

**Final report for CRASA**

Regulatory impact assessment study  
on SADC Home and Away roaming

*23 April 2010*

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# 1 Executive summary

This document is the final report of a project carried out by Analysys Mason on behalf of the Communications Regulators' Association of Southern Africa (CRASA). The purpose of this study is to examine the status of roaming in the Southern African Development Community (SADC) region, and to propose a tangible programme of action to reduce the high cost of roaming in the SADC region, to be considered by the Ministers.

This document draws on a total of 32 interviews with operators, regulators and policy makers from within the SADC region, as well as our internal views and analysis of this topic. In this chapter we present a summary of our findings, as well as an overview of the available options and recommendations that are discussed in full in the report.

## 1.1 Overview of key findings

### 1.1.1 Architecture of roaming

Roaming is not a simple “on/off” switch on a mobile network: it imposes additional costs on a mobile operator. Even once the capability is available, commercial agreements may not and usually do not exist between every possible pair of countries/operators. Furthermore, technical and commercial limitations may mean that only limited types of roaming may be available (for example, prepaid roaming or data roaming are frequently not available).

The direct cost to receive a call while roaming is roughly the difference between mobile termination rates in the visited and home networks, plus the cost of carrying a call between the countries, plus a roaming overhead cost. The cost to make a call while roaming is roughly the same as carrying the equivalent call for a subscriber of the visited network, plus a roaming overhead cost.

The wholesale cost of a roaming call (the Inter-Operator Tariff or IOT) depends on which visited network in a given country handles the call (since different networks within one country tend to have different charges). As a result, home operators may have little control over how much a call will cost them. This is especially true if they lack the capability to direct roamers along with their call traffic to the most cost-effective network. In turn, this may limit their ability to offer clear roaming tariffs to subscribers.

### 1.1.2 Structure of roaming

Roaming represents sizable revenue streams for a number of SADC operators. The islands of Mauritius and the Seychelles have significant tourist trade from Europe and Asia, and their mobile operators rely heavily on roaming as a source of foreign exchange (forex). ICTA, the Mauritian

regulator, estimates that roaming constitutes half of the total mobile industry revenues. Any regulatory action to reduce IOTs charged by mobile operators may reduce the inflows of foreign currency, which could have a disproportionately large impact on those countries that have a significant tourist trade. As such, further research will be required to fully understand this phenomenon.

While postpaid roaming is relatively well established in SADC, prepaid roaming in the region continues to be hampered by technical and market challenges, including difficulty in establishing roaming partners, high levels of testing complexity and high upfront costs. Less than three quarters (73%) of operators interviewed as part of the study offered any voice roaming to prepaid subscribers and only a couple of those offered prepaid roaming in more than a couple of countries. We expect to see a fairly significant shift in the prepaid roaming landscape over the next 12 to 24 months, as roaming agreements are established and the usage of specialist roaming hubs develops, but that is still some way off in the context of speed of market development and there is something to be said for facilitation, rather than regulation at this crucial juncture.

To date, a significant number of prepaid and, indeed, postpaid subscribers rely on alternative approaches to calling home while travelling within the region, notably roaming. The introduction of SIM registration (“RICA”) in the region, however, will make it more difficult for non-residents to acquire or keep a stock of local SIM cards and may result in increased demand for roaming by both prepaid and postpaid subscribers, although the full impact of RICA has yet to be felt.

### 1.1.3 Cost of roaming

The major element of international roaming cost is the IOT and, in countries where international services are not liberalised, the international gateway charge. These are lowest at their unit level for the larger operators in the region, especially the groups such as Zain and MTN. The same is true for other roaming enablers such as signalling, data clearing and financial clearing. However, these enablers often represent as little as 10% of total roaming cost. Therefore, the focus of operator cost reduction remains the IOT and, where relevant, the international gateway.

As a result of this, retail-level innovation in Africa is led by the operator groups with offerings such as Zain’s ONE Network.

Small operators are handicapped in the roaming market by their lack of scale. This results from their inability to build roaming volume. They are frequently second or third players in their domestic market with little to attract new roaming partners. In order to compete more effectively at the retail and wholesale levels, small operators need to build volume through increased coverage. The opportunity to do this is emerging in the form of roaming hubs; however, this will take time. Any imminent regulation of African roaming prices will need to take account of the higher cost levels of small operators.

### 1.1.4 Price of roaming

There is strong evidence to suggest the IOTs are not cost based, but are in fact above cost, which has a direct impact on retail tariffs (which most operators in SADC calculate on the basis of IOT plus mark-up).

Retail margins vary significantly between operators and in some cases may also be above cost. These problems are compounded by a lack of transparency and consumer awareness of prices at the retail level, which has affected consumer choice and competition. In addition, operators frequently require subscribers to pay a deposit of up to USD500 before they are allowed to roam, which may prove a barrier to adoption.

There is strong qualitative evidence to suggest low consumer awareness. Transparency for the end user is currently a commercial, rather than a regulatory decision. Although 56% of operators interviewed claim to have taken steps to increase consumer awareness, there is still some way to go to ensure a unified approach.

### 1.1.5 Market forces

Some operators in SADC claim that competition at the wholesale level is working and is helping to bring down wholesale prices (IOTs). While there may be competition among operators and genuine consumer choice driving competitive forces in some roaming markets in SADC, there is evidence to suggest that wholesale prices may be above cost and that not all operators are benefiting from reductions.

Zain's 'One Network' initiative, which allows subscribers to receive free incoming calls and to make outgoing calls and send SMS at local rate while roaming has had a marked impact on competition, driving large operators with a similar footprint in the region, like Vodacom and MTN, to offer similar roaming packages. However, smaller operators without partners have found themselves at a disadvantage.

## 1.2 Presentation of key issues

As a result of our research, we have identified key issues for developing policy options based on our analysis of responses from operators, policy makers and NRAs in the areas of market structure, cost, price, market forces and service delivery. Figure 1.1 summarises the key issues:

<i>Issue</i>	<i>Description</i>
4.1: Lack of data on roaming	Complete and clear information about the status of roaming for each country in the region will be required, if national regulators or consultants are to accurately assess the potential impact of policy at a regional level.
4.2: Forex impact	Any regulatory action to lower IOTs charged by mobile operators may reduce the inflows of foreign currency, which could have a proportionally large impact on those countries that have a significant tourist trade. As such, further research will be required to determine the impact of lower IOTs, which may vary substantially by country.
4.3: Limited prepaid roaming available	While postpaid roaming is well established in the region, prepaid roaming is still in a development phase: some operators do not currently offer prepaid roaming services; others offer prepaid roaming, but only offer voice services. Only the larger operators (Vodacom and MTN) have prepaid roaming in place with the majority of countries.
4.4 Impact of SIM registration ('RICA')	Purchasing a local SIM card is a common substitute for roaming. The introduction of SIM registration across the region may in future make it difficult for non-residents to acquire or maintain local SIM cards. While it is too soon to draw firm conclusions, SIM registration may lead to increased demand for roaming in the region.
5.1 IOT and international gateway costs	The major cost components for international roaming are the IOT and, for some countries, the international gateway costs. These are variable depending on an operator's roaming traffic volume, but can form up to 90% of costs. Most other overheads are variable and outsourcing opportunities exist for their reduction.
5.2 Lower scale of small operators	Due to their lower scale and lower bargaining power, smaller operators face higher costs per minute of roaming traffic than large operators or those that are part of a group. The largest element of these costs remains the IOT. There are emerging opportunities to increase roaming volume and, hence, small operator bargaining power.
6.1: Limited access to pricing data	To be able to conduct a fuller assessment of the impact of regulating roaming in the region, a much fuller and clearer picture of current retail and wholesale tariffs is required. Consideration will be required as to how best to collect this information, bearing in mind the commercial sensitivities regarding wholesale tariffs.
6.2: IOTs are above cost	There is strong evidence to suggest that many IOTs are not cost based, but are in fact above cost, which has a direct impact on retail tariffs (which most operators in SADC calculate on the basis of IOT plus mark-up).
6.3: Retail mark-ups may be inflated	Most operators interviewed claim to apply a mark-up of 10–25% on the IOT to generate the retail tariff, although there was variation between operators, with some operators charging as much as 60% mark-up.
6.4: Lack of consumer awareness and transparency	There is clear evidence of low consumer awareness of costs and available pricing schemes when travelling in the region. A lack of transparency for the end user limits choice and competition.

Figure 1.1: Overview of key roaming issues in SADC [Source: Analysys Mason]

### 1.3 Problem definition

As a result of our research, we have defined what we perceive to be the core problem, which goes to the heart of this study:

**Problem definition:**

In many cases, prices for SADC-wide roaming at wholesale level appear to be above the costs of providing the service. Retail margins vary significantly between operators and also appear to be above cost. These problems are compounded by a lack of transparency and consumer awareness of prices at the retail level, which have affected consumer choice and competition. Moreover, policy makers have little access to data on roaming costs, service volumes and revenues on which to make a value judgement.

There is a lack of adequate and appropriate infrastructure in the region – many operators only offer prepaid roaming to a limited number of destinations in SADC, which is a significant barrier to consumer adoption.

SADC markets are at different stages of development, with regard to the degree of market liberalisation and market competition, which has a direct bearing on costs. Accordingly, there is no one-size-fits-all regulatory approach for SADC at this stage.

In the course of our primary research, policy makers have alerted us to the fact that they are concerned about these problems. A key issue which has been raised by participants, however, is that regulatory initiatives, if required, may require cross-border policy. Initiatives may also have cross-border impacts, and will need to take into account concerns of all stakeholders including small operators and operators/countries that depend on roaming to generate foreign exchange.

## 1.4 Objectives

The objectives of any action at SADC level are:

- to reduce the tariffs to end users of mobile roaming services within SADC to be more consistently aligned with operator costs
- to identify and address any costs or conditions unique to SADC or its member states that might objectively lead to high roaming tariffs
- to improve competition at all levels, including through the removal of regulatory barriers
- to encourage more widespread availability of prepaid roaming across the region
- to improve consumer awareness of roaming services, including tariffs.

## 1.5 Options

We then review and assess the options available to SADC member states to achieve their objective of reducing the cost to end users of mobile roaming within the region. Each option is described in

terms of the type (unilateral or multilateral), a summary of the measure, the rationale, expected impact (based on this partial impact assessment) and cost, and suitability given CRASA, SADC and individual member states' concerns. The options considered are summarised as follows:

<i>Soft interventions</i>	<i>Hard (regulatory) interventions</i>	<i>Speculative options</i>
No policy change	Lowering regulation and costs of international voice gateway	Mobile VoIP
Self-regulation	Increased transparency and consumer protection	Unbundling roaming from mobile national services
Co-regulation	Regular roaming data collection	International SIMs and multi-national MVNOs
Statement of policymakers' goals	Price control regulation by agreement	
Public education and awareness		
Promotion of multilateral cost-reduction measures and roaming hubbing		

## 1.6 Recommendations

The present study is a partial regulatory impact assessment, and the costs and benefits of the options presented have not been quantitatively analysed. Nevertheless, it is important that concrete actions are identified to maintain the momentum that Ministers have imparted to the process – and that any intervention is proportionate and based on accurate information and analysis.

Based on our assessment of the available options, the following actions are recommended to be taken in the short term:

- **Statement of policymakers' goals.** CRASA should seek views from its member regulators and their governments on what goals are deemed realistic in a five-year time frame, given the SADC Ministers' determination that roaming is a policy priority. It should then put those goals out to consultation before finalising them.
- **Regular roaming data collection.** CRASA should compile a data collection template to be distributed to all member regulators, which should be completed on a regular basis (perhaps quarterly). The data collected could relate to costs, revenues, traffic volumes, number of roamers and prices. Regulators will need to be aware of the sensitivities in relation to such data and define rigorous data handling procedures, which may involve having the data collected, validated and interpreted by a third party. Such data collection may also require minor development expenditure by mobile operators. The GSM Africa and SATA have a role to play in engaging their members in the process and soliciting their support and involvement. Such data will prove critical if further policy intervention is required.
- **Promotion of multilateral cost-reduction measures and roaming hubbing.** Data gathered from operators on a regular basis, supplemented by questionnaire feedback, could help to

identify costs and conditions specific to SADC that are contributing to high roaming tariffs. CRASA or a number of other regional bodies may be able to co-ordinate initiatives to address those issues. Vendors and solution providers are likely to be co-operative if offered the opportunity to market their services to a regional audience offered by industry stakeholder groups.

- **Lowering regulation and costs of international voice gateway.** Regulatory obstacles to lowering international telecoms costs (including but not limited to gateway licensing policy) persist in some countries. Unless there are compelling reasons to retain them, these should be removed in the wider interests of promoting electronic communications between SADC member states.

The key feature of all the actions recommended for short-term implementation is that they do not impose significant incremental costs or regulatory burden on mobile operators, and they also do not require appreciable resources from regulators or CRASA. They further provide a robust platform on which to base any subsequent policy intervention. Following this, a number of further actions could be taken in the medium term (one to three years):

- **Increased transparency and consumer protection.** Some operators are already offering consumers clear tariffs and accurate information about the use of roaming, both in retail outlets and on their websites. While transparency is generally desirable, other operators have made a commercial decision not to publish their rates. Instead they charge retrospectively using the exchange rate in force during the roaming settlement period (rather than when the call is made). In doing so they may be able to offer consumers a lower average price than if they applied a mark-up that simply hedged the exchange rate risk. There is a risk therefore for both operators and consumers in forcing companies in competitive markets to adopt a particular tariff strategy. Moreover, introducing increased transparency and consumer protection as a regulatory requirement may, however, impose major regulatory burden on some operators (particularly small ones) and this should be evaluated more carefully before it is widely introduced. We would recommend that in the short term that industry stakeholder groups should look to begin a period of consultation with operators on this matter with a view to implementing a solution in the mid-term.
- **Price control regulation by agreement.** Price regulation will require protracted negotiation and careful consideration of the underlying cost of providing roaming services. It would therefore be advisable to conduct a full regulatory impact assessment before adopting this approach. However, it may be worthwhile for regulators or governments to circulate a non-paper in the short term to identify as early as possible the challenges facing policymakers.

We therefore do not recommend that a full regulatory impact assessment be undertaken in the short term, until further data has been collected to support such an assessment.

## 2 Introduction and methodology

This document is the final report of a project carried out by Analysys Mason on behalf of the Communications Regulators' Association of Southern Africa (CRASA). The purpose of this study is to examine the status of roaming in the SADC region, and to propose a tangible programme of action to reduce the high cost of roaming in the SADC region to be considered by the Ministers.

This document draws on a total of 32 interviews with operators, regulators and policy makers from within the SADC region, as well as our internal views and analysis of this topic.

### 2.1 Background

The issue of home and away roaming has been of importance to the Southern Africa Development Community (SADC) since July 2007, when the requirement to consider policy on this topic became more important. It has subsequently been declared “a priority” by Ministers.

In November 2008, the Regional Alliance Task Team (RATT) on SADC Home and Away Roaming was formed. RATT comprises representatives of the SADC Secretariat, CRASA, GSM Africa, Southern Africa Telecommunication Association (SATA) and SADC Parliamentary Forum as an observer.

The main task of the RATT is to investigate mechanisms for reducing the high cost of roaming in the SADC region, with a view to submitting a report to the Ministers for a final decision. Since the Ministers have already made a principled intervention in this regard, the focus of this report is to propose a tangible programme of action for consideration by the Ministers.

#### 2.1.1 Objectives

The stated aims of the study are to gain more detailed understanding on the following specific points:

- **overview of current roaming tariffs** (both wholesale and retail) charged by operators within different countries in the region
- **implications of international roaming tariffs on regional tariffs**, covering the issues of: prepaid and postpaid service offerings, Inter-Operator Tariffs (IOTs) for termination or origination (where applicable), mobile calls, and International Direct Distance Dial (IDD) rates
- **possible market and regulatory factors** influencing international roaming wholesale and retail charges

- **factors that influence service delivery and performance of the market**, specifically addressing pricing, network infrastructure and architecture, and quality of service
- possible **factors contributing to high or low charges/prices**, with reference to specific market examples.

## 2.2 Study methodology

### 2.2.1 Project definitions

There have been a number of discussions regarding the definition of Home and Away roaming, both with the RATT Committee on 21 March 2010 and subsequently with individual stakeholders.

For the purposes of this study, '**roaming**' refers to international voice, data and texting (SMS). CRASA has not called on Analysys Mason to address MMS as part of this study.

'**Home roaming**' (or 'national' roaming) refers to an agreement among operators within an individual nation or state to provide services in geographical areas where one, or other, operator has no coverage. '**Away roaming**' refers to agreements between operators located in different countries within the SADC region to use each other's networks to provide international roaming services – though the home network may belong to the same group as the foreign provider.

