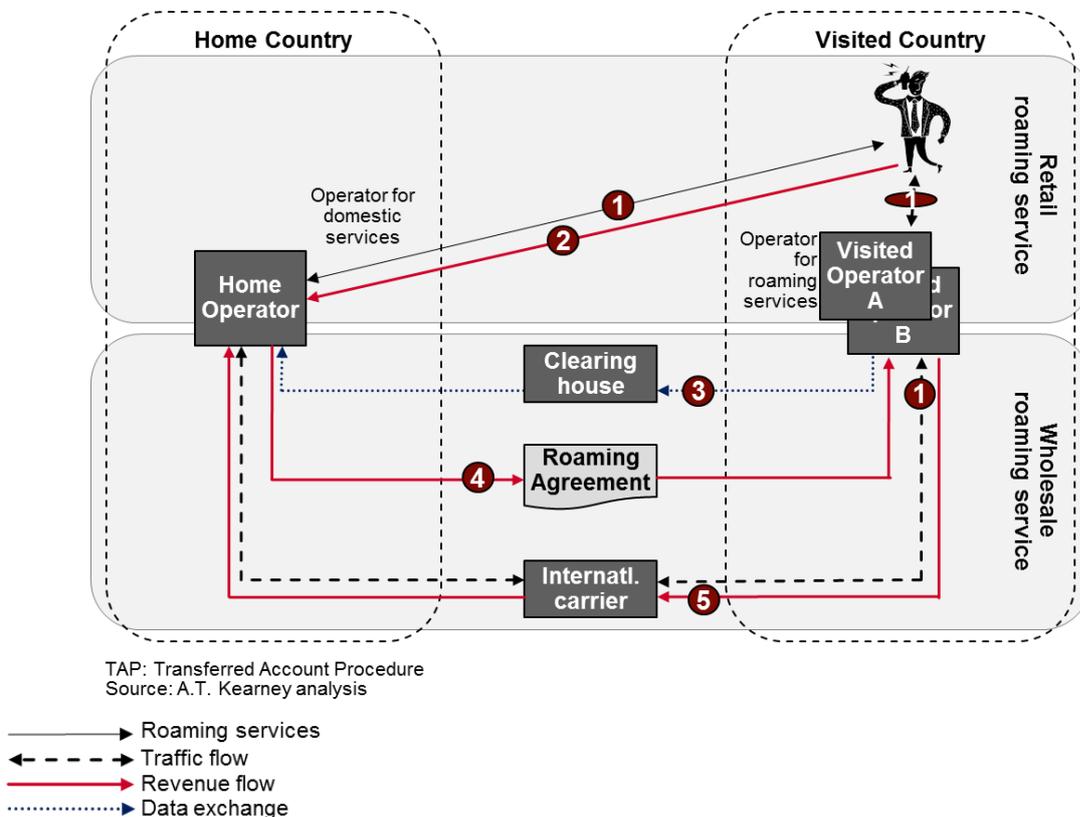
Figure 1. Overview of IMR technology and operations



As the above diagram illustrates, when you make the call to your friend, “your visited operator” will carry your call to the “international transit service”. The international transit service will then carry the call between the visited country and your home country. The international transit service then passes the call over to “your home operator”, which then connects the call to your friend’s home operator, which terminates the call on your friend’s phone.

The following diagram takes this calling back home scenario down a level into the commercial and technical detail. The diagram leaves out your friend and your friend’s network, for simplicity, focusing on the IMR wholesale and retail arrangements.

Figure 2. Commercial links required for international mobile roaming



Working through each of the technical and commercial elements in the order shown on the above diagram:

1. You have IMR service with your Home Operator, and you are connected to the Visited Operator A while roaming. You would have been granted access automatically to the Visited Operator A network in the visited country when you arrived as a result of data provided by your home to the visited operator confirming that you are a roaming customer. The wholesale roaming agreement specifies how this data is to be provided to the visited operator. Your home operator is likely to have wholesale roaming agreements with more than one operator (i.e Operators A and B) in the country you are visiting. As a result of the wholesale roaming agreement, you can make a call back home using the Visited Operator's network, which in turn uses international transit services to carry the call back to your home country.
2. You pay a retail price to your Home Operator for the IMR service and pay nothing to the Visited Operator A. Your friend does not incur any charges for receiving a call from you while you are roaming.¹
3. The Visited Operator A sends Transferred Account Procedure (TAP) files to a Clearing House which forwards them to your Home Operator. TAP files are used for billing of calls while roaming.
4. Your Home Operator can then pay Visited Operator A wholesale charges as per call volumes in the TAP file and rates in the wholesale roaming agreement.
5. Visited Operator A pays the International Carrier for carrying the call and handing over the call to your Home Operator. The International Carrier in turn pays your Home Operator a termination rate for terminating the call in your home country.

4. Global comparison of roaming prices

Regulators from around the world have expressed concern about the transparency of international roaming prices, bill-shock, and high prices. It is important to understand the factors that might influence roaming prices as it indicates where to start looking for an explanation. It will not be surprising that these factors differ between countries, and therefore not surprising that differences in roaming prices are observed.

A simple, global comparison of roaming prices between countries clearly shows that even though some roaming prices are higher, there are also clearly some much lower roaming prices. The following graphs illustrate this point. They provide a simple comparison of IMR prices for different home countries given a common, visited roaming destination. Switzerland is the common, visited destination, for roaming customers travelling from 17 different countries.

¹ This assumes that the charging regime is "calling party pays". In the United States, mobile calls are charged on a "receiving party pays" basis.

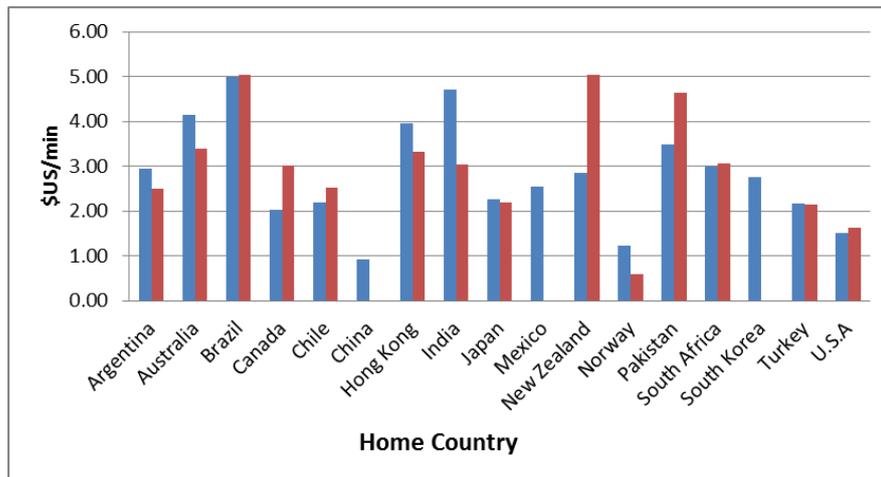
Plotted on each graph is the consumer, post-paid, non-discounted retail prices for:

1. Calling back home;
2. Sending a text back home; and,
3. Data roaming – i.e. used for sending emails and internet browsing.

For each country, the prices of one or two operators are plotted, which represented by the red and blue bars.

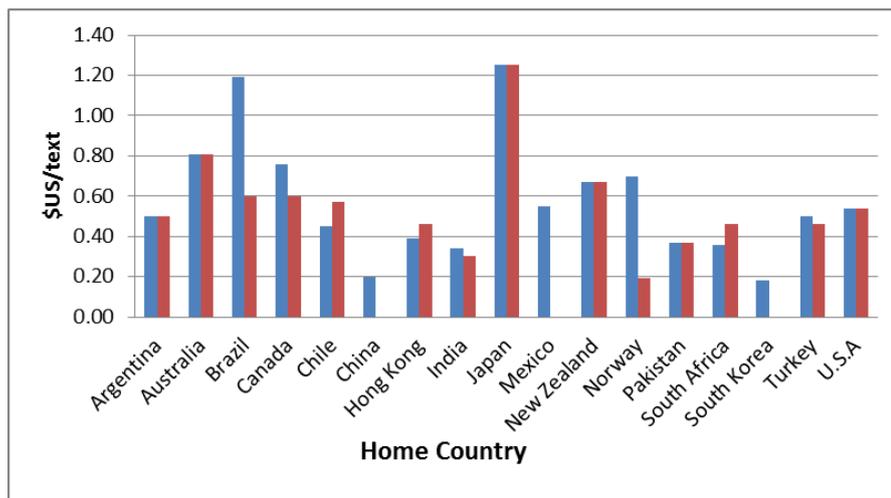
These graphs show that while there are higher IMR rates, there are also much lower rates.