However, for the purposes of this study, '**Home and Away roaming**' refers only to away roaming, that is regional roaming within the SADC region. Home roaming is being treated under separate initiatives and has not been considered as part of this study. International roaming outside the SADC region is only considered in terms of the direct impact it may have on regional roaming rates within the SADC region.

It should also be noted that a number of stakeholders have argued in favour of a more holistic approach to the question of roaming within the SADC region that incorporates both national, regional and international roaming; however this has not been considered in detail as part of this study.

During the RATT Committee meeting on 21 March 2010 and during the RIA training workshop in Victoria Falls Zimbabwe (22–24 March 2010), the issue of whether this study constitutes a full or partial RIA was considered. It was agreed that this study represents a partial RIA; that is, it contains elements of a full RIA, but given time and budgetary constraints, a full RIA has not been possible at the present time. The question of whether a full RIA should be conducted will be treated in this report.

### 2.2.2 Project scope

The project includes the CRASA member states, their regulators and mobile operators:

<i>Country</i>	<i>Operator (% market share at end 2009)</i>
Angola	<ul style="list-style-type: none"> <li>• Movitel (38.8%)</li> <li>• Unitel (61.2%)</li> </ul>
Botswana	<ul style="list-style-type: none"> <li>• Mascom (MTN) (58.3%)</li> <li>• Orange (35.8%)</li> <li>• Be Mobile (BTC) (5.9%)</li> </ul>
DRC	<ul style="list-style-type: none"> <li>• Congo Chine Telecom (2.2%)</li> <li>• Supercell (1.8%)</li> <li>• Tatem Telecom (2.1%)</li> <li>• Tigo (Millicom) (15.8%)</li> <li>• Vodacom (50.9%)</li> <li>• Zain (41.3%)</li> </ul>
Lesotho	<ul style="list-style-type: none"> <li>• Vodacom (81.1%)</li> <li>• Econet (18.9%)</li> </ul>
Madagascar	<ul style="list-style-type: none"> <li>• Orange Madagascar (47.6%)</li> <li>• Telma (18.3%)</li> <li>• Zain Madagascar (34.1%)</li> </ul>
Malawi	<ul style="list-style-type: none"> <li>• Celtel (71.4%)</li> <li>• TNM (28.6%)</li> </ul>
Mauritius	<ul style="list-style-type: none"> <li>• Emtel (Millicom) (40.2%)</li> <li>• Mokoze (MTML) (2.1%)</li> <li>• Orange (Mauritius Telecom) (57.7%)</li> </ul>
Mozambique	<ul style="list-style-type: none"> <li>• mcel (Mozambique Cellular) (66.3%)</li> <li>• Vodacom (33.7%)</li> </ul>
Namibia	<ul style="list-style-type: none"> <li>• MTC (83.6%)</li> <li>• Leo (Orascom) (16.4%)</li> </ul>
South Africa	<ul style="list-style-type: none"> <li>• Cell C (Oger Telecom) (14.6%)</li> <li>• Mobi (Telkom) (1.0%)</li> <li>• MTN (31.8%)</li> <li>• Vodacom (53.6%)</li> </ul>
Swaziland	<ul style="list-style-type: none"> <li>• MTN (100%)</li> </ul>
Tanzania	<ul style="list-style-type: none"> <li>• BOL Mobile (Benson Informatics) (0.0%)</li> <li>• Sasatel (Dovetel) (0.0%)</li> <li>• Tigo (Millicom) (23.0%)</li> <li>• TTCL (0.7%)</li> <li>• Vodacom (39.8%)</li> <li>• Zain (28.4%)</li> <li>• Zantel (Etisalat) (8.0%)</li> </ul>
Zambia	<ul style="list-style-type: none"> <li>• Zain Zambia (formally CellTel Zambia) (69.4%)</li> <li>• MTN Zambia (formally Telecel) (25.4%)</li> <li>• Cell Z (Zantel) (5.2%)</li> </ul>

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Zimbabwe	<ul style="list-style-type: none"> <li>• Econet Wireless (56.8%)</li> <li>• NetOne (16.0%)</li> <li>• Telecel (27.1%)</li> </ul>
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Figure 2.1: Mobile operators in CRASA member states (Source: Wireless Intelligence)

### 2.2.3 Project team

Figure 2.2 provides an overview of the structure of the project team:

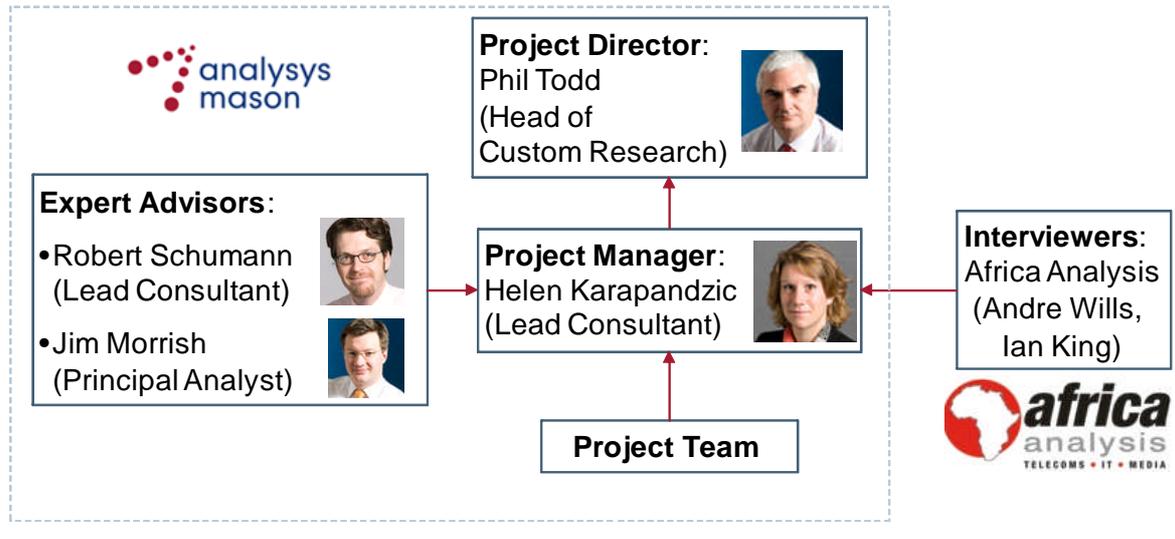


Figure 2.2: Project team [Source: Analysys Mason]

### 2.2.4 Approach to the project

Our approach to the project is illustrated in Figure 2.3 and described in more detail below.

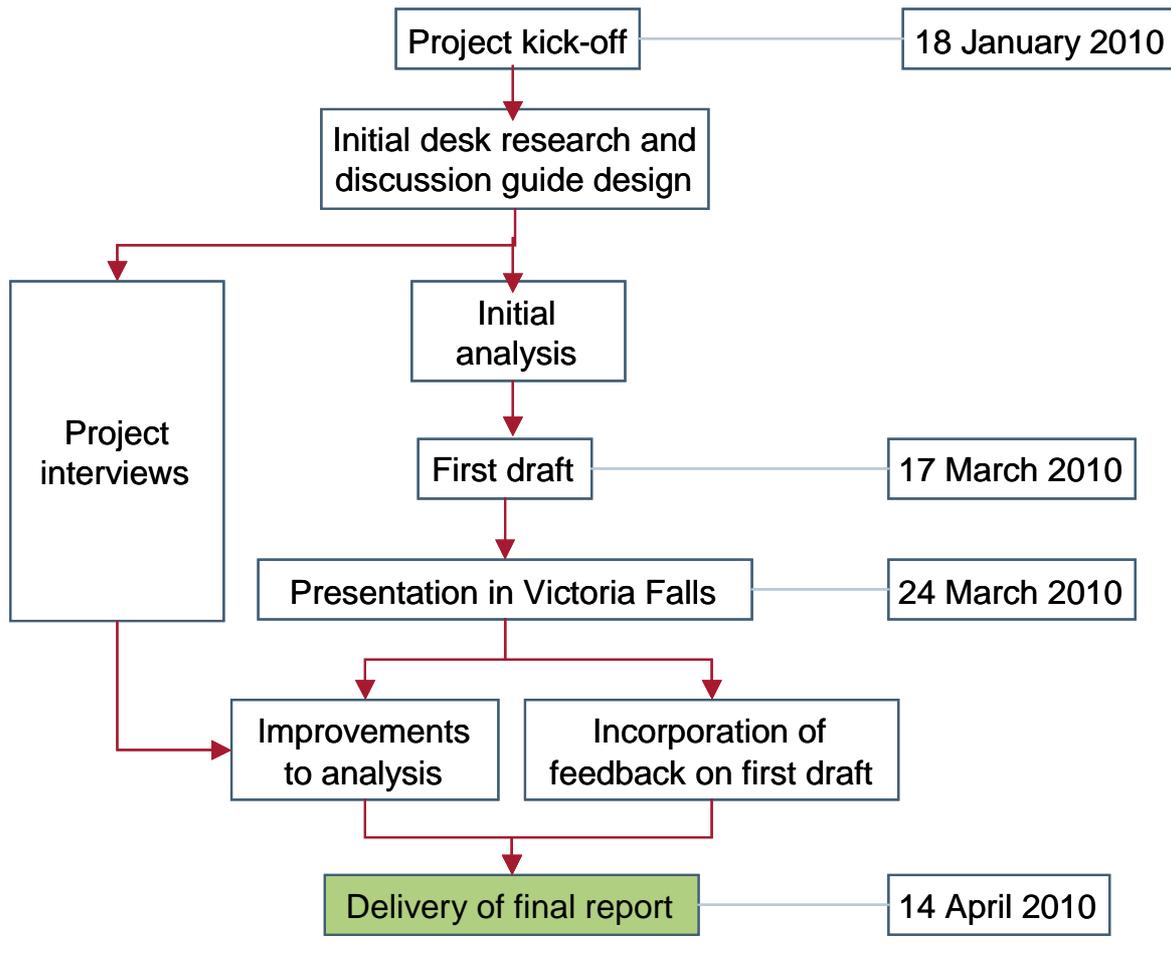


Figure 2.3: Project methodology [Source: Analysys Mason]

### 2.2.5 Project kick-off

Prior to commencement of the project we held a contract signing meeting in early October in Johannesburg with CRASA officials. The contract was countersigned on 11 January 2010 and a kick-off conference call was held on 18 January 2010 involving senior representatives from CRASA and Analysys Mason. This meeting agreed the core scope and related project parameters, as well as discussing target organisations for the primary interviews. This meeting also provided an opportunity to exchange views on some of the challenges of roaming in SADC, as well as to discuss the logistics of engaging such a large number of participants, across a variety of geographies within the available timeframe.

## 2.2.6 Assessment of market structure and characteristics

The first main task of the project was to conduct a highly focused programme of desk research to gather public-domain information about roaming in SADC. This task informed the discussion guide and the analysis prepared based on the primary interviews.

### *Design of the discussion guides*

Two discussion guides – one for mobile operators and another for regulators and policy makers – were prepared by Analysys Mason for use as the basis of the primary interviews.

The discussion guide design posed specific challenges, in that it was probing into highly specialised areas where:

- technical terminology in the questions was unavoidable
- there were only a small number of possible respondents in the sphere
- there were potential problems and reservations about confidentiality.

Detailed planning was therefore required. The discussion design drew on initial analysis conducted by Analysys Mason, discussed above, as well as the opinions of our in-house experts. Africa Analysis was also invited to provide comments on the questionnaires, and their comments, which drew on Africa Analysis's extensive knowledge of the region and experience of conducting primary research in these markets, were incorporated in the final design. Finally, copies of the questionnaires were provided to CRASA. The operator discussion guide can be found in Annex A; the discussion guide for regulators and policy makers can be found in Annex B.

### *Primary interviews*

A total of 32 primary interviews with operators, regulators and policy markets in SADC were conducted as part of the study, covering a range of issues relating to Home and Away roaming.

We targeted over 40 senior staff with responsibility for roaming within the SADC region. These staff were identified during the initial desk assessment, and included CTO, Head of Roaming and the managers immediately reporting to them. They included contacts from CRASA, our partners Africa Analysis and our own existing contacts, as well as those researched specifically for this project. Africa Analysis was responsible for conducting interviews in the region.

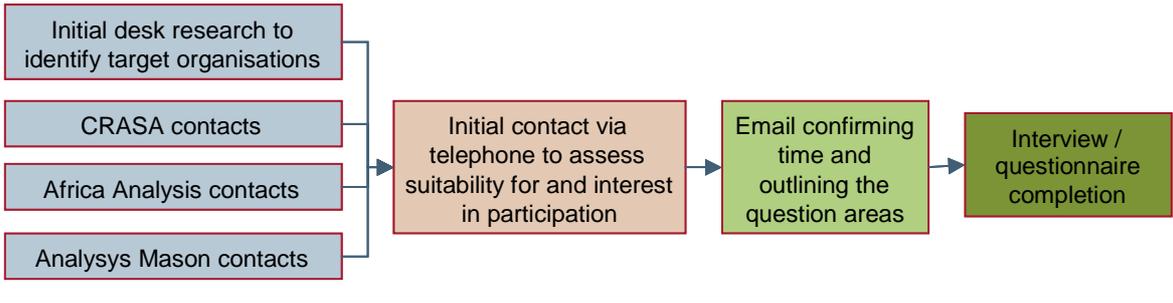


Figure 2.4 The recruitment process [Source: Analysys Mason]

Figure 2.5 provides an overview of interview participants by country and organisation type:

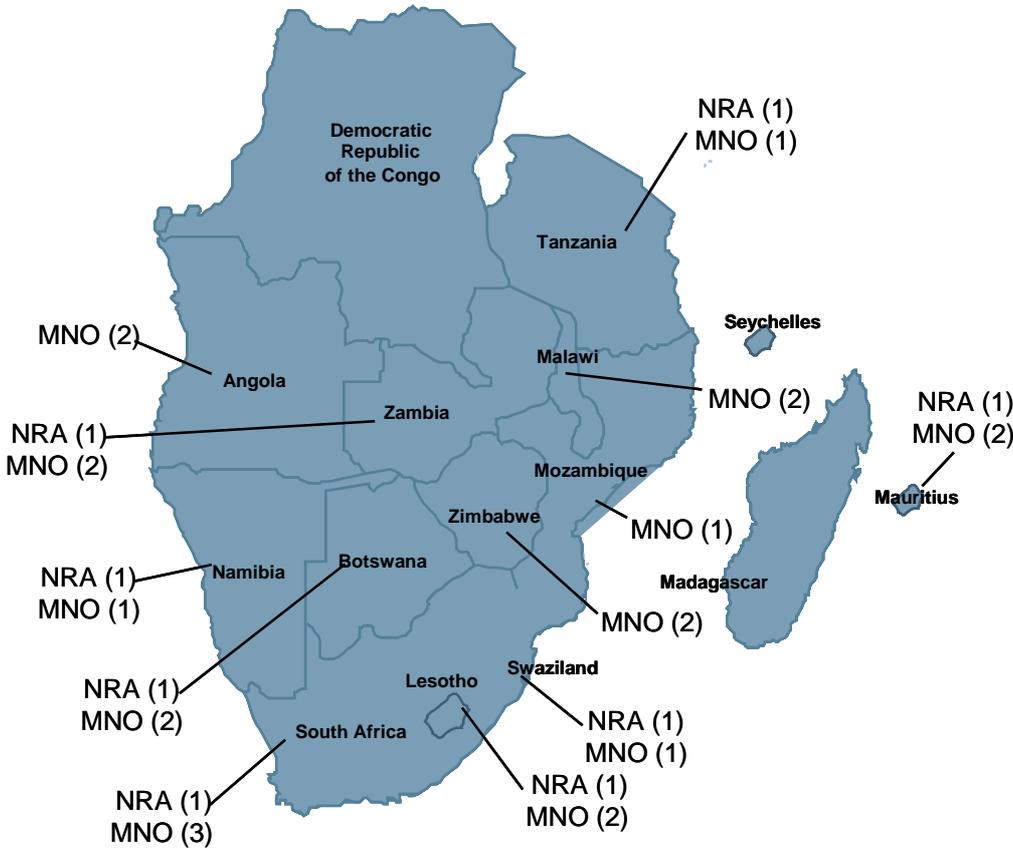


Figure 2.5: Primary interviews conducted as part of the study, by country and organisation type [Source: Analysys Mason]

Figure 2.6 provides an overview of details of participants and type of interview conducted:

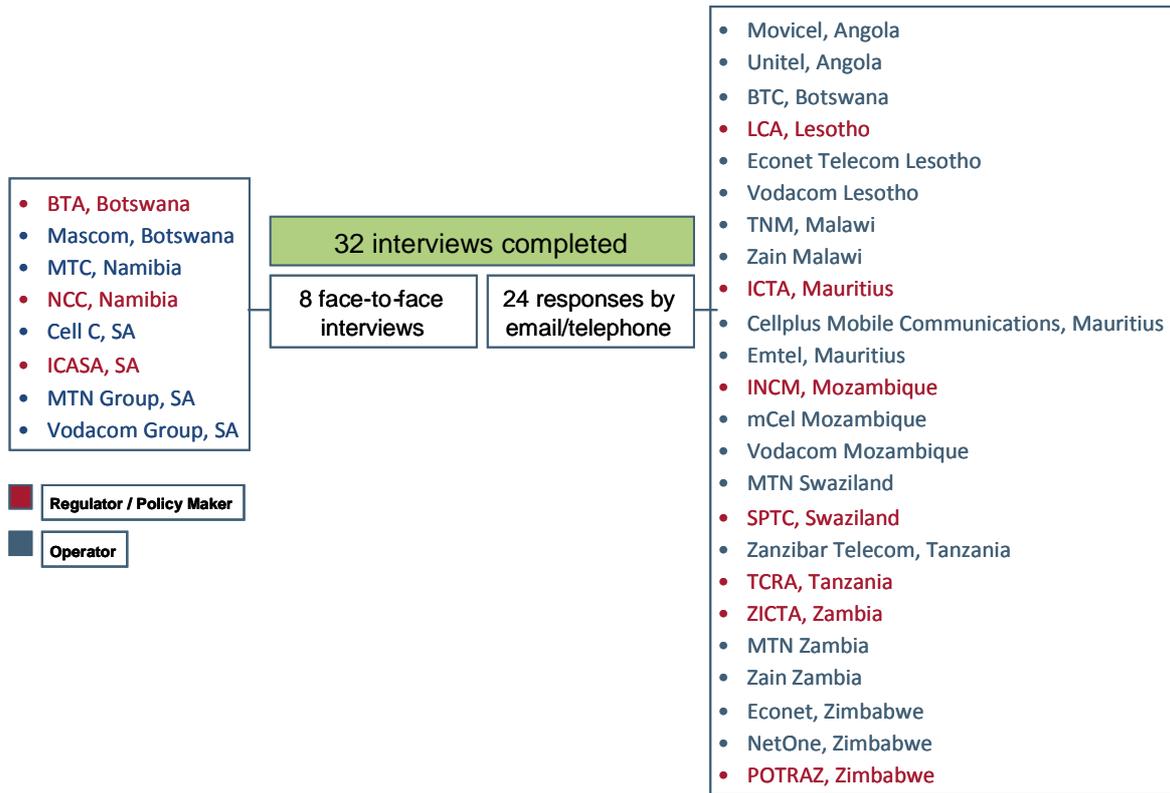


Figure 2.6: Primary interviews as part of the study, by country and organisation type [Source: Analysys Mason]

In addition, Analysys Mason has spoken with international organisations involved in clearing, settlement, routing and roaming hubbing, including Mach, Syniverse and Star Home.

### 2.2.7 Full analysis

On completion of the interview programme, we assimilated feedback from the interviews with mobile network operators and national regulatory authorities, and all secondary information to generate the overall analysis.

## 2.3 Structure of this report

This deliverable is a report in Microsoft Word summarising the status of roaming in the SADC.

The remainder of this document is laid out as follows:

- Section 3 provides an overview of the architecture of roaming
- Section 4 provides an overview of the structure of roaming in SADC

- Section 5 provides an overview of the cost of roaming in the SADC region
- Section 6 discusses the current wholesale and retail roaming rates that are being charged within the SADC region.
- Section 7 analyses and evaluates the market forces that have an impact on roaming in the region
- Section 8 provides analysis and options for self-regulatory mechanisms, enhancing the performance of the international roaming market in SADC, addressing regulatory barriers, and the difficult task of reducing the cost of roaming in the region
- In Section 9, we present our recommendations, which propose a tangible programme of action for consideration by the Ministers.

The report includes a number of annexes containing supplementary material:

- Annex A provides a copy of the discussion guide for mobile network operators
- Annex B provides a copy of the discussion guide for regulators and policy makers
- Annex C provides an overview and discussion of the rationale behind and implementation of EU regulation
- Annex D provides a timeline of EU action on international roaming charges in its Member States.

### 3 The architecture of roaming

Roaming is the ability to make and receive voice calls, send and receive data and SMS, and access value-added services outside the geographical coverage of the network to which the customer is subscribed. It is a key mobile service, allowing consumers to continue accessing mobile service outside their network operator's coverage area. It also allows operators to offer these services to visitors from foreign networks. By using multimode GSM and 3G handsets, it has become possible for subscribers to roam in a visited network regardless of the access technologies in operation, allowing them to switch from one network to another depending on the coverage.

In this chapter we provide an overview of the mechanics of roaming, and some of the key trends that are emerging in this segment.

- In Section 3.1 we consider why roaming poses new challenges to communications providers, and outline how roaming is implemented between operators.
- Section 3.2 outlines what happens when a roaming call is made, and in particular what type of costs are incurred for originated (subscriber-initiated) calls and for terminated (received) calls.
- In Section 3.3 we identify some of the trends in roaming that will be influencing the way that operators undertake roaming and that may have an impact on their cost structures.

#### *Key findings*

Roaming is not a simple “on/off” switch on a mobile network: it imposes additional costs on a mobile operator. Once the capability is available, commercial agreements may not and usually do not exist between every possible pair of countries/operators, and small operators (or operators that are not part of multinational groups) typically struggle to expand roaming partnerships. Furthermore, technical and commercial limitations may mean that only limited types of roaming may be available (e.g. prepaid roaming or data roaming are frequently not available).

The direct cost to receive a call while roaming is roughly the difference between mobile termination rates in the visited and home networks, plus the cost of carrying a call between the countries, plus a roaming overhead cost. The cost to make a call while roaming is roughly the same as carrying the equivalent call for a subscriber of the visited network, plus a roaming overhead cost.

The wholesale cost of a roaming call (the Inter-Operator Tariff or IOT) depends on which visited network in a given country handles the call (since different networks within one country tend to have different charges). As a result home operators may have little control over how much a call will cost them. This is especially true if they lack the capability to direct roamers along with their call traffic to the most cost effective network. This may in turn limit their ability to offer clear roaming tariffs to subscribers.

### 3.1 The challenges of roaming

Roaming functionality was not included in the original specification of the GSM standard in the 1980s, but rather had to be added on through the incorporation of new features into the standard. It is worth noting that when roaming was first introduced, mobile telephony itself was considered to be a niche product, and, as a result, the scope of roaming standards – and the resulting user experience – was vastly different from the situation today. Some examples:

- Prepaid roaming requires real-time call control, to ensure that a user doesn't exceed their available credit. When roaming was first introduced in around 1990, all users were postpaid<sup>1</sup>, so this was not an issue: the only requirement for roaming was to be able to bill the user correctly at the end of the month.
- Short codes to access voicemail or customer services are today handled in a highly customised way by the home network operator. Roamers in the early years of roaming were asked to dial the long-form numbers to access these services. Making short codes available while roaming requires significant control of the user's experience while the user is connected to someone else's network.
- Market and regulatory requirements now frequently call for making an announcement to the roamer before a call is connected (for example, to indicate the call tariff or warn a prepaid user that their balance is low). This requires the ability to deliver that message from a service platform in the home network to the visited network, and to manage call connection around the delivery of such messages.

Clearly, roaming is not a simple “on/off” switch on a mobile network. It requires (possibly expensive) upgrades to the network, and significant network inter-operation unlike any other service offered by mobile operators. There may indeed be operators (such as those using CDMA, or operators targeting a specific niche) who decide against implementing roaming at all.

Furthermore, as a result of the various generations of standards, “roaming” is not a uniform service (as discussed later in Section 4.2 in connection with what types of roaming are available in SADC):

- The simplest type of roaming is postpaid telephony. Prepaid telephony typically requires a technology upgrade (CAMEL<sup>2</sup> Phase 2 is, by an overwhelming margin, the most frequently employed solution ) which can cost in the order of millions of US dollars
- SMS roaming is relatively simple to implement on top of voice roaming, but can present some unique difficulties

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<sup>1</sup> Prepaid mobile service only became widely available in 1995.

<sup>2</sup> CAMEL – Customised Application for Mobile Network Enhanced Logic.

- MMS and data roaming require further effort to implement. More significantly, however, is the fact that charging mechanisms for data are widely variable. Whereas it is standard for voice to be charged per minute of usage, MMS is charged per event (despite the fact that it is very similar to a standard data service) while data may be charged per megabyte or, where circuit switched as opposed to IP based, for the time connected. The attribution of cost to data services is also a difficult problem on which operators may have contrasting views.
- In each case, a certain type of roaming may be available in one direction but not the other; for example, subscribers from country A may be able to use data roaming when in country B, but country B users may not be able to use data roaming when in country A.

Finally, roaming is something that is typically undertaken on a bilateral basis between operators, as shown in Figure 3.1. This results in the mesh of connections between networks known as “spaghetti” roaming.

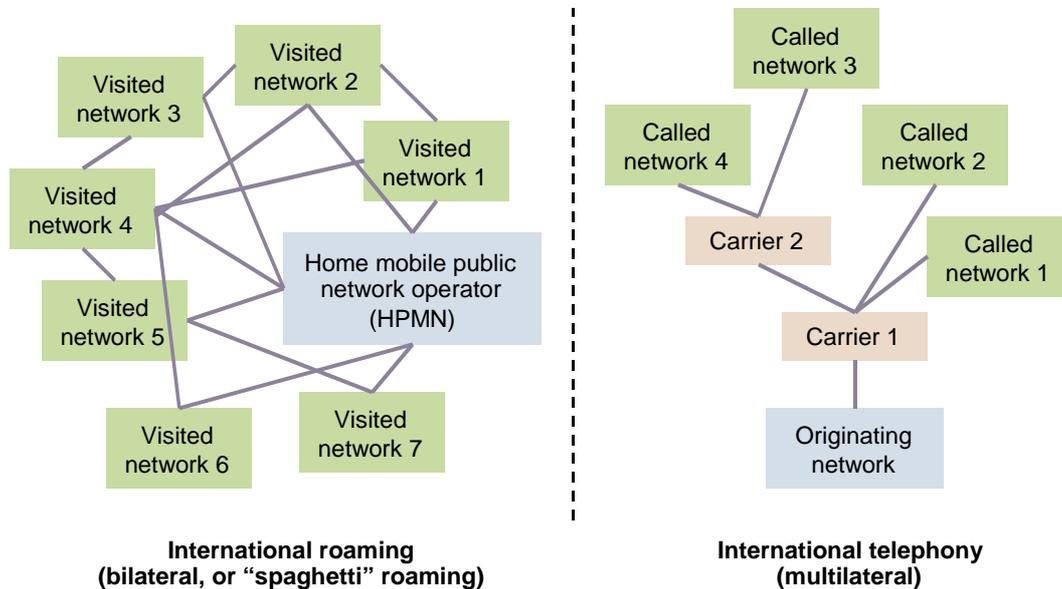


Figure 3.1: “Spaghetti” roaming relationships, based on bilateral agreements among all parties, contrasted with the multilateral relationships which allow calls to be carried between any two networks

In roaming, the home network (sometimes referred to as the home public mobile network or HPMN) and the visited network need to reach an agreement and undergo testing between their networks (discussed below). For most roaming agreements, implementation will be on a bilateral basis, requiring each network to test its functionality in both home and visited capacities.

Since an operator may have hundreds of roaming partners, this process has to be undertaken with each roaming partner individually and can consume significant resources. As a result, operators will prioritise establishing roaming agreements with partners that are likely to generate the revenue and coverage to make the cost of those resources worthwhile. They frequently decide against

establishing roaming with operators where they determine that subscribers are not likely to travel between those countries or that existing agreements suffice for commercial and geographical coverage purposes.

### 3.1.1 How to establish roaming between two networks

A typical mobile operator has relatively few staff dedicated to roaming; there may be only one to four people involved in the commercial side, and a similar number involved in testing and implementation. There will also be staff from other departments (particularly those involved with network, billing and fraud prevention) whose tasks include aspects of roaming.

The particular tasks required to establish and operate roaming between two networks can be subdivided into those that are typically performed in-house (agreement management, testing, and operations and maintenance) and those that are often outsourced (signalling, settlement, fraud prevention and data clearing).

Activities that are typically performed in-house are:

- **Agreement management.** For a visited network to allow a foreign subscriber to use service on its network, the subscriber's home network will need to have concluded a roaming agreement. There are standard contractual documents (AA12, AA13 and AA14) published by the GSM Association. They are universally used by operators for this purpose with minimal variation. Supplementary standard documents are also used for the addition of new services such as data. The initial agreement usually requires little negotiation. Typically, ongoing negotiations follow with key partners, focusing on the level of Inter-Operator Tariffs (IOTs) charged by each operator, and the volume discounts that are available if certain traffic levels are reached. Note that the IOT may be asymmetric – the operators don't necessarily charge each other the same prices.
- **Testing.** Tests are carried out on the network to ensure that the subscriber can access all the services provided by the roaming agreement at a satisfactory level of quality of service. The International Roaming Expert Group (IREG) and the Transferred Account Data Interchange Group (TADIG) of the GSM Association are the bodies primarily responsible for setting the roaming test cases that need to be carried out by operators, including network operator databases, signalling aspects, quality of service and routing. These tests are referred to as the IREG and TADIG tests. They can take many weeks to perform, and it is not uncommon for roaming agreements to fail because of incompatibilities found in testing. This problem is at its greatest when testing the CAMEL capability that underpins prepaid roaming.
- **Operations and maintenance.** These activities cover the operational aspects of roaming. For instance, defining the format in which subscriber's billing information is stored and how usage is captured, dealing with customer problems, optimising performance of the roaming process and performing administrative functions.

Further roaming support services are provided by third-party companies:

- **Data clearing.** Whenever a call (or other billing event) is made by a roaming subscriber, a TAP (Transferred Accounts Procedure) record is generated with the particulars of the call or event. TAP records are compiled into TAP files which are sent from the visited network to the home network. Data Clearing Houses (DCH) perform an intermediary function, verifying the integrity of the data, performing fraud and other checks, and allowing reconciliation, data mining and IOT optimisation. In practical terms, roaming operations without the use of a DCH are currently impossible. Mach and Syniverse are the largest players in this market with a combined market share estimated to be over 90%.
- **Signalling.** The exchange of signalling data is required for the provisioning of international roaming and related additional services between mobile network operators. This service is generally provided by carriers such as Belgacom and BT Global, who also carry signalling traffic for other international call services. However, data clearing houses are increasingly providing this service as part of their offering. It should be noted that signalling incurs costs even when a roaming subscriber makes no calls, since signals continue to be exchanged regarding the subscriber's location (and providers typically levy a charge per signal transferred).
- **Financial clearing.** Although it is possible for operators to prepare an invoice for each of their roaming partners, and to pay the invoices they receive from each of those partners, most operators outsource this aspect to Financial Clearing Houses (FCH). The financial clearing houses minimise the amount of billing administration required, and also allow each operator to make one monthly payment, representing the sum of all amounts due to and from all roaming partners. The financial clearing house also offers further currency and risk management services.

Together, the in-house costs and the outsourced costs add up to a roaming overhead cost, which is discussed further in Section 5.

## 3.2 The mechanics of international roaming

In the following two subsections we outline the process underlying terminated (received) and originated (subscriber initiated) roaming calls, and in particular identify where costs are incurred during the process.

### 3.2.1 What is the cost of subscriber received calls?

Incoming roaming traffic will incur an international conveyance fee (including any mobile termination charges from the visited network), which the home operator will pay to its chosen international carrier:

- the international carrier reimburses the visited network for call termination under standard interconnect arrangements
- the international conveyance fee (including mobile termination) varies depending on the origination, destination and routing of the call.

In Europe, for voice calls, the visited network does not actually levy any wholesale roaming charge with the TAP, although incoming roaming traffic in mobile-party-pays regimes (e.g. North America and certain Asian markets for voice and a wider range of countries for SMS) does result in a wholesale network access charge by the visited network.

The mechanics of a call received by a roaming user are shown in Figure 3.2.