Figure 3. Calling back home from Switzerland (February, 2012)



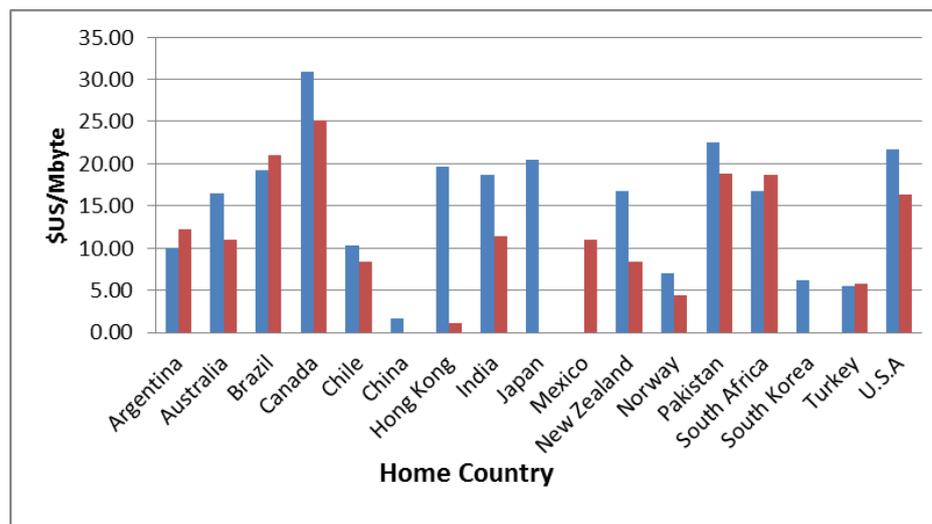
The above graph shows that maximum call price (US\$5.04/min) for calling back home is 5 times the minimum call price (US\$0.93/min).

Figure 4. Sending text message back from Switzerland (February, 2012)



The above graph shows that maximum text price (US\$1.25/text) for sending a text back home is 7 times the minimum text price (US\$0.18/text).

Figure 5. Data roaming from Switzerland (February, 2012)



The above graph shows that maximum data roaming price (US\$30.95/Mbyte) is 29 times the minimum data roaming price (US\$1.07/Mbyte).

5. Economics of IMR pricing

The price of roaming is one element within an overall tariff bundle for the total mobile service that a consumer purchases. This bundle can include the price of a mobile handset, the monthly rental, domestic call charges, SMS charges, volume discounts, contract term, and interconnection charges for terminating calls that originate off-net². In addition, operators generally offer consumers more than one tariff bundle from a range of bundles. That is, consumers can choose from a menu of tariffs.

The pricing of each element (i.e. mobile handset, the monthly rental, domestic call charges, SMS charges, etc) differs within a bundle and can differ between bundles offered in a range of bundles. How these prices differ within and between bundles is referred to as ‘tariff structure’.

Mobile operators compete vigorously with each other by offering retail tariffs with different structures – be it, higher roaming prices, lower national call prices and monthly rental, or lower roaming prices with higher national call prices, etc – due to the number of elements involved means that the potential combinations are essentially endless. In other words, operators compete through a process of tariff innovation.

² As well as charging their retail customers for mobile services, mobile operators also charge other operators for terminating a call on a customer’s phone, that is originated by another mobile network operator’s customer. Calls that originate on one network and terminate on another network are said to “originate off-net”.

The fact that mobile operators compete by tariff innovation illustrates an important point highlighted by economics. That is, the structure of a tariff bundle is as important if not more important than the level of price of individual elements within the bundle when maximising the total welfare of society. This point has been made numerous times in economic literature.³

What this means is that the simple, global comparison of the roaming prices provided in the above graphs does not take into consideration all these other parts of the tariff bundle, how they interact, and what that means for the overall tariff structure. Therefore, no conclusion can be drawn regarding whether or not the high individual roaming prices are efficient or not - i.e. whether or not individual prices are “too high” or “too low” – by simply examining the price of roaming only.

Economics makes the following important points regarding tariff structure:

- a. Individual prices within the bundle may be linked through a variety of mechanisms, so regulating down one price may result in an increase in another. One commonly referred to mechanism is the “waterbed effect” between the mobile termination rate and mobile access prices. In the case of the regulation of mobile termination rates in Europe it was found that the regulated reduction in termination rates resulted in an increase in the access prices⁴;
- b. Customer income can have a very important effect on tariff structure. A different distribution of income and level of income over a population can result in a different efficient tariff structure. Therefore, the different income per capita between countries, observed below, implies different efficient tariff structures ultimately leading to different efficient roaming prices for different countries.
- c. The fact that customers do not welcome unexpected, negative shock of a large roaming bill (e.g. an extreme form of an unexpected, negative shock is “bill-shock”) indicates that customers are “risk averse”, in the language of economics, and value avoiding such shocks. The value of avoiding such shocks can have significant effect on tariff structure. For instance, in addition to the per megabyte prices reported in the above graph, it is common to find mobile operators offering data roaming bundles where customers pay a fixed amount for unlimited data usage for either a day, week or month, while roaming. Examples of such bundle prices will be discussed below.

³ For a general discussion about the structure of a simple two-part tariff see Tirole, Jean. *The Theory of Industrial Organisation*, (Cambridge University Press, 1988) sec. 3.3.1, pp. 143-148. The entire text of Wilson, Robert B. *Nonlinear Pricing*, (Oxford University Press, 1993), and Mitchell, Bridger M. and Ingo Vogelsang *Telecommunications Pricing: Theory and Practice*, (Cambridge University Press, 1991) essentially address the question of the factors that will influence the structure of the multipart tariffs.

⁴ Genakos, Christo and Valletti, Tommaso *Testing the "Waterbed" Effect in Mobile Telephony* (CEP Discussion Paper No 827, October 2007) shows that the regulated reduction in mobile termination rates resulted in a statistically significant increase in retail customers' bills.

6. Demand-side factors

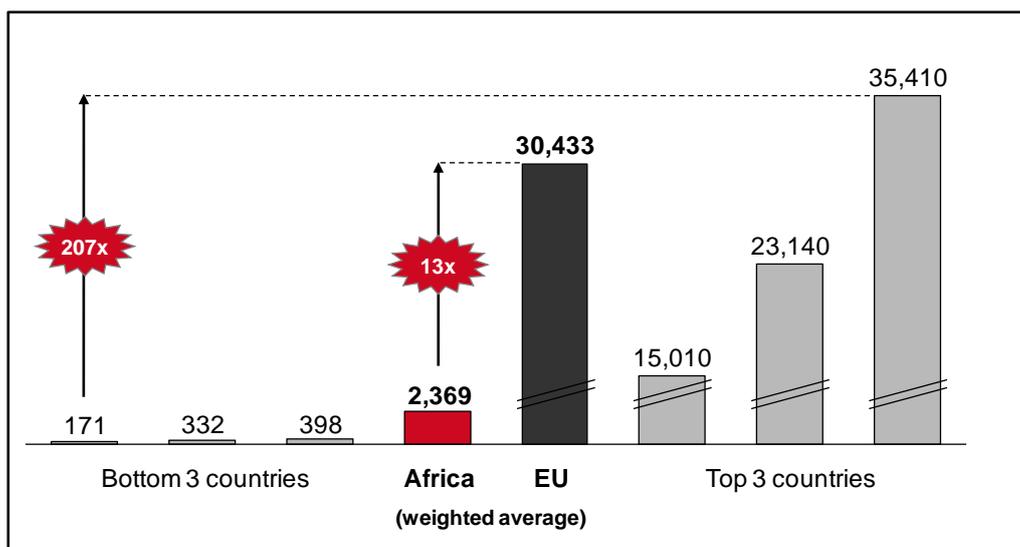
These are factors, in addition to price, which influence a consumer's decision to purchase roaming services.

a. Per-capita Income

As discussed above, customers' income has a significant effect on tariff structure and demand. Significant differences between customers' income suggests that there will be significant differences in the efficient tariff structure and thus roaming prices. Clearly, there are significant differences in the distribution of incomes between countries across the world. Therefore, it should be no surprise that there are differences observed in roaming prices.