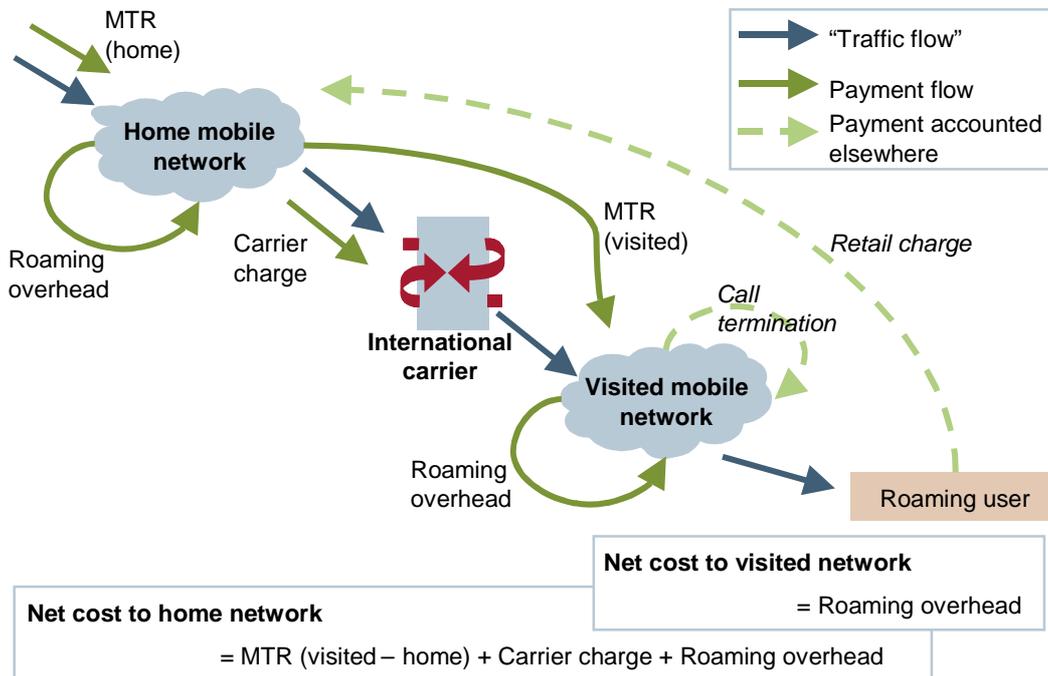


Figure 3.2: Schematic illustration of wholesale roaming fee charging for a terminated call (Note that some features are simplified) [Source: Analysys Mason, 2010]

The key payment flows that contribute to the cost of the call are as follows:

- **MTR (home).** In all SADC countries, the home operators receives a payment, the mobile termination rate (MTR), for calls made to its network<sup>3</sup>. This fee is typically set to be the cost of conveying the call across the network to the target subscriber, and is typically in the range of USD0.01 to USD0.20 per minute (often around USD0.10). In the roaming case, the home

<sup>3</sup> If the call is on-net, the operator does not receive an explicit mobile termination payment, but must instead recover a similar payment from the retail price charged to the customer who originated the call. Note also that some countries, for example the USA, operate a bill & keep regime in which there are no termination charges (so the cost of termination is typically recovered by charging the receiving subscriber).

operator will not be using its own network to terminate the call but will, if the call originates outside the home network, still receive an MTR payment in the normal course of interconnection.

- **Carrier charge<sup>4</sup>.** Having established that the subscriber is roaming in another country the home operator will pay an international carrier to convey the call to that country, in the same way that a normal international call is carried. This charge may vary significantly (perhaps USD0.05 to USD1.00) depending on availability of telecommunications routes between the two countries and taxes or tariffs charged for access to international gateways.
- **MTR (visited).** The visited mobile network will have to be paid a termination rate for delivering the call to the roaming user. In principle, this should be roughly similar to the MTR in the home country; for example in Europe, the European Commission closely monitors MTRs across all countries to ensure some level of consistency between them.
- **Roaming overhead.** Each operator will incur some internal charge for operation of its roaming service (as discussed in Section 5.1), which will contribute to the cost of the call.

Figure 3.2 further depicts a **call termination** charge (which in principle is compensated by the payment of a mobile termination rate to the visited network), and the **retail charge** paid by the subscriber to cover all the costs listed above. These do not contribute to the cost of the call.

As a result, the total cost per minute of receiving a call as a roaming user is the sum of

- the difference between the visited and home mobile termination rates
- the cost to carry the call from the home network to the visited network, and
- the overhead costs incurred by the home and visited networks.

### 3.2.2 What is the cost of subscriber initiated calls?

The mechanics of a call initiated by a roaming user are shown in Figure 3.3.

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<sup>4</sup>

In reality, the carrier charge will include MTR (visited). The originating network makes a single payment to a carrier, who then uses its network to carry the call and pays the terminating network to deliver it.

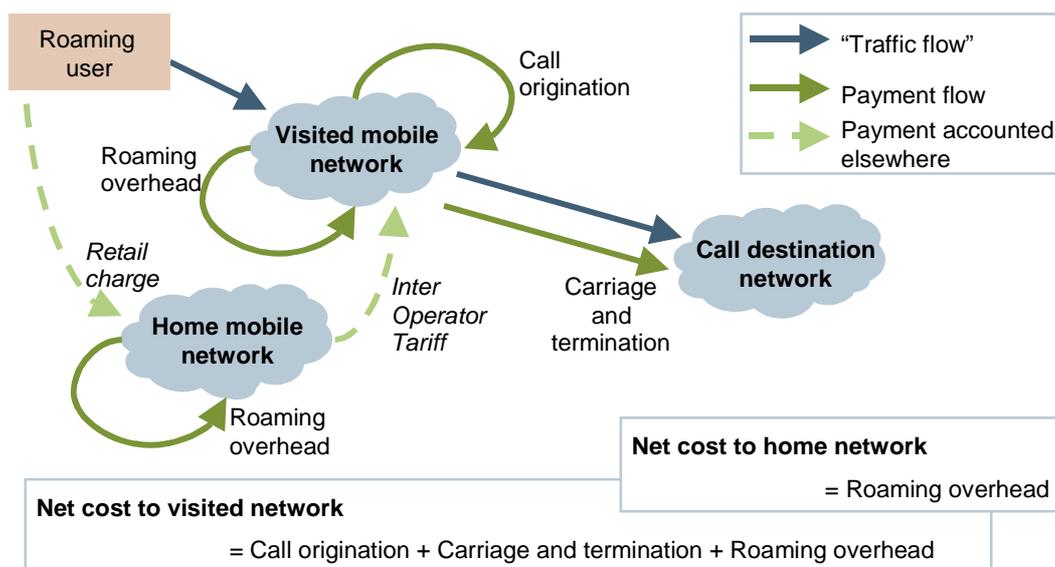


Figure 3.3: Schematic illustration of wholesale roaming fee charging for an originated call (Note that some features are simplified) [Source: Analysys Mason]

The key payment flows that contribute to the cost of the call are as follows:

- **Call origination.** The visited network will incur some cost for carrying the originating leg of the call (from the caller to the switch). This is not a cash cost; it represents a notional payment to the network for the service of carrying the call. In principle, this should be roughly similar to the cost of terminating a call since they consumer similar resources – the cost of this is therefore in the region of USD0.01 to USD0.20, as discussed in the previous section.
- **Carriage and termination.** As with any call on its network, the visited mobile operator must determine how the call is to be routed, and the charge will depend on the call destination. The call could terminate on the visited network (at a cost approximately given by the MTR), or it could terminate on a local fixed network (at the fixed termination rate, which is commonly around USD0.01 to USD0.05), or, most commonly, it could be an international call in which case the cost of carriage and termination could be up to USD1.
- **Roaming overhead.** As with received calls, both operators will allocate some portion of their overhead costs (both fixed and variable) to the call. It is widely perceived that the overhead costs incurred by the visited network are inflated in determining the IOT.

The visited network will charge an **Inter-Operator Tariff (IOT)** to cover the costs of roaming overheads, origination, carriage and termination. Apart from the roaming overhead, these costs are broadly similar to the cost of the equivalent call from one of the visited network's own subscribers.

The actual level of an IOT chargeable for an individual call may vary by factors including time of day, call destination, total bilateral volumes of roaming traffic. The home operator will have to take into account these variations when setting the **retail charge**. The retail charge must further

take into account currency fluctuations, as well as the fact that roamers may have a choice of networks in each country they visit (with different IOTs). Some operators simply add a set mark-up on the IOT to calculate their retail tariffs, while others will attempt to calculate an average IOT for a country or a set of countries in order to minimise their subscribers' confusion over prices.

### **3.3 Effects of the changing roaming landscape on the mobile operator**

#### **3.3.1 Clearing houses have become entrenched in the roaming value chain**

Historically, operators were responsible for the majority of the operations involved in the provisioning of roaming services. For this, operators needed to have either unilateral or bi-lateral agreements with many networks to provide roaming services in visited regions. However, the fact that operators deploy different technologies and follow different standards means that a single operator will need to manage multiple commercial relationships as well as manage different visited networks. Naturally, one-to-one relations cannot scale globally given that a single operator will need to partner with hundreds of other operators.

Third-party companies, known as clearing houses, can offer operators the possibility to outsource much of the management and settlement task and reduce the costs and headcount involved in their operations. Their involvement can also expand to cover the negotiation, preparation and documentation of a roaming agreement. They can also act as a single point of contact for managing multiple roaming partners. While the activities involved prior and during delivery of roaming services were historically carried out by operators, there is increasing involvement of third-party service providers that provide services ranging from those that are independent of usage such as billing, to the more core ones, such as signalling. This is illustrated in Figure 3.4.

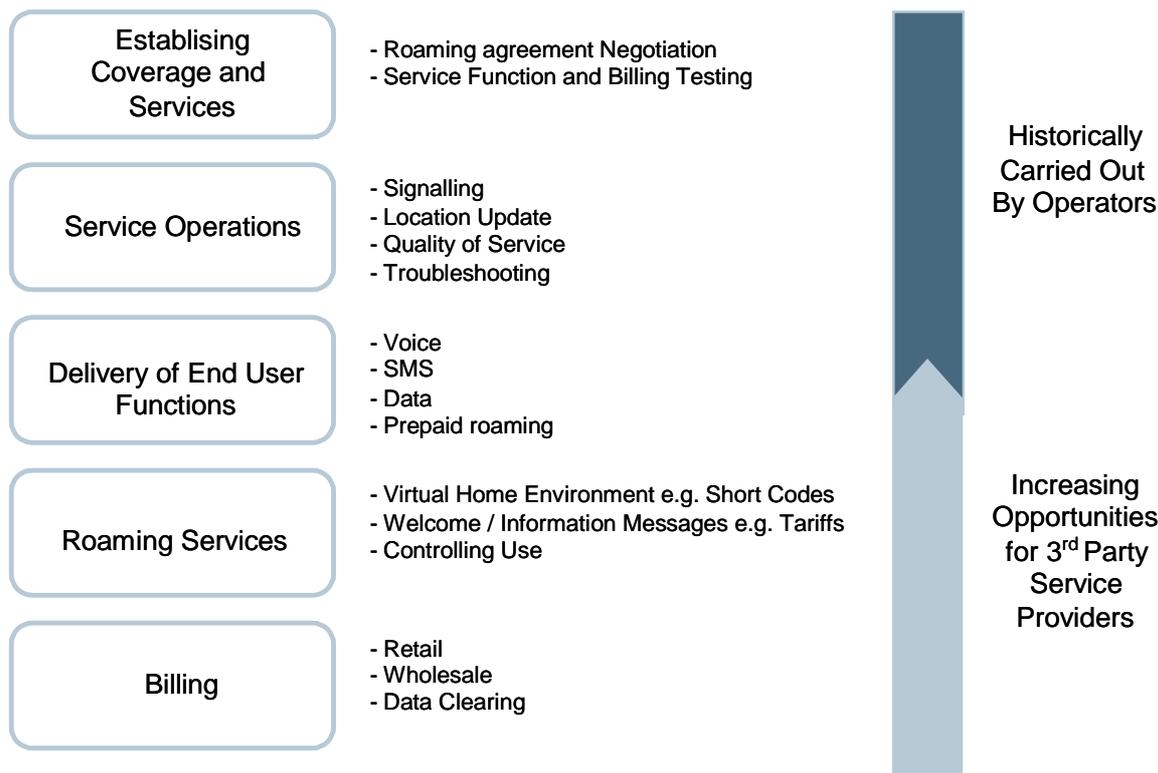


Figure 3.4: Roaming service operations [Source: Baobab Management Services, 2010]

### 3.3.2 Hubbing can be used to promote multilateral interconnection

Traditionally, operators wishing to extend the reach of roaming services needed to establish one-to-one roaming agreements, mostly bilateral, with every roaming partner. This has led to some operators having to implement and maintain more than five hundred separate bilateral agreements to guarantee sufficient coverage to their subscribers. To minimise the complexity of these connections, roaming hubs have emerged since 2008 as an enabling infrastructure to facilitate the establishment of roaming agreements with some or all operators through one or more hubs. Beyond the operational and cost-saving benefits of using a roaming hub, there is the possibility for operators to incrementally deploy new services as they become available (e.g. prepaid roaming, data roaming). Roaming hubs can also be used to support roaming-facilitating services such as CAMEL, as well as perform more effective end-to-end roaming quality analysis (historically it has been very difficult to ensure quality of service in roaming due to the multiple parties involved).

In theory roaming hubs should offer operators the ability to connect to different partners via a single agreement with the hub provider (see the left side of Figure 3.5). However, in practice at least for the moment, roaming hubs are not interlinked and operators must sometimes subscribe to multiple hubs if they are to connect to their desired number of roaming partners. Each hub operator tends to charge a fixed monthly fee in addition to or in lieu of traffic charges, so at the moment

there is some frustration from roaming managers that hubbing is adding to the cost base rather than simplifying the process of adding roaming partners.

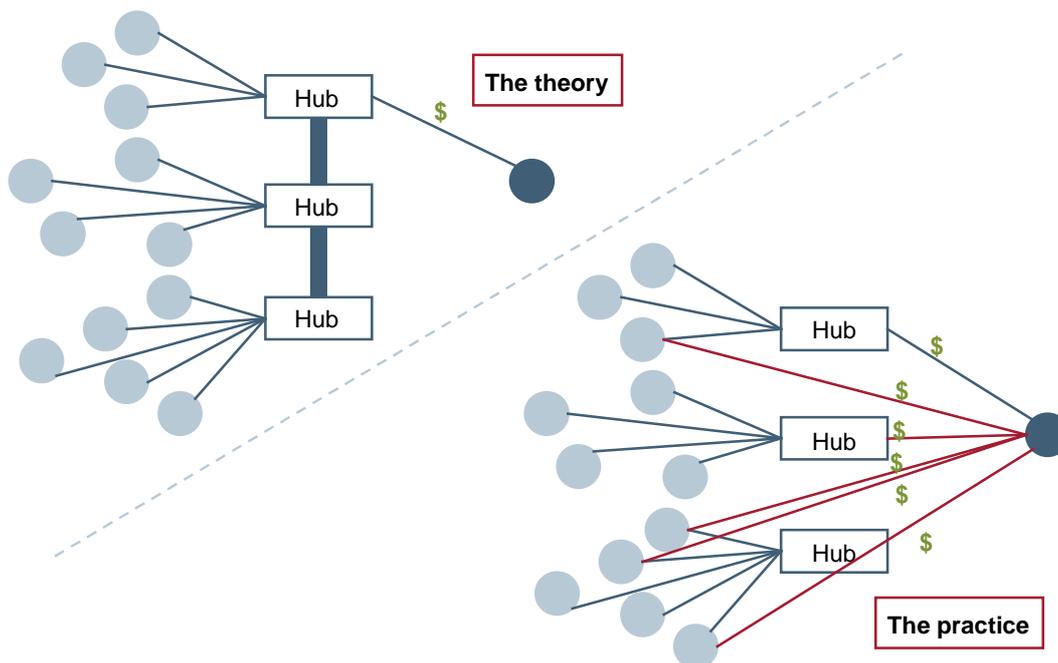


Figure 3.5: *The problem with current hub arrangements: lack of universal interconnection [Source: Analysys Mason, 2010]*

The hub market is relatively immature, and there are several hub operators (including Syniverse, Comfone, MACH, United Hubbing, Vodafone and Aicent) who are moving quickly to sign up large operators and operator groups before full interconnectivity is in place. It is likely that some bilateral roaming relationships will continue indefinitely, because they are of sufficient interest for each party to maintain. It is conceivable that roaming hubs may lead, eventually, to roaming becoming a “buyer’s market”, in which spot prices are offered for roaming in various countries at competing rates. In any case, it is likely that hubbing will lower the barriers for potential roaming partners to establish a relationship, by speeding up the process and minimising the obstacles to testing and implementing roaming.

### 3.3.3 Operators would like to direct traffic onto preferred networks

A home operator may have more than one roaming partner in a given country. When its subscriber arrives in that country, which network should the roamer use?

It is possible, if unlikely, that subscribers have their own view. They may choose to roam on a given network because they believe it has higher quality, or better coverage. Their home operator may have told them that one operator is cheaper than another, and that lower tariffs will be passed on to the subscriber. However, in many cases subscribers do not have the skills to make the change

on their phones or the information required to make a selection between the networks available, nor is there any history of changing user behaviour in this way.