An indication of the extent of these differences at the global level is provided by a comparison of the GDP per capita. For example, Sub Saharan Africa GDP per capita can be up to 207 times higher in some countries compared with others within the region, and is on average 13 times lower than the EU. These disparities can also be observed in other regions, such as Latin America with differences in GDP per capita of up to 37 times and the Arab World with differences of up to 36 times.⁵ This will lead to different usage patterns, tariff structures, and roaming prices.

Figure 6. Africa vs. EU GDP per capita (USD PPP)⁶



⁵ Source: EIU – GDP per capita at PPP for the Arab World and GDP per capita nominal for Latin America

⁶ Source: EIU, A.T. Kearney analysis

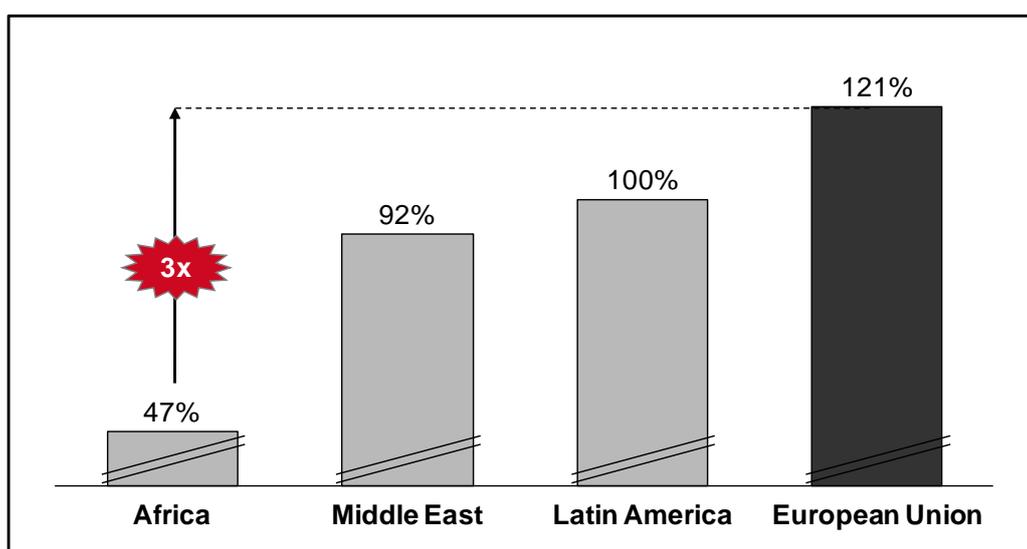
b. Mobile penetration rate

The demand for roaming will also depend on the demand for access to the mobile network, and the rate at which access to mobile networks is growing.

The following graph shows that there is a significant difference in mobile penetration rates between countries. The graph shows that mobile market state within and between regions also differs significantly. Some markets experience European levels of penetration, while for others mobile ownership is still very much a new service with low take-up.

These differences in penetration rates can be due to differences in income distribution which affects affordability and thus uptake. As already noted, income distribution can also affect tariff structure. Differences in penetration can be an indicator of differences in the cost of connecting customers to a network, and thus influence the level of prices and the resulting revenue required to recover these costs. Finally, it is a general indicator of the extent of roaming usage and its relevance as a service for consumers, which may vary by country.

Figure 7. Average mobile penetration rates of selected regions, Q2 2011, %⁷

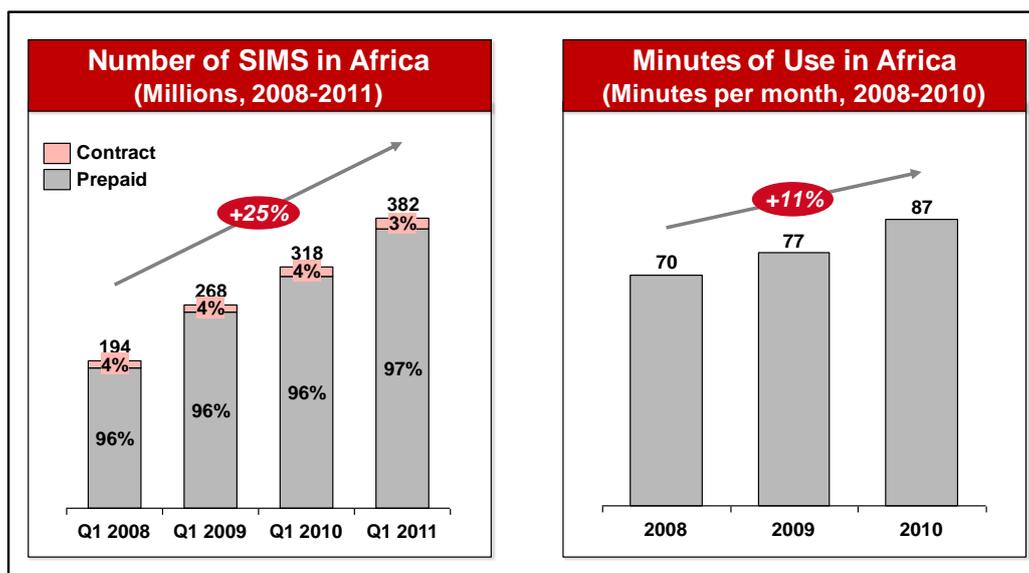


In addition, the rate at which the penetration of mobile services is growing also varies significantly between countries. In several regions the mobile industry is still in a growth phase; the market is expanding rapidly in terms of subscriber numbers and mobile usage. In the case of Africa, minutes of use per subscriber is growing at a slower pace than the number of SIMs (see graph below), and average revenue per user fell 8% from Q1 2010 to Q1 2011.⁸ These trends are present in many regions and are indicative of a market where more marginal, low-income users are joining mobile networks.

⁷ Source: EIU, Wireless Intelligence, Merrill Lynch Wireless Matrix, A.T. Kearney analysis. Penetration rates are calculated using total connections over population

⁸ Source: Wireless Intelligence – based on ARPU data available for 78 operators in 36 countries in Africa

Figure 8. Development of African mobile market, 2008 - 2011⁹



c. Percentage of population that travel internationally

The demand for international mobile roaming not only depends on the number of consumers with access to mobile services, but also of those that do, the number that travel abroad.

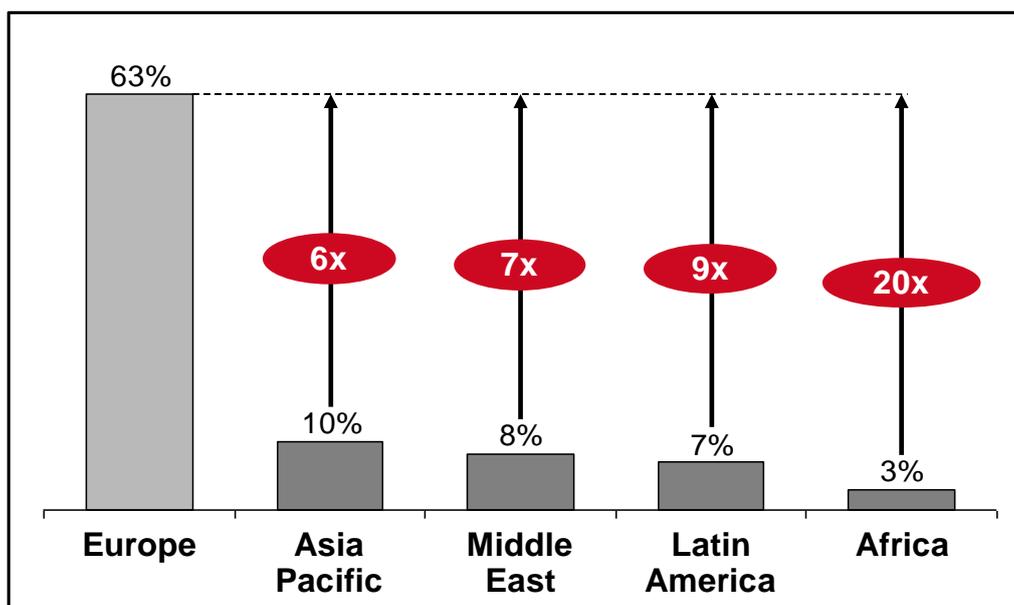
Whilst the mobile market is growing strongly, the roaming market is still in the early stages of development. A good proxy to measure the strength of the roaming market is related to the ratio of international trips to population. Based on statistics published by the WTO, the current ratio of international trips to population is significantly lower in regions outside the EU, as can be seen below. However, continued regional economic integration which promotes growth in business traffic and tourism is expected to drive future growth in roaming usage.