For key countries, the operator has a preference between the potential visited networks (which does tie into a fundamental issue, which is that smaller operators may struggle to get their partners' attention). For example, as shown in Figure 3.6, one operator may offer lower IOTs than the others, which may lead to more profit on roaming for the home operator<sup>5</sup>. In this case, the home network can use "steering" techniques to direct the user onto the preferred network.

On the other hand, a visited network sometimes employs anti-steering to prevent this from happening (in order to maximise its revenue from inbound roaming). This is strongly opposed by the GSM Association, and indeed could be considered abusive (since it involves using manipulation to sell services to an unwilling buyer) and degrades user experience.

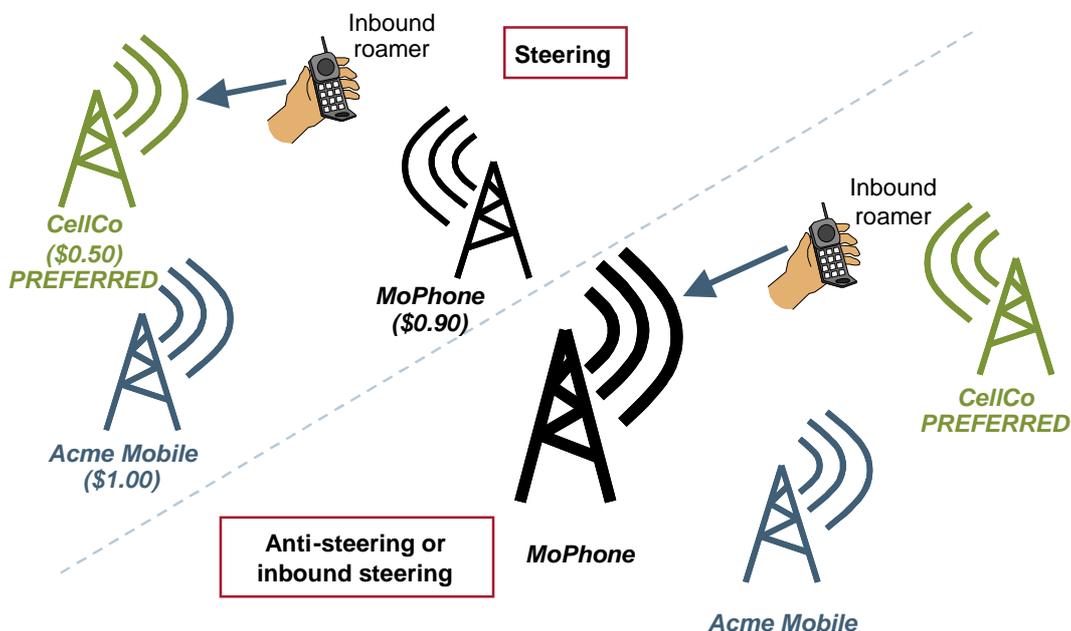


Figure 3.6: Traffic steering and anti-steering [Source: Analysys Mason, 2010]

Steering is not particularly easy to accomplish since, like roaming itself, it was not originally anticipated that this would be important when the GSM standard was being developed. Historically, home network operators have used a number of techniques to direct mobile traffic to their preferred partner visited network operator. Two approaches have been widely deployed by operators<sup>6</sup>:

<sup>5</sup> There are circumstances in which the home network may not want to steer onto the network with the lowest IOT. For example, if that network had very poor coverage then it is unlikely to generate much revenue because the subscriber will more often be out of coverage.

<sup>6</sup> These techniques can be used a standalone solution as well as be combined to maximise their traffic steering effectiveness.

- *SIM programming*: this involves setting a list of preferred networks that can be used by the subscriber when roaming abroad. However, considering that, in its most basic form, the number of combinations can grow to more than two thousand, and that there very limited space on the SIM card, it is not a very effective way to force the handset to connect to a particular network. This can, however, be significantly improved by creating SIM-based applications in the handset that can force the switch to the preferred network. It is also possible to deploy technology that sends by SMS a preferred partner list relevant to a given country on the roamer's first location update in that country.
- *Network-based steering*: this approach uses network probes to detect when a roaming subscriber enters the visited network and can decide which content to update into the SIM and which method it will use to steer the subscriber to the preferred network.

Steering is only partially effective: simple methods can direct upwards of 30% of traffic onto preferred networks, while comprehensive software solutions, usually in combination with SIM based solutions, can deliver over 75% direction (and up to 90% is advertised by vendors).

As an example, MTN Swaziland cited a 48% success rate for traffic steering. It is targeting 75%, but is currently experiencing problems, notably due to the shortcomings of MTN South Africa as a visited network. The majority of MTN Swaziland's roaming traffic (around 80%) is with South Africa. However, the operator reports that MTN South Africa's signal is weak until subscribers reach Pretoria, which mean that some roamers are lost to other networks. Secondly, the operator reports that although the network automatically defaults to MTN, subscribers have learned that if they manually select a network, on the fourth attempt they can opt out of the MTN network, with the resulting impact on revenues.

### 3.4 Service delivery challenges

From the preceding discussion, it can be concluded that successful roaming services depend on having robust underlying systems, including billing and operational support in the visited network, good international call facilities, signalling and data clearing – not to mention the management of tariffing and business planning for the roaming service.

Given the complexity of the systems involved, it is encouraging that 27% of operators who participated in our study indicated that there were 'no issues' relating to the provisioning of roaming services. Those operators who did refer to service delivery challenges responded as shown in Figure 3.7.

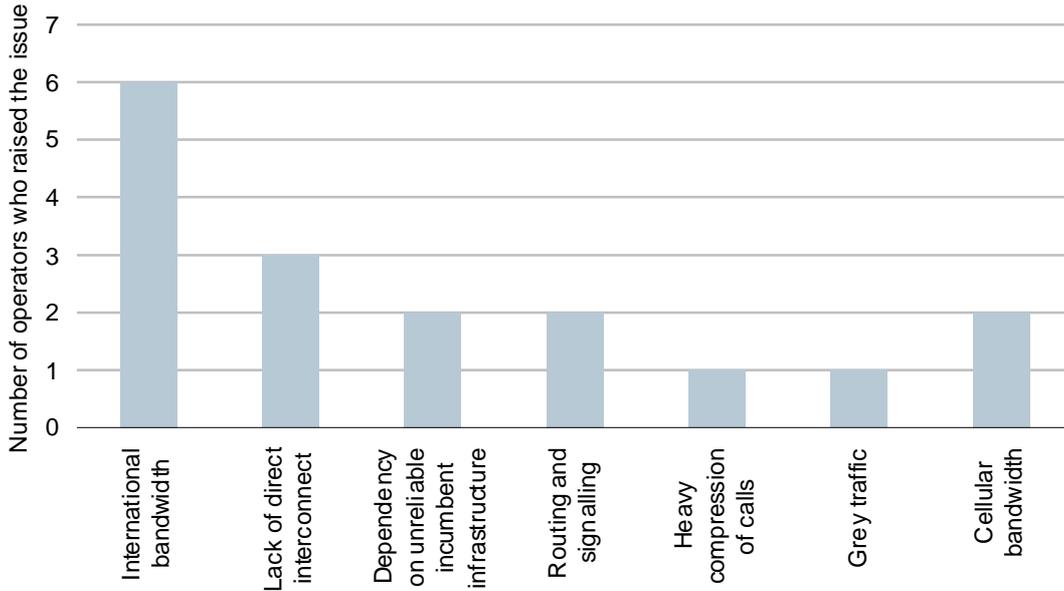


Figure 3.7: Frequency of issues raised by operators regarding the quality of service of roaming services [Source: Analysys Mason]

These issues broadly fall into the following categories: dependence on unreliable third-party infrastructure; degradation of traffic quality; routing and signalling problems; and cross-border signal spillage.

*Dependence on unreliable third-party infrastructure*

Deploying infrastructure – particularly long-distance transmission networks – is costly, risks duplicating existing investment, and may depend on holding a suitable telecoms licence. As a result, many operators continue to depend on infrastructure deployed by a third party (typically the incumbent fixed operator), despite the fact that this infrastructure may be unreliable and expensive to use.

For example, MTC (Namibia’s largest mobile operator) relies on Telecom Namibia’s national and international infrastructure. MTC has pointed out that its biggest concern has been the reliability of Telecom Namibia’s national and international infrastructure, including the international voice gateway (a monopoly until 2009). The fact that Telecom Namibia controls most of the terrestrial connectivity and the international voice gateway means that there is a great dependency on the incumbent’s infrastructure.

International connectivity itself is the cause of a number of concerns; for instance, international bandwidth, particularly between Angola and Namibia, is unreliable and inconsistent. Mauritius’ Cellplus reported that it has experienced quality issues with calls to SADC and other African

destinations. It has suggested that the lack of direct interconnections to the visited countries and poor-quality international bandwidth result in numerous failed call attempts by roaming users. This issue was also reported by NetOne Zimbabwe and MTN South Africa, who suggested that this was due to how well interconnected the countries are and the operator-to-operator connections in place in the SADC region.

### *Degradation of traffic quality*

International voice calls are commonly channelled through a third-party carrier, and heavy compression or conversion techniques (e.g. VoIP) may be used to bring down the cost; however, these savings are frequently made at the expense of call quality.

Grey traffic routing<sup>7</sup> is also a growing concern for operators like Vodacom South Africa, as it can cause revenue loss (if there is a premium for terminating internationally originated traffic over locally originated traffic), exerts pressure on wholesale pricing and reduces their competitiveness. Traffic monitoring and IP address tracking can be used to detect grey routing and curb the illegal call termination business; however, it should be noted that grey traffic is sometimes caused by above-cost prices for terminating incoming international traffic, which should be discouraged (see Section 5.1.5).

### *Routing and signalling problems*

Routing and signalling presents specific problems in Botswana. Mascom, the largest operator in Botswana (by subscriber number), reported that the use of direct voice routes and poor signalling on the partner's network cause degradation of call quality. This issue can be difficult to diagnose, because if the home and visited operators use different signalling providers, the fault may lie anywhere in a long chain of telecoms links.

In extreme cases, poor signalling quality can prevent a customer from roaming, despite being connected to a roaming partner network. beMobile in Botswana has complained that this can lead to major problems: "Once you have announced roaming to the customer and they experience a problem, it creates real challenges – you need to explain to customers what has gone wrong, why the call has failed. This can have a very big impact – one large corporate customer threatened to cancel the contract because of quality issues, which were a direct result of poor signalling links."

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<sup>7</sup> Grey traffic is traffic which bypasses the international gateway (perhaps using a VoIP connection), and is then re-originated in the destination country before being terminated on a local network. VoIP with re-origination is often cheaper than using an international gateway, but loses some functionality (e.g. caller line identity) and quality.

### *Cross-border signal spillage*

Spillage of radio transmissions from one country into another has been raised as an issue by a number of operators in SADC member states, including Lesotho, Swaziland and Botswana. In Swaziland, signal spillage from South Africa can take place as much as 5 to 10km into the country; in Lesotho, it can penetrate as far as 40km into the country. The situation is particularly significant in Lesotho, where most of the urban areas and economic centres are situated close to the border with South Africa.

Spillage can have two types of impact on roaming markets:

- **Loss of visitor roaming revenue (impact on operators).** South African subscribers who travel to towns in Lesotho close to the country's border are often able to pick up a South African signal. Such users are likely to use their home network rather than roaming – resulting in revenue loss for operators in Lesotho.
- **Inadvertent roaming (impact on consumers).** MTN Swaziland reported that its subscribers occasionally find themselves accidentally connecting to South African networks from within their own country due to signal spillage. This can result in bill shock for subscribers who are unaware that they are using roaming.

Spillage is an important issue for the management of radio spectrum, and should be addressed on a bilateral basis (for example, we understand that discussions are currently underway between South Africa and Lesotho on this issue) and multilaterally if necessary. It does not, however, have a significant impact on either the structure, quality or cost of roaming, although policymakers should take care to ensure that it does not have a negative impact on consumers. It can be tackled through the deployment of effective traffic steering technology.

#### **3.4.1 Remedies for service delivery problems**

The issues described above are issues that stakeholders tend to focus on in the course of their normal functions. *Unreliable infrastructure* is the target of government investment and policy initiatives; *degradation of traffic* is addressed in quality-of-service regulations in most member states; *routing and signalling* should indeed be a concern to operators, who need to ensure that third-party suppliers deliver minimum quality or else seek new suppliers; and *spillage* is an issue that needs to be addressed by CRASA and in other regional fora.

Although service delivery issues are clearly vital to a healthy roaming market, these issues are also applicable to the delivery of non-roaming services and are a continuing focus of attention across Africa. For this reason, they do not need to be specifically addressed in the Home & Away Roaming initiative.

## 4 Structure of roaming in SADC

Current regulatory efforts are focusing on what is perceived as the high price of roaming in SADC, but there are basic structural issues which have to be addressed. In this chapter we consider the current structure of roaming in SADC and whether the market is ready for roaming regulation.

- Section 4.1 discusses the economic and commercial context: how much is roaming worth and which countries benefit the most from regional roaming.
- Section 4.2 considers the availability of roaming in the SADC region; whether there is sufficient infrastructure in place to support postpaid and prepaid roaming within the region and what needs to be done.
- In Section 4.3 we outline the current alternatives to roaming for calling home while roaming; consider what the main barriers are for prepaid subscribers to become roamers and discuss the introduction of SIM registration in SADC and consider what its impact will be on the take-up of roaming.

### *Key findings*

Roaming represents sizable revenue streams for a number of SADC operators. The islands of Mauritius and the Seychelles have a significant tourist trade from Europe and Asia, and their mobile operators rely heavily on roaming as a source of forex. ICTA, the Mauritian regulator, estimates that roaming constitutes half of the total mobile industry revenues. Any regulatory action to lower IOTs charged by mobile operators may reduce the inflows of foreign currency, which could have a proportionally large impact on those countries that have a significant tourist trade. As such, further research will be required to fully understand this phenomenon.

While postpaid roaming is relatively well established in SADC, prepaid roaming in the region continues to be hampered by technical and market challenges, including difficulty in establishing roaming partners, high levels of testing complexity and high upfront costs. Less than three quarters (73%) of operators interviewed as part of the study offered any voice roaming to prepaid subscribers and only a couple of those offered prepaid roaming in more than a couple of countries. We expect to see a fairly significant shift in the prepaid roaming landscape over the next 12 to 24 months, as roaming agreements are established and the usage of specialist roaming hubs develops, but that is still some way off and there is something to be said for facilitation, rather than regulation at this crucial juncture.

To date, a significant number of prepaid (and indeed postpaid) subscribers rely on alternative approaches to calling home while travelling within the region, notably roaming. The introduction of SIM registration (“RICA”) in the region, however, will make it more difficult for non-residents

to acquire or keep a stock of local SIM cards and may result in increased demand for roaming by both prepaid and postpaid subscribers, although the full impact of RICA has yet to be felt.

## 4.1 Economic and commercial context

### 4.1.1 Overview of roaming revenue and traffic in SADC

Based on a high-level evaluation of the roaming market in SADC, Analysys Mason estimates that there were 3.1 million regional roamers (inbound and outbound) in 2009 out of a total subscriber base of 108.1 million. That is to say, it is estimated that only 2.9% of mobile subscribers in the region currently roam. This suggests that roaming prices are currently prohibitively high; the average penetration rates for domestic mobile services in SADC was 51% in 2009 and there were 12.3 million travellers within the region. This figure does not take into account the significant number of plastic roamers within the region.

Analysys Mason estimates that the regional voice roaming market within SADC was worth USD70 million in 2009. This figure, however, excludes roaming revenue from outside the SADC region, which could well represent several multiples of the SADC-only figure, roaming from SMS and data, and also ignores revenue from plastic roamers and other roaming substitutes.

It should, however, be noted that within the time constraints of this project and in view of the partial nature of responses, it has not been possible to build up a detailed understanding of the status of roaming in the region.

Looking forward, unless full and clear information about the status of roaming is provided for each market within SADC, its usefulness will be significantly eroded and it will be very difficult to accurately assess the potential impact of proposed regulation. Therefore, it appears sensible that the provision of basic revenue and traffic information should be mandatory for all operators.

#### **Issue 4.1**

Complete and clear information about the status of roaming for each country in the region will be required, if national regulators or consultants are to accurately assess the potential impact of policy at a regional level.

Sufficient time will be needed to collect such information. Operators may not currently have such information at their disposal. Systems may need to be put in place to capture the information and staff may need to be trained to extract and interpret the data.

**4.1.2 South Africa sees the greatest number of international tourist arrivals from Africa**

For countries that are popular tourist or business destinations, high-margin wholesale roaming revenue may constitute a higher percentage of overall revenues than in countries that receive relatively fewer international visitors, due to the likely traffic imbalance.