An additional factor contributing to the growth of roaming, particularly in regions where the number of prepaid subscriptions prevails (e.g. Latin America where 82% of mobile customers are prepaid, and Africa where 97% of mobile customers are prepaid¹⁰) is the number of available prepaid roaming routes (see next section). Operators' investment in this area has been significant over the past few years. As operators continue to heavily invest in assets required to enable roaming for prepaid customers, allowing larger numbers of customers gain access to roaming services, uptake is expected to increase.

⁹ Source: Wireless Intelligence. Minutes of Use estimated per SIM is a simple average based on a sample of 6 African countries

¹⁰ Source: Wireless Intelligence, Q1 2011

Figure 9. Ratio of international trips to population for selected regions, 2010¹¹



Whilst these markets are nascent, it is important that regulators foster an environment that promotes investment; both to drive roaming uptake and to support price plans that deliver adequate returns to enable the market to grow.

7. Supply-side factors

Supply-side factors influence an operator's ability to provide roaming services, and the cost of providing those services. These costs include the cost of providing service and network elements that are roaming shares with other mobile services, as well as elements that specifically required for roaming.

Some of the roaming infrastructure that is shared with domestic services includes:

- Retail billing
- Customer acquisition and retention
- Radio network for visitors
- International transit is used for international toll calls

Other elements that are specific to roaming include:

- Implementation, management and operations of an international signalling network
- International call termination and the international carrier services
- Dedicated roaming teams for coordination and management of the roaming service with numerous roaming partners

¹¹ Source: UNWTO, EIU, A.T. Kearney analysis. Based on number of trips divided by population so overestimates % of unique roamers. Regions based on UNWTO definitions. Previously stated figure (in 2008) is the number of mobile subscribers that have used roaming services at least once in a year

- Periodic commercial and technical negotiations
- Trouble shooting
- Fraud prevention
- Management and operations of the roaming billing chain including relationships with clearing houses
- Network expansion in targeted areas with high visitor concentration

Costs directly associated with these elements and providing roaming services include:

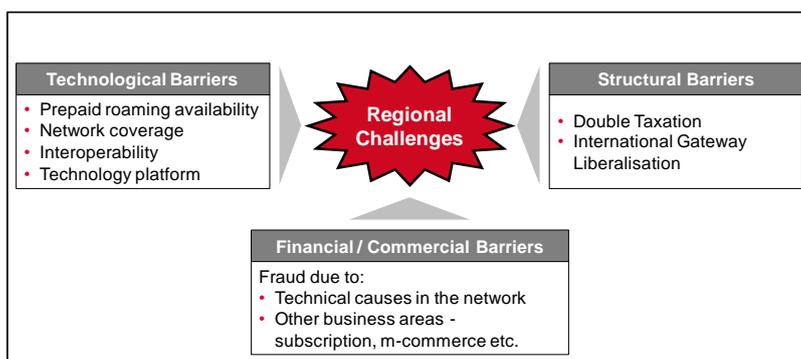
- Reaching and maintaining bilateral roaming agreements
- Roaming specific communications and marketing costs
- Implementation of technical infrastructure, testing and updating
- Payments to roaming clearing houses
- Payments to signalling link providers
- Increased signalling traffic on own network for location updates, i.e. authentication, authorisation and accounting.

In addition to these service and network elements, there are factors that act as a barrier to a well-functioning roaming market in many regions, thus increasing the cost of providing roaming services. Regulators are in the best position to address these barriers as they are largely institutional rather than commercial.

Over the past few years there has been considerable regulatory activity at a regional level in Latin America, Southern Africa, Asia Pacific, and the Middle East. Some of the activity has been focused on removing some of the barriers for roaming. Although some progress has been made to remove some of the barriers that still exist in many regions (see examples in Figure 5), more could still be done. The role of regulators and governments in removing regional and co-regional challenges will be critical.

Legal and technical developments are required to remove structural barriers such as double taxation and international gateway monopolies, financial barriers such as fraud, and technological barriers such as non-harmonised technical standards, as illustrated below. All of these are vital to reducing roaming charges in many regions.

Figure 10. Key regional challenges to roaming market development

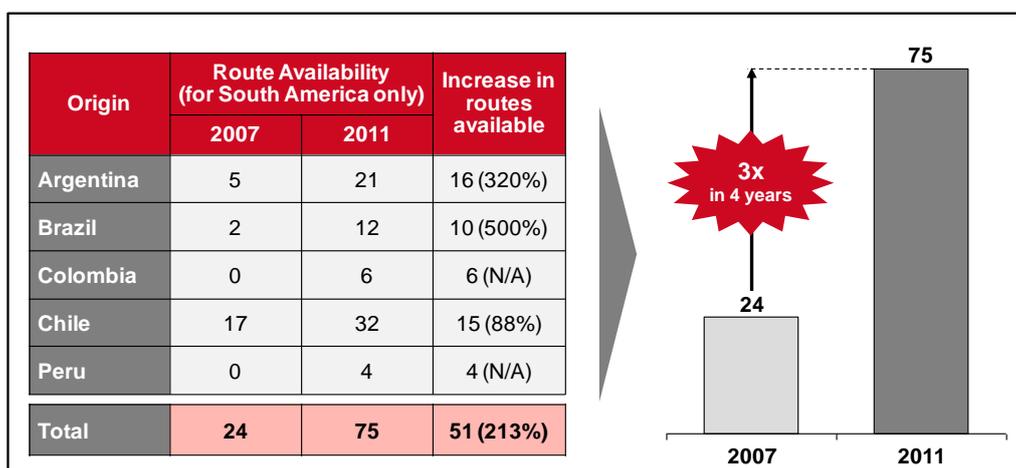


Introducing roaming regulation whilst these obstacles still exist could force operators in certain regions to reduce roaming rates below cost, either impacting their profitability or their ability to provide customers with roaming services. Technological challenges have and will continue to require heavy investment from operators. Regulatory intervention is likely to diminish the ability of operators to invest in eliminating these challenges.

a. Prepaid route availability

In order to increase the accessibility of roaming services to their customers, many operators have invested heavily in improving roaming services for prepaid customers. For example, as shown below, the number of prepaid routes increased three times from 2007-2011 for a sample of five of the largest South American countries. Pre-paid platforms such as CAMEL are generally expensive to implement and initially yield lower returns than that of post-paid customers.¹² However, operators understand that future demand from prepaid customers is critical to increasing roaming usage and can only be captured if the necessary infrastructure is in place.

Figure 11. Prepaid route availability for a sample of South American countries, 2007 vs. 2011¹³



b. Network coverage

Network coverage is improving but in some regions remains a technological challenge as operators continue to roll-out and upgrade their networks. For example, 2G coverage in Columbia and Peru increased by 74% and 69% respectively from 2009-2010 and access to 3G in those countries is now over 50% of the population.

¹² Source: Confidential operator interviews

¹³ Source: 2011 route availability found on operator websites, 2007 route availability taken from IIRSA South American Roaming Initiative report, 2009. Route availability is the number of available prepaid routes (only for South American destinations) * number of operators that offer each route

Figure 12. 2G and 3G network coverage as a percentage of population for selected Latin American countries, 2010 vs. 2009¹⁴

Country	Network coverage as % of population		% increase in network coverage since 2009	
	2G	3G	2G	3G
Argentina	99%	75%	19%	N/A
Brazil	97%	75%	13%	100%
Colombia	94%	52%	74%	N/A
Mexico	93%	39%	9%	34%
Peru	95%	65%	69%	N/A

As we look within and across the different regions, it is clear that interoperability challenges, caused by the existence of different network technologies and different GSM spectrum frequencies, are still in existence and limit the ability of roaming, particularly with low-cost handsets. As operators continue to upgrade their technology platform, interoperability and coverage should increase, but technical implementation costs must be absorbed by operators.

Technological constraints such as these require large investments, which especially burden smaller operators. Regulation that reduces the capital available for such upgrades could severely limit the ability of operators to invest in necessary improvements to cope with future demand and technology.

c. International gateway monopolies

Even with widespread use of roaming services, prices on routes with monopolised international gateways will continue to remain high until all gateways are liberalised. The international call component is a very important element in roaming calls given that the majority of roamers make calls back home - for example, in Latin America 79% of roaming calls are made back home.¹⁵ The termination costs of international long-distance calls are a large component of wholesale costs which is out of the control of operators in routes with monopolised international gateways. Even

¹⁴ Source for 2010 data: Teleco, Operators, ITU, ANATEL; CRT (via SIUST), Ministry of Transport and Communications of Peru, GSMA. Source for 2009 data: GSM coverage analysis by area and population, October 2009. Peru 3G penetration calculated on the basis of number of inhabitants in districts where there is at least one customer with ADSL (14%), in the case of broadband and 3G (348 districts covered with 3G network of total 1833) for case of mobile telecommunications. December 2010. Mexico 3G penetration calculated using the population of cities where 3G service is enabled. The information of the cities with 3G service is current as of January 2010

¹⁵ Source: Confidential operator data, A.T. Kearney analysis

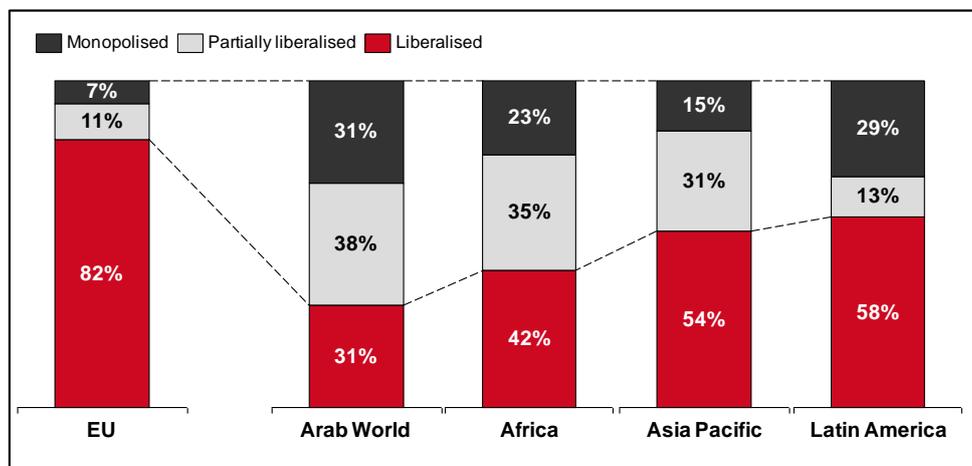
with volume growth, there is no bargaining power for operators whilst gateways are not liberalised. As a result, retail tariffs to end-users are higher.

Figure 2 (page 5) sets out the mechanism by which international gateway monopolies lead to higher roaming prices. Following the call illustrated in Figure 2, a roaming customer on a visited network makes a call back to their home country. The call is passed from the visited network to the international transit service, which in turn hands the call over to the roaming customer’s home operator. In terms of the payment flow, the visited operator pays the international carrier, and the international carrier in turn pays your home operator a termination rate for terminating the call in your home country. The visited operator then pass these costs, along with other costs, including the cost of providing access to its network, to the home operator, within the commercial terms set out in the wholesale roaming agreement. The home operator recovers these wholesale costs from the retail price.

If interconnection between the international carrier and the home operator is via an international gateway monopoly, then the price for terminating the call could be (significantly) greater than a competitively determined price. This higher termination price would then feed through the payment loop, just described above, back to the home operator.

International gateway monopolies are still prevalent in several regions, with monopolies or partial liberalisation existing in over half of Sub-Saharan Africa.

Figure 13. International Gateway status, Africa vs. European Union¹⁶



Liberalisation of international gateways can reduce roaming wholesale costs which in turn can reduce end-user prices. In the Middle East, international roaming call prices between Arab countries with liberalised gateways were typically 25% lower than between Arab countries with gateway monopolies.¹⁷ We would expect the same trend to be found on liberalisation of international gateways in other regions.

¹⁶ Source: ITU 2005-2010 data, international gateway status as defined by the ITU

¹⁷ Source: ITU 2005, GSMA/Case Associates 2007, A.T. Kearney analysis

d. Double taxation

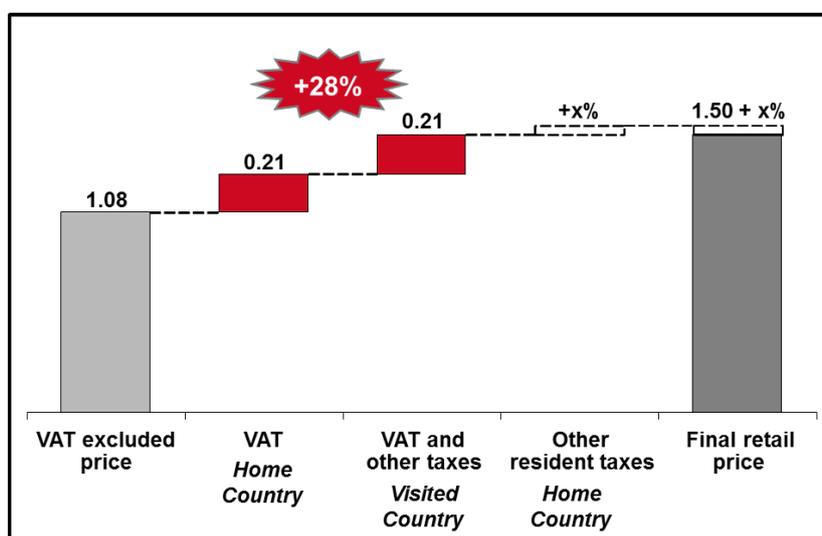
The problem of double taxation is that it can inflate retail prices in a similar way as international gateway monopolies can inflate retail prices as described above. As a result, retail prices may be set inefficiently high, harming the industry, consumers, and government revenue.

Referring to Figure 5 (page 5) taxes can enter into the payment flow at three points:

1. The home country government might add a surcharge tax to international calls terminating in the home country;
2. The visited country government might add a VAT or other tax to the wholesale roaming service; and,
3. The home country government might add a VAT to the retail price for the service.

Whilst initiatives by regional regulatory bodies such as Initiative for Infrastructure Integration of South America (IIRSA) exist to help remove double taxation, the problem still exists and continues to substantially increase roaming tariffs for customers. In 2009 double taxation remained on 72% of roaming routes in South America.¹⁸ In Latin America VAT rates ranged from 0% to 22% and averaged 14% in 2010.¹⁹ As a result of double taxation, retail prices for consumers could on average increase by 28%. On some routes additional withholding and local, state and federal taxes could increase this figure considerably.