There were a total of 16.455 million tourist arrivals to SADC countries from Africa in 2009 according to data from Euromonitor, of which Analysys Mason estimates that 75% (12.341 million) were from within SADC. South Africa was by far the most popular destination in the SADC region in 2009, with 46% of all tourist arrivals from Africa. Zimbabwe and Botswana also benefited from healthy visitor numbers, with 13.1% and 12.3% respectively of all tourist arrivals. Angola, Madagascar, the Democratic Republic of Congo and the Seychelles accounted for less than 1% of all tourist arrivals from Africa in the region in 2009, although all fared slightly better when looking at the total global tourist arrivals to the country.

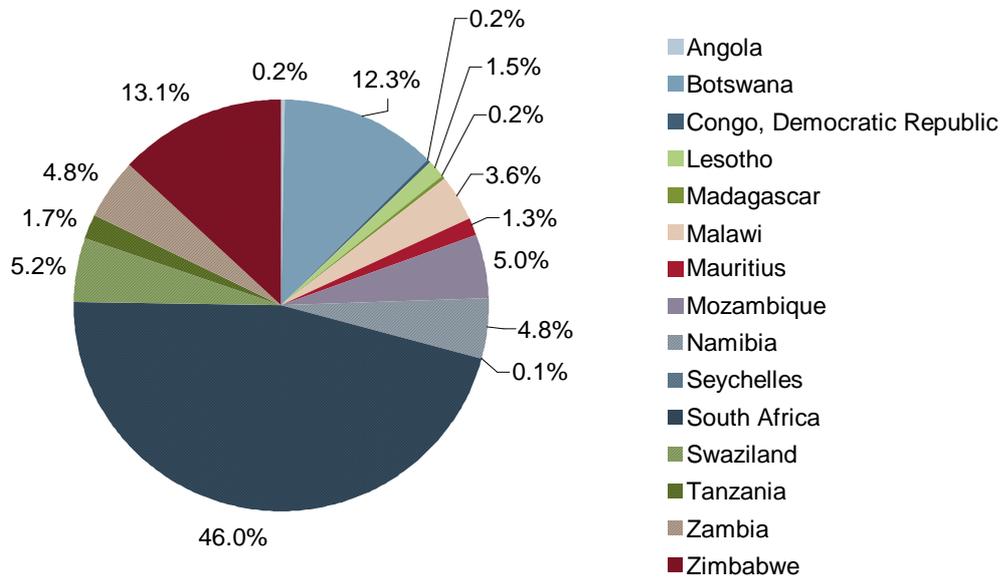


Figure 4.1: Percentage of tourist arrivals from Africa to the SADC countries, 2009 [Source: Euromonitor International, Analysys Mason]

The flow of tourists and business travellers within the region and their requirement for seamless communication is one of the primary motivations for operators establishing roaming agreements with partners in the frequently roamed from/to country. As Figure 4.2 shows, South Africa, Zimbabwe and Botswana, which see the highest numbers of international arrivals, are also the most commonly roamed to countries in the region. Namibia and Tanzania also benefit from significant numbers of inbound roamers.

Country of origin	Operator	Destination roaming country														
		Angola	Botswana	DRC	Lesotho	Malawi	Madagascar	Mauritius	Mozambique	Namibia	Seychelles	South Africa	Swaziland	Tanzania	Zambia	Zimbabwe
Botswana	Mascom									T/F		T/F			T/F	T/F
Botswana	BTC									F		F			F	T
Botswana	Econet											T/F	T/F		T	F
Lesotho	Vodacom											T/F	T/F			T
Malawi	TNM	F	T/F	T/F	F		F	F	T	T/F	F	T/F			T	T
Malawi	Zain		F						F		T			T	T	F
Mauritius	Cellplus		T/F						T/F	T/F	T/F			T/F		
Namibia	MTC	T/F	T/F								T/F					
South Africa	MTC	T			T					T						T
South Africa	Vodacom			T/F					T/F	T/F						
Tanzania	Zantel				F				F				T			F
Zambia	MTN		T/F										T/F		T/F	
Zambia	Zain		T	T		T/F			F			T/F	T/F	T		T
Zimbabwe	NetOne		T/F						T/F	T/F		T/F			T/F	

Figure 4.2: Mostly commonly roamed from / roamed to country, select operators [Source: Analysys Mason]

As part of the primary interviews, respondents were asked to provide their views on the factors driving inbound and outbound roaming in their country. A selection of the responses are provided below.

- Botswana:** “Trade between neighbouring countries drives the need for away roaming between the countries. The roaming of business people as indicated by contract roaming is higher than prepaid roaming. There is also a lot of social movement between the countries where people travel on reasons other than business. We have observed that over weekends that prepaid roaming is stronger than contract roaming.”
- Malawi:** “Mostly, roaming is influenced by the presence of NGOs, activities that are happening in the country like football matches, meetings etc., government meetings”
- Namibia:** “Regional roaming is driven the growth and investment in Namibia by foreign countries. Sectors such as mining and tourism drive inbound roamers to Namibia. Most outbound roamers are to and from South Africa. This is historical and is as a result of the previous economic ties between the two countries.”
- Swaziland:** “Swaziland is a completely landlocked country, mainly by South Africa and also by Mozambique. Therefore there is a lot of movement by locals through SA to other countries. Inbound traffic is mainly driven by tourism and the business sectors.”
- Zimbabwe:** “The country is host to one of the seven wonders of the world. There are rich mineral deposits in the region – for example, Zimbabwe hosts the most palatable part of the great dyke. The country has good links DRC, Angola, Zambia Malawi and Tanzania to South Africa, the region’s economic giant. It is also a rich colonial source market which has a thorough travelling culture”

### 4.1.3 Roaming is a major source of forex for several operators

The islands of Mauritius and Seychelles are popular holiday resorts and are heavily dependent on tourism, particularly among visitors from outside of Africa. Mauritius received 977 000 visitors in 2009, of which 77% were from non-African countries, compared to a population of 1.27 million. The Seychelles received 149 000 visitors in the same year, of which 89% were from non-African countries, compared to a population of 86 000.

Tourists make substantial contributions to the revenues of the mobile network operators, both by conventional international mobile roaming and also by plastic roaming. The revenues boost the operators and help to sustain commercial operations. ICTA, the Mauritian regulator, estimates that roaming constitutes half of the total mobile industry revenues.

#### **Issue 4.2**

Any regulatory action to lower IOTs charged by mobile operators may reduce the inflows of foreign currency, which could have a proportionally large impact on those countries that have a significant tourist trade. As such, further research will be required to determine the impact of lower IOTs, which may vary substantially by country.

## 4.2 Availability of roaming in SADC

### 4.2.1 Voice roaming is widely available; prepaid SMS and data roaming is not

As part of the primary interviews, respondents were asked what type of roaming services they currently offer their customers. Figure 4.3 shows the percentage of operators in SADC offering roaming services, by service and subscriber type:

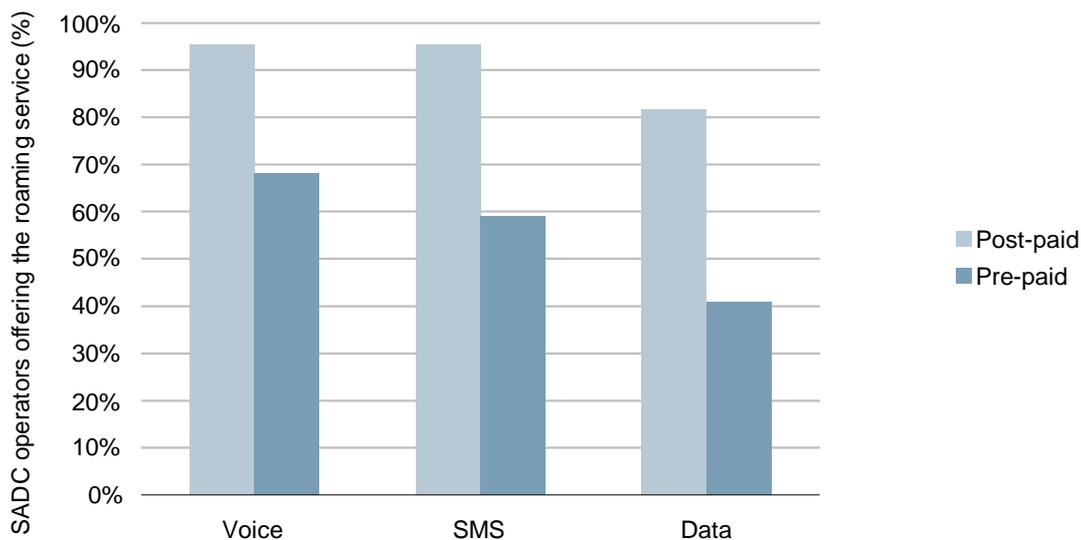


Figure 4.3: Percentage of operators offering roaming service, by service and subscriber type [Source: Analysys Mason]

As we discussed in the previous chapter, the simplest type of roaming is **postpaid telephony** – 86% of operators interviewed offering voice roaming to postpaid subscribers. **Prepaid telephony** typically requires a technology upgrade (typically “CAMEL”), which can represent a significant upfront cost – only 68% of operators interviewed offer voice roaming to prepaid subscribers

**SMS roaming** is relatively simple to implement on top of voice roaming, but only 59% of operators interviewed offered SMS to prepaid roamers; in comparison, 95% offered SMS to postpaid subscribers.

**Data roaming** is still at a fairly nascent stage within the region, with a number of operators in the region not yet having deployed GPRS or EDGE technologies. Data roaming also presents implementation challenges, notably in the area of billing. Whereas for voice it is standard to be charged per minute of usage, data may be charged per megabyte or, in the case of circuit-switched data, for time connected. Only 41% of the operators interviewed offered data roaming to prepaid subscribers, while 82% offered data roaming for postpaid subscribers.

Only 36% of operators interviewed as part of the study offer voice, SMS and data roaming services to both prepaid and postpaid subscribers.<sup>8</sup> Figure 4.4 provides an overview of the spectrum of roaming services on offer by individual operators:

<sup>8</sup>

It has been suggested that the major beneficiaries from lower prices would be business customers and more affluent leisure customers who roam frequently, at the expense of consumers who roam less often. However, it may be the case that large corporates are privileged to have personnel who deal with matters including telephone expenses and, by virtue of their size and custom, are able to negotiate preferential rates with operators, which may be lower than those paid by residential subscribers and SMEs who do not have the same leverage in negotiating contracts with their provider.

Country	Operator	Prepaid			Postpaid		
		Voice	SMS	Data	Voice	SMS	Data
Angola	Unitel Angola						
Angola	Movicel						
Botswana	Mascom						
Botswana	BTC						
Lesotho	Econet						
Lesotho	Vodacom						
Malawi	TNM Ltd						
Malawi	Zain						
Mauritius	Cellplus Mobile Communications Ltd						
Mauritius	Eritel Ltd						
Mozambique	Mcell						
Mozambique	Vodacom Mozambique						
Namibia	MTC						
South Africa	Cell C						
South Africa	MTN						
South Africa	Vodacom						
Swaziland	MTN						
Tanzania	Zantel						
Zambia	MTN						
Zambia	Zain						
Zimbabwe	Econet						
Zimbabwe	NetOne						

Figure 4.4: Overview of type of roaming offered by selected operators in SADC [Source: Analysys Mason]

While Figure 4.4 shows what services are being offered by selected operators in SADC, it does not show *where* they are being offered. The most common countries for operators to have CAMEL roaming agreements with were South Africa and Tanzania. It is noteworthy that only three operators who took part in the study (Vodacom South Africa, MTN South Africa and MTN Swaziland) said they offered prepaid roaming in more than two other countries in the SADC region, although it should also be noted that some operators only provided partial information on this point.

**Issue 4.3**

While postpaid roaming is well established in the region, prepaid roaming is still in a development phase: some operators do not currently offer prepaid roaming services; others offer prepaid roaming, but only offer voice services. Only the larger operators (Vodacom and MTN) have prepaid roaming in place with the majority of countries.

#### 4.2.2 Operators within SADC are assessing the viability of implementing prepaid roaming agreements within the region

Roaming agreements are commercially negotiated and established on the basis of a number of factors, which may include commercial, political and historical reasons.

They are often a reflection of tourist flows between particular countries. The flow of tourists and business travellers within the region and their requirement for seamless communication is one of the primary motivations for operators when establishing roaming agreements with partners in the frequently roamed from/to country.

All operators we spoke to during the study have postpaid agreements with the majority of SADC countries. Where roaming agreements were absent, agreements were, in all but a couple of cases, in progress. The notable exception was the Seychelles, where BTC (Botswana), MTC (Namibia) and MTN (Zimbabwe) had not yet proposed roaming agreements because of the low level of demand.

In contrast, relatively few operators in the region currently offer prepaid roaming services with anything but a handful of other SADC countries. A number of operators within SADC are, however, assessing the viability of implementing prepaid roaming agreements within the region, with a number of operators currently conducting tests with other operators within SADC. Prepaid roaming continues to face a number of challenges, which are discussed in the next section.

#### 4.2.3 Prepaid roaming continues to be hindered by technical and market challenges

With early implementations of roaming, the decision on whether a given subscriber could roam was based on creditworthiness rather than real-time credit monitoring – and roaming, therefore, was only available to postpaid subscribers.

Prepaid roaming can offer increased roaming revenues and churn reduction. It could be the most significant roaming segment in the market, but is limited due to its dependency on CAMEL Phase 2, which is not widely implemented in the region due to its technical complexity and, frequently, a lack of investment in the technology. There continue to be significant obstacles and delays in exploiting the prepaid roaming opportunity in the region:

- **Difficulty in establishing roaming partners.** Establishing bilateral roaming partnerships can be a long and drawn-out process. There can be varying degrees of interest from roaming partners in adopting CAMEL as its implementation and operation are typically more complex than for postpaid roaming.
- **High levels of testing complexity.** Inter-operator network tests for multiple roaming partners take time, effort and money. There is no real standard since these tests are specific to individual home operators. This is due to the visited operator having to assure the roaming function of home operator service elements that are often non-standard in nature.

- **High upfront costs.** The capex required to upgrade a “typical” network can be a high seven-figure sum in US dollars.

As operators establish more roaming agreements, they move up the experience curve, but continue to encounter new problems as they seek to form new partnerships.

Most operators have significantly more roaming arrangements in place for postpaid customers than they do for prepaid customers. For a number of operators across the region, postpaid roaming arrangements are already established and prepaid roaming arrangements are under negotiation or are being tested.

### 4.3 Alternatives to roaming and the impact of SIM registration

Interviews with operators and regulators in the region suggest that a **significant proportion** of prepaid and also postpaid subscribers **do not use roaming at all**, but instead use **alternative approaches** to call home while travelling within SADC. Assuming that roaming is available, there may be a number of reasons for subscribers to adopt alternative approaches:

- **Cost sensitivity** is a primary reason for adopting plastic roaming, since it allows consumers to save money by making calls at the local rate, rather than the roaming tariffs, which are simply not feasible for customers with low levels of disposable income.
- **Cost control** is another consideration. While a number of operators do not publish the roaming prices, domestic tariffs are readily available, allowing subscribers to manage their expenditure
- Subscribers may also benefit from **improved call quality** by using a local network, rather than calling internationally.

There are a number of applications, which may be adopted as alternative approaches to calling home, described in Figure 4.5.

<i>Name of application</i>	<i>Description</i>
“Plastic roaming” (local SIM card)”	Local SIM or ‘plastic roaming’ requires a subscriber to insert a new SIM card (the ‘plastic’) into their mobile phone to suit the mobile network that they will be accessing in their destination country
Prepaid local number (PLN)	PLN enables a traveller to use their mobile when they travel, by obtaining a local subscription, to complement their home operator subscription, without the need to change the original SIM card housed in the handset
International Direct Dial (IDD) Calls	Many telecoms providers offer reduced-rate IDD calls. The IDD prefix is the international prefix required to dial a call from the country listed to another country. This is followed by the country code for the country being called – for example: IDD prefix + Country Code + Local area code + Number
VoIP	A roaming subscriber uses a data connection (typically through fixed or mobile broadband) in the visited country to connect to their home network. Calls are routed directly to and from the home network via this data connection with no involvement from any visited network
Wi-Fi	A roaming subscriber uses their Wi-Fi enable cellular handset to connect to the internet over a Wi-Fi, rather than a cellular network, thereby reducing their data costs

Figure 4.5: *Alternative approaches to calling home [Source: Analysys Mason]*

These applications and their degree of adoption among SADC consumers are discussed below.

*“Plastic roaming” (local SIM card)*

Plastic roaming, whereby subscribers change their SIM card on arrival in a foreign country to one from a local operator, is common throughout the SADC region, particularly in South Africa. Some subscribers may even carry a stock of such cards.

Most operators interviewed commented that their subscribers purchased a local SIM when travelling to South Africa.

Selected operator comments:

- “Roaming in almost all SADC countries is expensive; therefore travellers resort to plastic roaming due to the fact that most of the SADC countries are able to regulate its international tariffs”
- “In South Africa our anecdotal evidence is that subscribers buy a local SIM card (plastic roaming). This occurs as MTN and Vodacom are well recognised brands given the strong branding and exposure of Namibians to these brands. In other SADC countries, we do not think that this happens as much as in SA”

*Prepaid local number (PLN)*

Prepaid Local Number enables travellers to use their mobiles when they travel, by obtaining a local subscription to complement their home operator subscription, without the need to change the original SIM card housed in the handset. PLN is common in SADC.

While this solution reduces the cost to the subscriber of almost all originated calls, it still introduces a new number (as if the subscriber had purchased a local SIM card). Received calls on the subscriber's home number are still charged at roaming rates. PLN does not currently require SIM registration in the same way that local SIMs do – as such, it may become more widespread with the introduction of RICA, due to the added convenience it affords subscribers.

*IDD calls*

Many telecoms providers offer reduced-rate IDD calls.

Vodacom South Africa noted that, looking at IDD trends, most calls being made to SADC countries are from the prepaid customer base, which implies that there is still significant opportunity for expansion/growth in the prepaid roaming segment, particularly considering the volumes of migrant workers/immigrants from the SADC countries who are based in South Africa.

*VoIP*

VoIP has the potential for widespread adoption in the SADC region and has gained ground in recent years following steady improvements in Internet bandwidth and deregulation.

VoIP offers the convenience to users of being contactable anywhere there is a data connection, on a single number (without the inconvenience of dual SIMs), at competitive rates. There are two principal obstacles to VoIP:

- Almost no mobile networks have implemented VoIP routing of their calls (although the technology is available). There are VoIP providers, such as Skype and Vonage, that will route incoming calls via the Internet, but this is not seamlessly integrated with any mobile service
- A data connection is required in the visited country, and this may be of poor quality<sup>9</sup>, or may be expensive, or only available in fixed locations.

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<sup>9</sup>

Latency (delay) of the data connection can have a big impact on call quality. Current 3G networks introduce high latency on data connections, so mobile broadband is not an optimal way to use VoIP.

*Wi-Fi*

Deployment of mobile broadband is still at a relatively nascent stage in most countries in the SADC region, but is becoming an increasing consideration. To reduce roaming data traffic costs, subscribers equipped with Wi-Fi enabled Smartphones can turn off access to the cellular network and connect using Wi-Fi. Current mobile vendors, such as Syniverse, already offer an integrated mobile data roaming solution that support Wi-Fi-based data roaming, enabling home operators to provide access to Wi-Fi hot spots in visited networks. During the interview, MTN Group (South Africa) indicated that it is looking at Wi-Fi for data transfer as a result of the high costs involved at present. One approach that could be adopted by the company is to set up partnership agreements with local providers of Wi-Fi access points in the neighbouring countries. In this way, travelling subscribers could use their smartphones and laptops to access data services at faster rates from designated hot spots. Subscribers could then be billed based on roaming agreement rates and contract terms, at a lower cost than if they were using cellular roaming data services.

Figure 4.6 shows Wi-Fi charges to selected countries in Africa and Europe using popular VoIP provider Skype’s CallOut service:

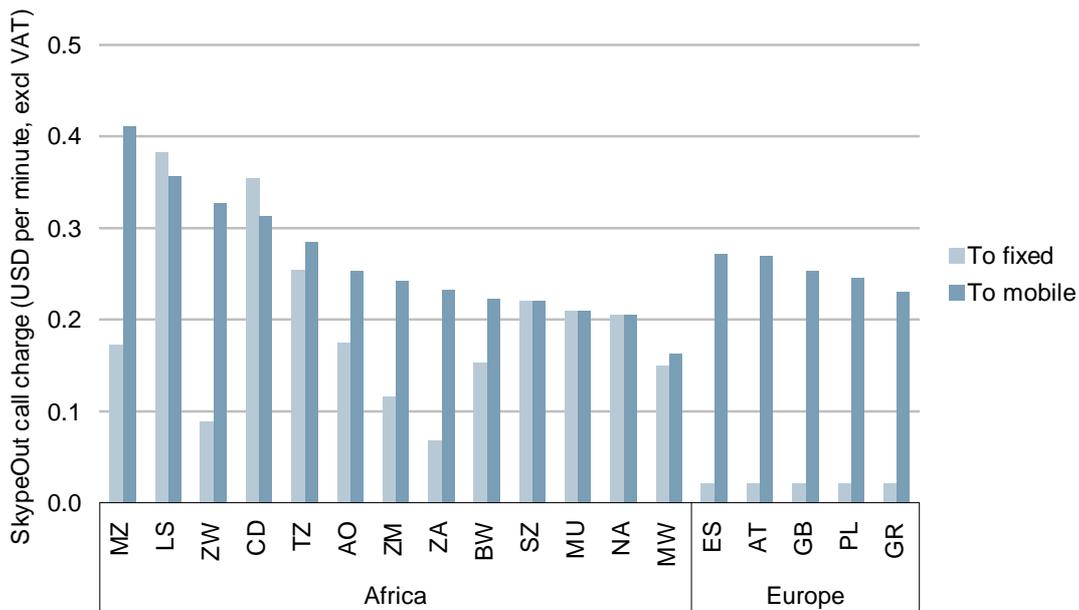


Figure 4.6: SkypeOut call charges to selected countries in Africa and Europe [Source: Analysys Mason]

Currently barriers to adoption may include the fact that Wi-Fi roaming requires more technical sophistication from the subscriber, who must explicitly choose a network, and also lacks the ubiquity of the wide area network provided by 3G technology.

### 4.3.1 Impact of SIM registration (“RICA”)

As discussed in the previous section, plastic roaming in particular is a common substitute for roaming. The introduction of SIM registration across the region, may make it difficult for non-residents to acquire or maintain local SIM cards. SIM registration (“RICA”) has been introduced in a number of markets in the region in a bid to curb crime perpetrated via mobile phones, such as fraud. Under the legislation, mobile subscribers have to submit identification details and addresses to the mobile operator or have their services disconnected.

Discussions with operators as part of the study revealed that Zimbabweans favour plastic roaming when travelling in South Africa, although new legislation regarding SIM registration will create barriers to adoption. NetOne commented: “The easy access to SIM cards in South Africa made “plastic roaming” a viable option for travellers. Consequently NetOne subscribers opted for holding a South African networks SIM card for use when in South Africa. This is however changing with the new RICA requirements in RSA where non residents are finding it difficult to get SIM cards.”

Increased difficulties in acquiring a SIM for non-residents may have a positive impact on the demand for roaming in the region. Visitors who travel relatively infrequently to the country may prefer to pay to roam, rather than incur the time needed to register locally, particularly if they are not familiar with the location of the mobile operator, or if there is no local operator. However, it is still too soon to draw firm conclusions and the outlook is mixed.

#### **Issue 4.4**

Purchasing a local SIM card is a common substitute for roaming. The introduction of SIM registration across the region may in future make it difficult for non-residents to acquire or maintain local SIM cards. While it is too soon to draw firm conclusions, SIM registration may lead to increased demand for roaming in the region.

One regulator argued that the potential inability of a foreign person (visitor or illegal migrant) to buy a local SIM would not lead to an increased incidence of foreigners using their foreign SIMS to call home because the costs of roaming remain prohibitive.

MTN Swaziland commented that it had actually seen an increase in the purchase of local SIM cards in the country as a result of the introduction of RICA in RSA; that is, inbound subscribers who had lost roaming functionality as a result of the staged ‘register or be disconnected’ process had been purchasing local SIMs to compensate. It was also noted, however, that there is a lot of churn among these subscribers, since many only visit for a few days.

SADC countries are at different stages in the SIM registration process and, as such, the full impact of the measures has yet to be felt. Selected examples follow:

- In **South Africa**, RICA was mandated in June 2009, with operators given 18 months to register (or disconnect) subscribers or face a fine for non-compliance.

- In **Tanzania**, operators have begun registering prepaid customers, with the deadline set for 30 June 2010.
- In **Namibia**, prepaid registration is not yet required. The requirement has reportedly been catered for in the new Communications Act, however no regulations have been passed to enact it.
- In **Zambia**, SIM registration is yet to be effected; however, plans are in the pipeline to start the process.
- RICA has yet to be introduced in certain countries, including **Lesotho** and **Mozambique**.

## 5 Cost of roaming in SADC

A key question when examining the roaming tariffs faced by consumers is whether the tariffs bear some connection to the underlying cost of supporting the roaming service. Wholesale and retail prices in SADC are examined in Section 6; before looking at prices, in this section we aim to understand the roaming costs faced by operators.

Operators have submitted only limited data on their costs for the purposes of this study. As a result, in this section we discuss costs at a high level, in order to inform subsequent discussion:

- In Section 5.1 we present a high-level view of the costs associated with roaming
- In Section 5.2 we outline some specific concerns about costs that have been raised by operators: seasonality and geographical variation in costs, and what impact these costs have on smaller operators.

### *Key findings*

The major element of international roaming cost is the IOT and, in countries where international services are not liberalised, the international gateway charge. These are lowest at their unit level for the larger operators in the region, especially the groups such as Zain and MTN. The same is true for other roaming enablers such as signalling, data clearing and financial clearing. However, these enablers are often as little as 10% of total roaming cost. Therefore, the focus of operator cost reduction remains the IOT and, where relevant, the international gateway.

As a result of this, retail-level innovation in Africa is led by the operator groups with offerings such as Zain's ONE Network.

Small operators are disadvantaged in the roaming market by their lack of scale. This results from their inability to build roaming volume. They are frequently second or third players in their domestic market with little to attract new roaming partners. In order to compete more effectively at the retail and wholesale levels, small operators need to build volume through increased coverage. The opportunity to do this is emerging in the form of roaming hubs; however, this will take time. Any imminent regulation of African roaming prices will need to take account of the higher cost levels of small operators.

### 5.1 Scale of costs

Section 3.2 presented an overview of the direct costs incurred in roaming, and included reference to a "roaming overhead" cost. In this section we recap the direct costs and provide an overview of the overhead costs in order to present a complete view of costs.

### 5.1.1 Termination and origination

Termination and origination are direct costs, incurred in proportion to the usage of roaming services. They are, in principle, recovered from mobile termination rates (in the case of termination) and from similar charges in the case of origination. This cost is typically passed on directly to the subscriber, included in the IOT.

When international roaming first began as a GSM service in the early 1990s, operators were uncertain how to set the level of what is now known as the IOT. The system agreed within the GSMA, and the predecessor to the IOT, was the National Network Tariff or NNT. Under this system, operators had to select a publicly available retail tariff to act as their IOT. The rationale for the NNT was to ensure transparency of pricing between the operators.

Four factors at this time led to there being no functional wholesale marketplace for inbound (visitor) roaming:

- the lack of *any* operator ability to steer roaming traffic to a preferred partner
- the absence of handsets capable of operating on more than one GSM frequency before 1997
- the status of international roaming as a premium telecoms service
- a lack of tariff transparency at the retail level.

Unsurprisingly, operators tended to choose from among their most expensive retail tariffs for the NNT. In the UK, for example, this could be USD1.50 per minute or more.

The lasting legacy of the NNT is that IOTs continue to be set according to a “market” level rather than in relation to the costs of origination and termination. Despite the factors listed above having now substantially disappeared, wholesale competition has not had a large effect on IOT levels, and operators are reluctant to abandon the continuing high margins. This trend is reinforced by the intense competition in many domestic markets.

The operators with the greatest advantage in current wholesale roaming markets are those with significant buying power. This buying power comes from a combination of three factors:

- **Groups held together by shared ownership of mobile networks** and, in some cases, international gateways. These groups can internalise their costs with their only concerns being internal ones over individual business unit profit and loss. Examples include Zain (Bharti), MTN, Vodafone and Orange. This factor enables retail offerings such as Zain’s ONE Network
- **Higher levels of international roaming traffic volume enhancing bargaining power** with other operators. Again, the groups generally hold the greatest advantage in this respect through their ability to pool their volumes. However, non-group operators, such as mcel (Mozambique), with high domestic market share also hold bargaining power. Such a market position implies a relatively strong network with which to attract visitor roaming and profit from high levels of IOTs

- **The ability to direct international roaming traffic to a preferred partner.** Globally, and for operators with a high level of technical sophistication, it is typical to be able to direct 90% to 100% of roaming traffic to a preferred partner network. Such levels require a combination of handset- and network-based technology with a significant level of capital and operational expenditure. In addition, technology is available to combat the steering of roaming traffic. Despite widespread industry opposition, this is used by some operators and is seen as a barrier to competition.

The travel patterns for many African countries are strongly weighted towards visitors. Therefore, the likelihood is that some operators will perceive their interests to lie in maintaining high IOTs. Any regulatory action to link IOTs to cost will encounter resistance from such operators.

In the scenario of high IOTs with their origin in retail rates and the importance of volume and operator scale, the charges paid by many operators to cover the origination and termination costs of their roamers have traditionally borne no relation to those costs. This clearly has the greatest implication for smaller operators outside the groups. This is discussed in Section 5.2 below.

The EU recognised this disconnect between IOT and originating and terminating costs by setting the decline in regulated IOTs to 2011 according to the decline of the region's mobile termination rates. Although there is yet to be any indication of convergence to the region's MTR levels, the regulator has made it clear that they expect to see competition below these levels during the current period. This raises the possibility of further EU action to enforce linkage between IOTs and true origination and termination costs.

### 5.1.2 Carriage

Carriage costs are also direct costs which are included in the IOT (for originated calls) or in retail prices (for terminated calls). IOTs are quoted either as "blended" rates with carriage included or with origination and carriage quoted separately. The latter situation tends to occur where international gateway costs are a significant percentage of the IOT.

The international gateway is a switch which sits between one national telephone network and another. If gateway charges are high, then these will become the key driver of roaming costs and this will in turn impact retail prices. On the other hand, the introduction of competition into the international gateways market can reduce call prices by up to 90% and double call volumes, according to a recent GSM Association study<sup>10</sup>.

Countries in SADC are at different stages of liberalisation:

- The majority of markets in SADC have liberalised their international gateway market

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<sup>10</sup> "Gateway Liberalisation: Stimulating Economic Growth". Available at:  
[http://gsmworld.com/documents/gateway\\_liberalisation.pdf?PUOL=GATELI](http://gsmworld.com/documents/gateway_liberalisation.pdf?PUOL=GATELI)

- In some countries (Swaziland and Zambia), a single operator has **monopoly over the international voice gateway**, and may be able to keep rates artificially high
- **Zimbabwe** is currently looking at reinstating its international gateway monopoly in a bid to aid the incumbent fixed-line service provider.

The terms and the conditions of the gateway licence vary between countries – some countries charge for the licence while others do not, and this has a direct impact on cost.

High transit fees due to monopoly pricing have resulted in SIM farming and terminating of grey traffic in certain countries.

### 5.1.3 Data and financial clearing, signalling and hubbing

#### *Data clearing*

Almost all operators use MACH, Syniverse and a small number of other providers for data clearing. All these providers are based outside SADC.

Most operators have indicated that data clearing and financial clearing costs are not a major cause for concern. An exception to this are mobile operators in Lesotho, who have indicated that these costs are significant. This indicates that most operators consider themselves to have reached a scale in their roaming business where these costs are not significant.

The use of data clearing houses is driven by the economics of maintaining only a single IT link for the exchange of roaming billing data. The absence of the data clearing house would mean the maintenance of separate process and infrastructure for each individual roaming partner. For some operators this can number over 500.

The advantages of using a Data Clearing House (DCH) relate to the operator's position of both originating and visited roaming network. These advantages are:

- The DCH provides a single link for the operator to send and receive roaming billing data. It does this via direct links to its own client operators and to other operators via direct links to their clearing houses
- The DCH can take on the task of creating billing records in the GSMA standard format for exchange, the Transferred Account Procedure (TAP) record. To do this, it receives records in the operator's own format and converts them. This is especially significant for smaller operators as the TAP record format undergoes regular change, implying increased operational expenditure and resource if handled by the operator
- The DCH can also provide related outsourced services such as roaming fraud detection and the conversion of TAP records into the home operator's retail billing format.

In effect, it is impossible for an operator to run a roaming business without using a DCH. The only decision to be made is the range of services that the operator purchases. Such decisions are made on a routine outsourcing business case with cost and internal capability being the key factors. Sometimes capability will override cost. For example, an operator may consider it necessary to outsource fraud detection functionality, as wholesale roaming market reputation will override cost as a consideration.