Figure 14. Hypothetical impact of double taxation on end-user roaming prices in Home Country, \$/min, 2011²⁰



¹⁸ Based on a sample of 10 South American countries. Source: IIRSA Regional Study of South American Roaming Services Market, April 2009

¹⁹ Source: KPMG's Corporate and Indirect tax survey 2010

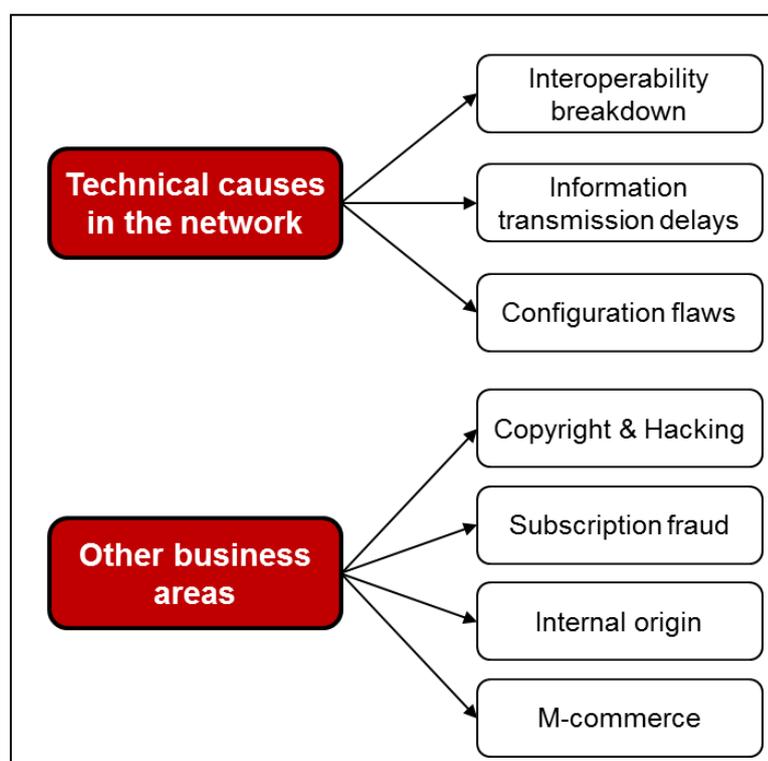
²⁰ Source: IIRSA Regional Study of South American Roaming Services Market, April 2009; EIU; Operator websites

e. Fraud

Fraud remains a major financial concern for operators despite increased efforts to eradicate it, and will require further investment to combat. The following diagram sets out the methods of fraud encountered in the roaming market. Fraud can cause losses of up to 5% of total mobile revenues in Latin America, up to 25% of which can occur whilst consumers are roaming.²¹ Slow detection and response times result in delays of up to 3 days in reporting fraud whilst roaming to the relevant operator. The GSMA and regional bodies are leading initiatives to reduce fraud, for example NRTDRE²², which limits the opportunity for fraud by reducing timeframes of processing calling records from 36 hours to 4 hours.

Whilst over 80% of Latin American operators have implemented NRTRDE,²³ for fraud to be reduced NRTDRE must be enforced through roaming agreements. This will require further investment in technology and the negotiation of roaming agreements.

Figure 15. Methods of fraud in the roaming environment²⁴



²¹ Source: IIRSA: Initiatives for the improvement of the South American market of roaming services, Analysis and Recommendations, February 2010

²² NRTDRE: Near Real Time Roaming Data Exchange

²³ Source: IIRSA: Initiatives for the improvement of the South American market of roaming services, Analysis and Recommendations, February 2010

²⁴ Source: Roaming fraud: assault and defence strategies. IIRSA/CITEL workshop on international roaming services, March 11th 2008

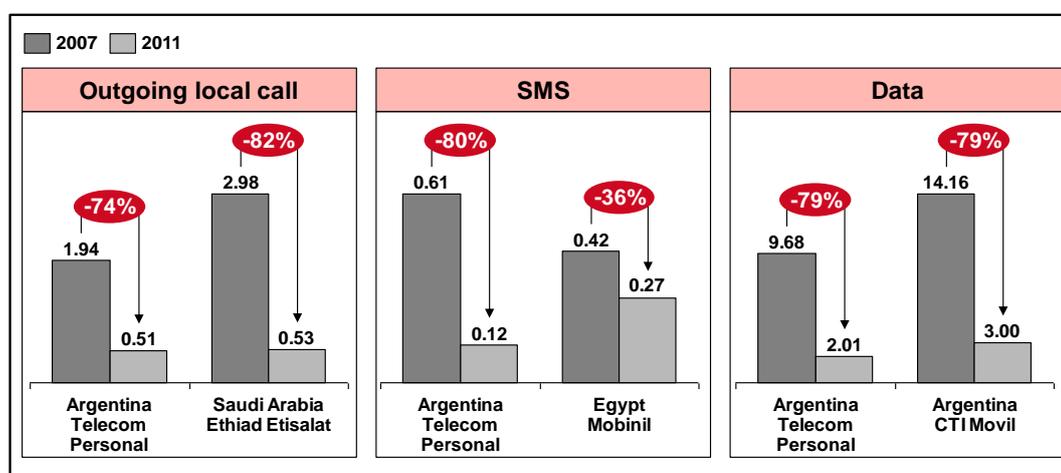
8. Roaming market trends and opportunities

Whilst there are some challenges to the development of regional roaming services, trends are positive. Mobile market growth indicates that customer bases are increasing in both size and usage. Increasing GDP per capita, growth in inter-regional tourism, and continued regional economic integration are positive signs of market growth. Equally, there are alternative communication services in competition with mobile roaming, and therefore operators are improving roaming offers and quality of service.

a. Roaming price declines

The global roaming market is characterised by strong price declines across all services and widespread tariff innovation. As shown below, operators in all regions are driving retail tariff prices down across all services, with declines of up to 82% since 2007. Another trend over the past few years has been the proliferation of roaming alliances²⁵ and partner network roaming agreements which provide consumers access to discounted roaming tariffs, in some cases up to a 90% reduction compared to standard tariffs.²⁶

Figure 16. Like-for-like comparison of selected post-paid retail tariffs from Latin America and the Middle East, \$/min, \$/SMS and \$/MB, incl. tax, 2007 vs. 2011²⁷



In some regions, the presence of operators with large geographical footprints has decreased roaming rates to levels similar to domestic tariffs. For example, the Zain “One Network” offers customers roaming rates in 21 countries across Africa and the Middle East that are equal to visited country local rates when customers roam on the Zain network. Other pan-African operators have

²⁵ For example, Asia Pacific Mobile Alliance, Bridge Mobile Alliance, Starmap Mobile Alliance, Roaming Alianza Alliance

²⁶ Bridge Mobile Alliance on data roaming in Asia Pacific, dependent on the visited network

²⁷ Source: Tariffs in 2011 are taken from operator websites. 2007 tariffs for Latin America are taken from IIRSA South American Roaming Initiative report, 2009. 2007 tariffs for the Middle East are taken from GSMA Arab World “Best Roaming Fares” web site

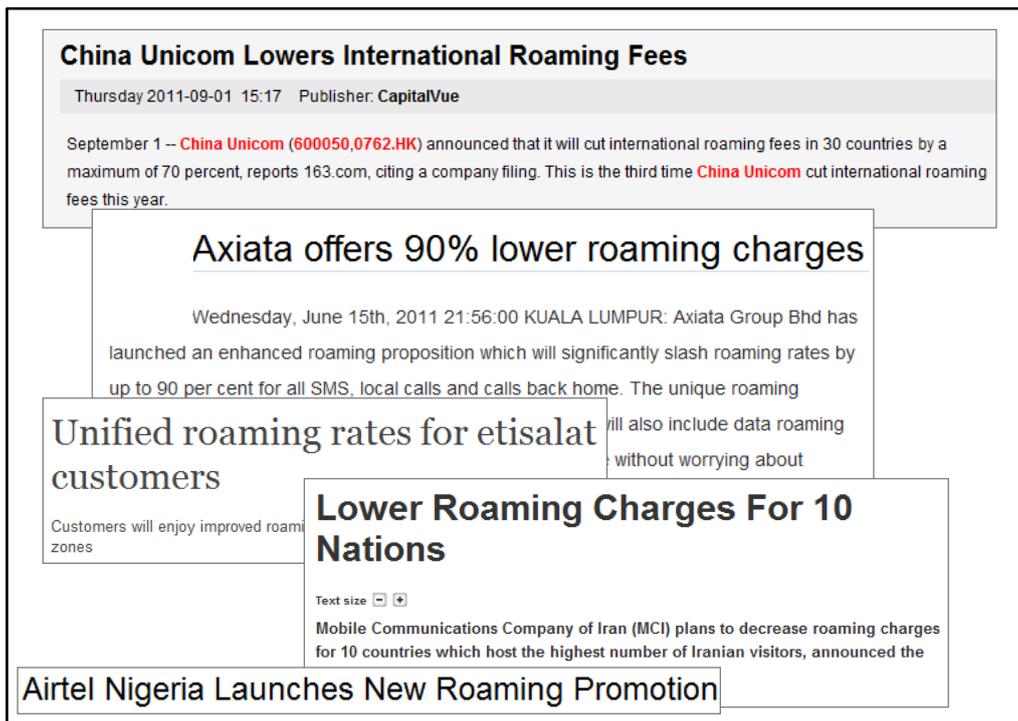
followed suit to encourage roaming usage over purchasing of a local SIM, which is a common phenomenon and competitive substitute in Africa and Asia Pacific. The Kama Kawaida alliance offers favourable rates across East Africa, Du offers a single preferential rate across the Gulf countries with local and incoming calls at AED1.25/min (€0.24/min), and MTN’s One World ensures local calling rates across African sub-regions.

b. Roaming tariff innovation

Innovative sub-region/bilateral packages are also facilitating cross-border travel and trade. Glo’s UNI World encourages roaming between bordering Nigeria and Benin through reduced tariffs. Similarly Argentina’s Claro supports Uruguay – Argentina – Paraguay tourism through reduced rates and innovative monthly roaming bundles.²⁸

Equally, operators are offering innovative global tariffs, such as Vodafone Passport or Vodafone Traveller, which permit customers to roam on their standard domestic rate plus a connection fee. In addition to these offers, new roaming bundles and standard tariffs are being launched on a frequent basis indicating significant commercial activity to provide competitive roaming offers to regional and global consumers.

Figure 17. Selection of recent roaming tariff offers available in the market



In particular in Latin America, the industry is leading the way to address inadvertent border roaming through innovative initiatives. Examples include specialised border tariffs, the option to disable individual customer roaming, and immediate SMS alerts when customers start roaming on a visited country.

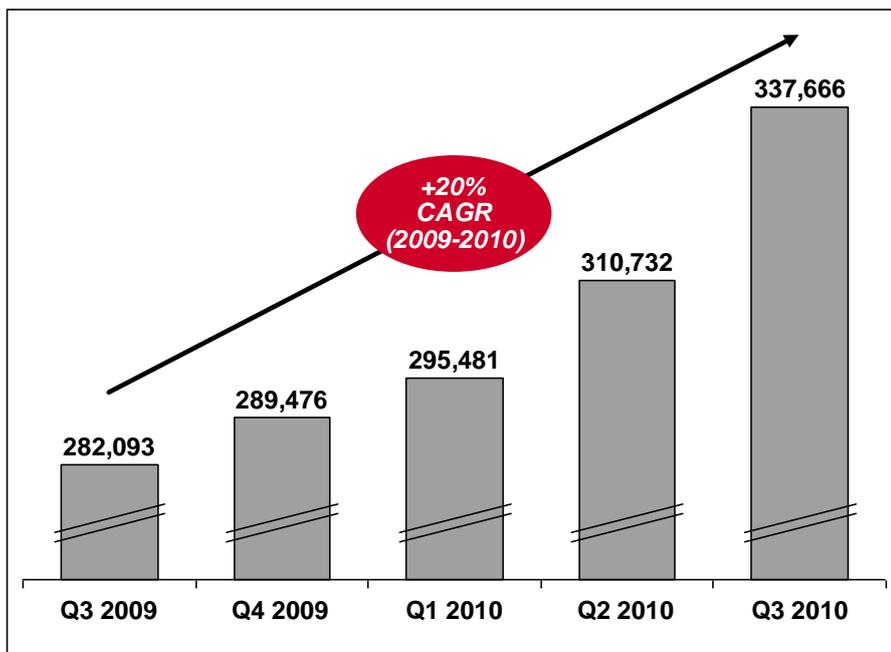
²⁸ Source: Operator website – monthly bundles of 20 mins and 25 SMS for \$33 are available

c. Strong substitutes

There are already strong substitutes which are in competition with mobile roaming services, especially data services. Today, there are multiple substitutes available for roaming services and technologies in these areas continue to evolve rapidly. Wi-Fi has grown as a strong substitute for an increasing number of customers and operators alike in both the domestic and roaming market.

Some operators are contributing to a shift in data traffic by encouraging customers to use Wi-Fi networks when possible. This is driven by rapid growth in demand and congestion of mobile networks in some regions (especially, but not only those with limited spectrum). There has been a strong push from manufacturers and service providers to increase the availability and penetration of Wi-Fi-enabled handsets. Today all major smartphone manufacturers include Wi-Fi capability in their handset portfolios; this feature allows consumers to use Wi-Fi hotspots both at home and abroad. The smartphone market is forecast to grow rapidly, and by 2012 handheld devices are expected to account for 50% of all hotspot sessions.

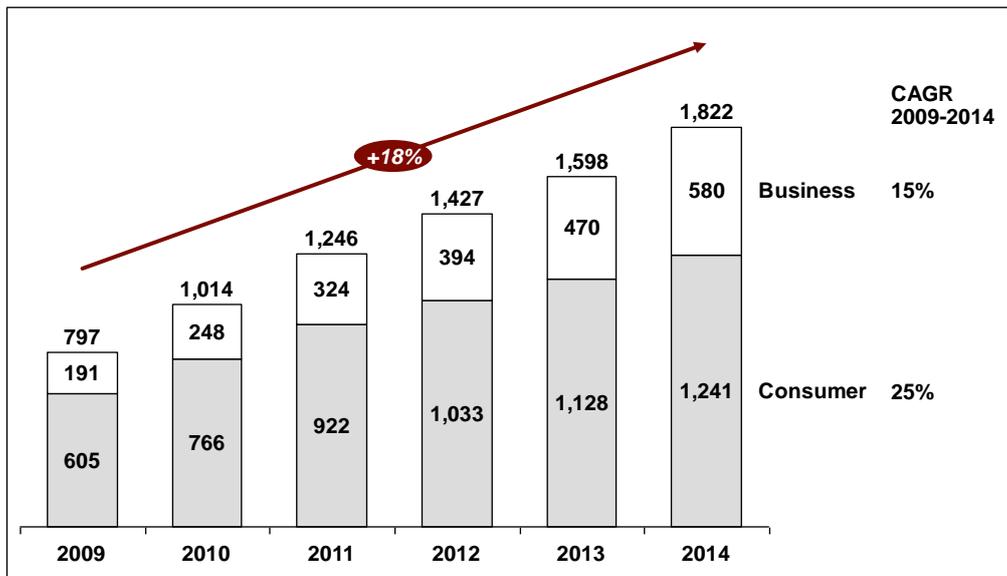
Figure 18: Global growth in public Wi-Fi locations²⁹



In addition to supporting data services, both 3G and Wi-Fi networks can support mobile voice-over-IP (VoIP) applications and several mobile operators are developing relationships with mobile VoIP players. The traffic growth of VoIP platforms has been significant, with VoIP minutes forecast to rise to 1.8 trillion by 2014, a growth rate of 18% p.a. It is clear that both domestic and roaming users will continue to use VoIP applications and Wi-Fi services as a substitute for roaming voice, SMS and data services.

²⁹ Source: JiWire, Q3 2010

Figure 19: Global growth in public VoIP traffic, billion minutes³⁰



Local SIMs have always been an important substitute for roaming services for those visiting other countries, and are particularly popular among regular visitors and migrant workers. Some Middle Eastern operators are evolving the concept of a Local SIM by offering a temporary local phone number which works in parallel with a user’s home number without the need for an additional SIM.³¹ Substitutes for data services are also a popular offering, given that the customer does not have any attachment to a phone number.

Asian and Pacific consumers have adopted SIM-based alternatives to international mobile roaming across multiple Asian and Pacific regions. Call-by-call substitutes to roaming for corporate and business users having a significant impact on the roaming market in Asia. As the usage of substitutes continues to increase, roaming prices will reduce further. Certain substitutes may be more appropriate than others depending on national market conditions.

d. Consumer protection and transparency

The industry has always been committed to customer protection. Improvements in transparency are on-going and the industry endeavours to ensure consumers are informed about IMR services and prices. For instance, GSMA announced in June 2012 the launch of an initiative that will provide consumers greater visibility of their roaming charges and usage of mobile data services when travelling abroad. The details of the initiative are provided in the GSMA press release, attached as an Annex. This initiative signals the commitment being made by operators to promoting and ensuring transparency of roaming services to consumers.

³⁰ Source: IDC, October 2010

³¹ For example: <http://www.stc.com.sa/cws/portal/en/individual/ind-aljawal/ind-alj-discover/ind-alj-dis-traveller/ind-alj-dis-traveller-visitors/ind-alj-dis-vstors-localrming?favouritLang=en>

Easy access to up-to-date personalised tariff and usage information allows consumers to quickly understand the range of options available in the market. Operators use several methods to ensure consumers are aware of the latest offers, such as consumer-friendly websites and via a “welcome SMS” to roaming customers.

Within the European Union, the industry has made considerable investment to relieve customer concerns over “bill shock”, which was an issue that operators considered important to resolve in order to gain customer acceptance and confidence – especially in data roaming services. Comprehensive warning systems and informative websites have been developed to ensure consumers understand their usage, and data roaming services are blocked as per regulation/customer preference when a data usage limit is reached.

These transparency measures are not unique to the European Union. Selected operator examples include SMS warning systems for Antel and Movistar customers in Latin America, and roaming “user guides” for Mobily Saudi Arabia and Comcel Colombia customers.³² In Hong Kong, several operators are also offering flat-rate data roaming daily plans on an opt-in basis before leaving the country to ensure no bill shock for consumers.

For the prepaid segment in particular, many operators are offering customers the ability to top-up with local cards while travelling abroad. This, in addition to easily accessible, free of charge customer support, allows prepaid customers the freedom to fully understand their roaming options and top-up their credit whether they are at home or abroad.

9. Regulatory intervention and unintended consequences

Regulators within different regions around the world share a common concern about the level of roaming charges and customer bill-shock. However, this common concern does not translate to one global solution. This is because only some countries have higher roaming charges, and the reasons for the higher roaming charges are likely to differ due to the different market conditions, between those countries, that have been discussed above. It follows that regulators should address their concerns at the national level in order to identify their own distinctive reasons.

A uniform, global regulatory measure may fail to address the source of any problem, and is likely to be detrimental to market performance. A uniform, global regulatory measure cannot take in account all of the different local market conditions, and thus it may fail to address the actual cause of any problem within a region. In addition, the imposition of such a recommendation may introduce new problems which harm consumers and the industry.

The introduction of price regulation by the European Commission in 2007 provides an example of unintended consequences of a uniform regulatory measure being applied at the regional level. In 2007 the European Commission introduced regulation of retail and wholesale roaming prices within the European Union. A justification for regulating price was an expectation that a benefit of regulating roaming prices down would be a significant increase in demand for roaming services.

³² Source: Confidential operator interviews, operator websites

Subsequent analysis has concluded that demand did not increase, and thus the benefit did not eventuate.

As BEREC noted the “Demand for roaming has not increased in light of reduced prices introduced by the regulation.”³³ The EU retail roaming revenue shrank by 7% p.a. between 2006 and 2010 (and by 13% p.a. for voice). Over the same period, the total European mobile market grew by 2%, which suggests that the regulation of roaming prices, not global economic factors, were the main cause of this contraction in roaming revenues. Furthermore, it is worth noting that, prior to the introduction of regulation, outbound roaming prices were falling 24% p.a. in the EU. This indicates that the overall effect of regulation was net reduction in welfare with little benefit to consumers but substantial financial pressure on some operators.

10. An appropriate approach to regulatory intervention

The industry recognises regulators’ concern regarding IMR prices. However, regulators need to also recognise that IMR is a complex service, involving many different factors that can influence price, as described in this paper. This complexity creates a significant risk that regulatory measures will result in unintended, detrimental consequences for consumers, governments and the industry, particularly in the long term. Regulating price may result in short- term benefits for consumers; however, these are more than likely to be offset in the long-term by a reduction in the level of competition and innovation, as evidenced by the EU experience.

It is for this reason that the industry supports a measured approach to the regulation, where regulators:

1. Encourage operators to take measures that enhance consumer awareness
2. Address structural barriers that increase costs for service providers and consumers, such as double taxation and international gateway monopolies, as well as those barriers that hold back the development of market based substitutes
3. Only consider price regulation as a last resort after:
 - a. The other measures have been given sufficient time to conclude there is a persistent problem;
 - b. It is clearly shown that operators offering roaming services have market power - that is, competition in the market for roaming services is limited;
 - c. It is clearly shown that the firm derives its market power from owning a natural monopoly; and,
 - d. It is clearly shown that the benefit exceeds the cost of regulation.

³³ International Mobile Roaming Regulation, BEREC, Dec.2010, page 45

ANNEX



GSMA LAUNCHES DATA ROAMING TRANSPARENCY INITIATIVE

New Measures Aim to Help Consumers Better Understand and Manage Data Usage, Addressing Head-On the Issue of Bill Shock

21 June 2012, Shanghai: At the Mobile Asia Expo, the GSMA announced that it has launched an initiative that will provide consumers greater visibility of their roaming charges and usage of mobile data services when travelling abroad. At a meeting held this week in Shanghai, 24 operator groups, including América Móvil, AT&T, Axiata Group Berhad, Bharti Airtel, Ltd., China Mobile, China Unicom, Deutsche Telekom, France Telecom-Orange, Hutchison 3 Group, KT Corporation, MTS, Qtel, SK Telecom, Smart Communications, Inc., SoftBank Mobile Corp., Tata Teleservices Limited, Telecom Italia Group, Telefónica, Telekom Austria Group, Telenor Group, TeliaSonera, Verizon Communications, VimpelCom and Vodafone Group agreed to undertake a number of measures which will help mobile subscribers better understand their data roaming charges and more effectively manage their use of data services.

“A number of our operator members are already implementing sound transparency practices, benefitting more than a billion subscribers worldwide,” said Franco Bernabè, Chairman of the GSMA and Chairman and CEO of Telecom Italia Group. “The initiative announced today will help to promote an even broader adoption of principles that will offer a more transparent and uniform experience for billions of consumers, wherever they travel.”

The GSMA is committed to working with mobile operators worldwide to adopt the following measures:

- Sending text messages to remind customers of their data roaming tariffs when they arrive in another country and turn on their mobile device;
- Implementing a monthly data roaming spending limit to help consumers manage their roaming bill and sending alerts when their data usage approaches the limit; and
- Temporarily suspending data service when usage exceeds the spending limit.

In the first phase of this initiative, these operators and their group subsidiaries have agreed to implement these data roaming transparency measures by the end of 2012, covering more than 4 billion mobile connections worldwide. The GSMA will also work to promote the adoption of these guidelines across its full membership base of nearly 800 mobile operators globally. Further, the GSMA will develop a trust mark that will identify to consumers that their mobile operator is implementing these measures.

-ENDS-

About the GSMA

The GSMA represents the interests of mobile operators worldwide. Spanning more than 220 countries, the GSMA unites nearly 800 of the world's mobile operators, as well as more than 200 companies in the broader mobile ecosystem, including handset makers, software companies, equipment providers, Internet companies, and media and entertainment organisations. The GSMA also produces industry-leading events such as the Mobile World Congress and Mobile Asia Expo.

For more information, please visit the GSMA corporate website at www.gsma.com or Mobile World Live, the online portal for the mobile communications industry, at www.mobileworldlive.com.

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