The costs of the first two DCH services listed above, TAP transfer and creation, are only payable by operators for the calls generated by roaming visitors. They are variable, based on the number of calls made and their duration. Multiple TAPs can be generated by a single long call. DCH charges are typically based on a standard rate per TAP record (or per thousand TAP records) transferred and/or created. These charges have reduced in recent years, with 2007 DCH contract renewals attracting discounts of up to 50% on charges for expired three-year contracts. With new process developments driven by changes to GSMA fraud detection, pricing for these DCH services is likely to come under further downward pressure.

Operators typically pay a fixed monthly fee plus a charge per TAP record generated by a visiting roamer for TAP transfer and creation. The fixed monthly fee is estimated at USD2000, with individual TAP charges of USD0.008 per record.

The costs of other services outsourced to a DCH depend on the nature of the service but, as stated above, are generally subject to an outsourcing business case. The cost of converting TAPs to a retail billing format would be borne by the home operator and would have a similar structure to that of TAP transfer and creation. The cost of a service such as fraud detection would be based on a fixed monthly fee, either per operator or overall.

### *Financial clearing*

MACH, Syniverse and other smaller players provide financial clearing services. MACH and Syniverse currently dominate the market and tend to bundle these services with data clearing. As with data clearing, all providers are based outside SADC. One operator indicated that it had previously used a South African financial clearing house, but that its charges were uncompetitive compared to those from international firms.

The chief role of the Financial Clearing House (FCH) is to provide invoicing and settlement services for the mobile operators. There are two advantages to this:

- The FCH has economies of scale and a concentration of expertise in terms of settlement functions such as invoicing, dispute negotiation and chasing late payments
- The aggregated nature of monthly settlements through the FCH means that operators take advantage of their greater buying power in international currency markets.

The explicit cost of FCH services is generally a charge per invoice issued (or per roaming partner). Typically, this charge per invoice can be as much as USD12. However, FCHs make most of their profit on handling the monthly deposits made by operators to cover their liabilities and related currency transactions. For larger FCHs, these handled sums can run to hundreds of millions of US dollars each month.

For operators who are net monthly outpayers (those with greater volumes of outbound roaming traffic rather than visitor roaming traffic), the FCH will frequently discount or even waive invoice charges. These are the operators from whom the large settlement currency gains originate.

It is difficult to express FCH costs as a percentage of overall roaming costs. This is because the invoicing charge per roaming partner operator (levied on the client operator in its capacity as visited operator) is constant regardless of the volume of traffic and subsequent charge. It is, however, likely to be lower for operators who are net outpayers.

The same is also true of any losses to operators on currency movements. These are, in effect, currency handling charges and are entirely dependent on settlement values and exchange rate fluctuations. Figure 5.1 below provides the timeline for roaming settlements:

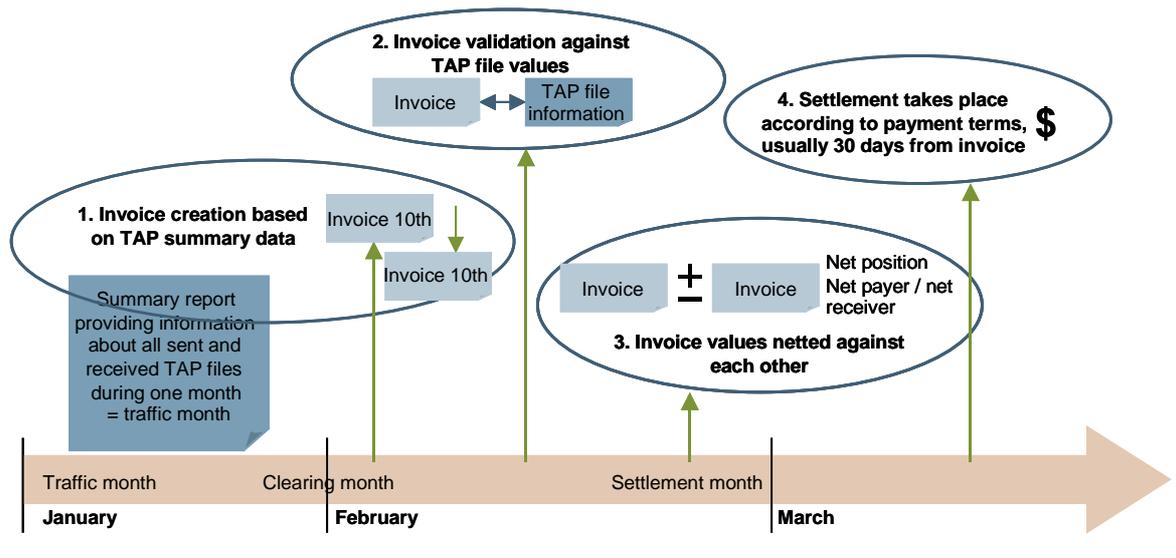


Figure 5.1: Roaming settlement cycle [Source: Baobab Management Services]

In this example, the relevant traffic month for billing is January. When two operators first make a roaming agreement, they agree to set currency exchange rates for their settlement on the 23rd day of the month before the traffic month (23 December in the example in Figure 5.1). The actual settlement does not take place until well into March, allowing nearly three months for currencies to fluctuate against each other and posing substantial risk to both home and visited operators.

### *Signalling*

Signalling for international roaming is carried out by specialist providers such as Syniverse and Comfone, as well as a number of international carriers including Belgacom International Carrier Services (BICS) and France Telecom.

Charges for signalling are generally levied on a per-signal basis. Typically, this charge is around USD0.0005. Again, it is difficult to estimate meaningfully the cost per call or roamer. This will depend on the number of location updates made by that roamer as well as the number and nature of the calls.

Prepaid roaming calls use CAMEL technology with its triggers and increased signalling requirement related to real-time charging. This will add to the signalling volume, as will factors such as the frequency and technological sophistication of maintaining preferred roaming partners. Future growth in prepaid roaming may increase the importance of signalling as a cost driver. However, this is likely to be more than mitigated by the beneficial revenue effects and the opportunity for some operators to negotiate better deals for signalling services. This includes the potential for their bundling into services offered by roaming hubs. Roaming hubs are discussed in the next section.

Operators with higher signalling traffic volumes are known to have deals based on fixed monthly fees per roaming partner. However, these are understood to be priced at around or above USD270 per roaming partner per month. Therefore, they would only pay for roaming partnerships with high signalling traffic volumes. They are likely to be most worthy of consideration by operator groups.

### *Hubbing*

The market for international roaming hub services is likely to be a key one for African operators. This is because it will enable wider roll-out of international roaming services, especially prepaid roaming, overcoming the barriers that many regional operators currently face in forging roaming partnerships (such as low partner revenue opportunity and implementation issues).

The key opportunity for an operator from the use of a roaming hub is the development of service coverage that would otherwise be difficult. Few operators currently see significant cost benefits from transferring roaming services to a roaming hub. The main reason for this is that the hub market is very immature, because hubbing providers are yet to interconnect (or “peer”) with one another.

The result of this is that some small operators, who see themselves as reliant on the hub providers for the necessary coverage to maintain their position in retail markets, have to use at least two hubs. As a result, they find that their roaming traffic volume and related bargaining power with the hubs are diluted.

The possible scenarios for connection via a roaming hub are detailed below:

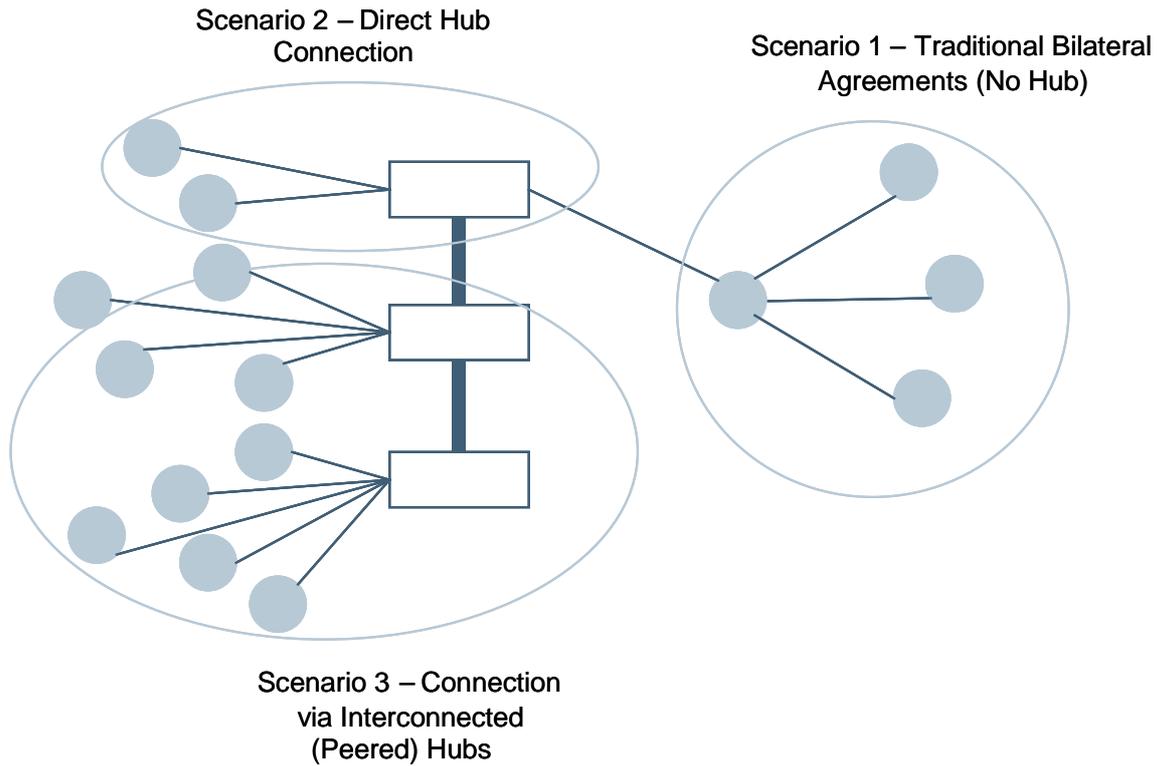


Figure 5.2: International roaming hub scenarios [Source: Baobab Management Services, 2010]

Many operators are finding that they can only connect in the legacy bilateral scenario (Scenario 1 to 2) or via a single hub (to Scenario 3). This is due to the lack of peering agreements currently in existence between roaming hubs. Therefore, they are having to pay high charges to more than one hub provider.

These charges are currently more significant than those for any of the services discussed in Section 5.1.3 so far. The hub will typically charge 10% of the IOT to its client operator for either originating or terminating traffic. There is also a minimum charge of around USD2500 per month; although this is unlikely to be significant for most operators.

Peering is the key issue in making roaming hub usage more cost effective. The development of peering will transform hubs into a true one-stop shop. This will allow operators to take their roaming volume to a single hub vendor and maximise their geographical as well as service coverage.

**5.1.4 Overheads and fixed costs**

Variable operating costs associated with roaming can include items such as accounting, payments, revenue assurance and fraud prevention, among others.

Fixed costs include staff costs for negotiating agreements as well as establishing and testing roaming connections and purchasing software and systems to manage the technical and operational side of roaming. Depending on the specific market, the opex costs of offering roaming may be high relative to the limited revenues generated from this service. This section briefly discusses those cost elements and attempts to quantify them:

### *Accounting*

If an operator uses an FCH, then accounting effort specific to international roaming is probably going to be minimal. As discussed earlier, the FCH provides specialist capability in this area. This extends to the production of standard monthly reports covering all aspects of reconciliation and settlement. Most of these are included in the invoicing charges discussed.

As the scale of the roaming business increases, the accounting effort may extend to items such as accruing against IOT volume discounts measured over several months. However, again FCHs tend to have reports available to cover such tasks, possibly at an additional charge, unlikely to be more than USD500 per month. Therefore, internal accounting overhead is likely to be minimal if using an FCH; no more than three man days per month per operator. We would estimate this to translate to between USD500 to USD1000 per month.

### *Payments*

As with accounting, payment overhead is substantially to the FCH. Other than invoice charges, most of this is incurred as currency trading loss. As stated earlier in the discussion on financial clearing, currency risk and loss is difficult to quantify.

### *Revenue assurance*

Beyond the roaming set-up phase, there is unlikely to be significant additional revenue assurance overhead associated with roaming for African operators. This is due to the overwhelming number of prepaid users within the typical customer base. The bulk of the roaming specific phase will be incurred in ensuring correct call charging operation during testing. This requires tests involving the roaming partner's own systems rather than just standard inter-operator testing. Trouble shooting involves frequent learning experiences and can be costly, often requiring several man days of revenue assurance effort. One man week per roaming partner can be quite frequent involving a revenue assurance cost per partner of around USD500 per partner implementation.

The growth of prepaid roaming via hubs is likely to mitigate this in the future. CAMEL-capable hubs are becoming centres of expertise who will take over most troubleshooting effort and internalise as a cost of sale.

For remaining postpaid users, roaming does sometimes generate bills up to bill shock level, requiring revenue assurance effort. However, this is unlikely to be a significant cost.

### *Fraud prevention*

Roaming fraud remains a high risk for many operators. However, if detection is outsourced to a DCH (the cost is variable, estimated at between USD2000 to USD7500 per month depending on roaming partner numbers and level of service) the key function left within the operator is to make the decision to act on reports of suspected fraud from the outsourced service. This function is normally included within a fraud prevention team and involves around one full-time equivalent (FTE) whose cost would depend on the local labour market. An estimate for graduate-level labour would be USD10 000 to USD20 000 per year, depending on experience.

Overheads and capital expenditure often increase within larger operators and groups with insourced legacy fraud detection systems.

The one operating expense related to fraud that all operators now face is Near Real Time Roaming Data Exchange (NRTRDE). This is for the continuous transmission of unprocessed roaming billing records related to visiting roamers to the DCH. The DCH then transmits this data on to the roaming partner either in the form of a suspected fraud alert or as roaming data if the partner operator chooses to carry out their own fraud detection. The typical cost of USD1000 to USD3000 per month is included in the overall fraud overhead assessment above.

### *Dedicated staff costs*

Dedicated roaming staff levels are generally dependent on the number of roaming partner networks with commercial or strategic significance. Dedicated staff typically have the following functions:

- establishing and maintaining roaming and commercial relationships
- contributing to industry activities, mostly within the GSMA
- implementing and testing new international roaming agreements, for both new services and geographical coverage.

Typically, the first two activities require a team of anything between one and five FTEs. Testing generally requires one to two FTEs. As with fraud prevention, costs depend on local labour markets. We would expect USD10 000 to USD20 000 per FTE per year to be typical.

A transfer of roaming responsibilities to the hubs is unlikely to reduce the size of the commercial team as they will generally be re-focused on the management of IOTs. However, operators may feel able to reduce testing effort to one FTE or less.

*Software and systems for roaming operation*

Some of these capabilities have already been touched on. Typically, they cover capabilities such as the Virtual Home Environment (VHE – Ensuring that the user’s roaming experience matches their home experience e.g. caller ID, voicemail access) and roaming traffic steering.

The cost is entirely based on the capability that the operator wishes to purchase. It is generally based on a software licence fee which may be variable depending on usage or number of roamers.

This model would be most typical for functionality that provides marginal revenue or cost enhancement. An estimated cost per roamer for this would be USD0.50 to USD1 per month. For functionality cost with a fixed fee, USD50 000 to USD100 000 per year would be typical depending on roamer volume.

**5.1.5 Taxes, duties and licence fees**

Operators have told us about the following taxes levied in various countries: the Universal Service fund (c. 5%), corporate Tax for the Telecommunications Operators (c.15%), Value Added Tax (c.15%), National Solidarity Tax (c. 5%) and mandatory CSR (c. 2%).

Taxes and duties can have a direct impact on the costs faced by operators in offering roaming.

In some situations, high licence fees can have a direct impact on the price of roaming. An example is high international gateway fees: these can have a significant impact on the cost of all telephony traffic to and from the country, including roaming.

**Issue 5.1**

The major cost components for international roaming are the IOT and, for some countries, the international gateway costs. These are variable depending on an operator’s roaming traffic volume, but can form up to 90% of costs. Most other overheads are variable and outsourcing opportunities exist for their reduction.

**5.2 Further concerns related to costs****5.2.1 Seasonality and geographical variation in costs**

In most countries, regulated mobile termination tariffs are geographically averaged across the country. Indeed, most operators themselves charge geographically uniform tariffs, despite the fact that the cost per minute carried is likely to be higher in rural areas where the volume of traffic is lower and costs may be higher.

There are reasons why the average cost of roaming calls may be higher than the average cost of other calls:

- **Seasonality.** Certain base stations may carry most of their traffic in a short period. For example, a beach resort may carry most of its traffic during the summer tourist season.
- **Geographical traffic pattern.** Roaming subscribers may make and receive calls in different locations from typical domestic users. For example, tourists are more likely to spend a greater proportion of their time in remote areas (beaches, game reserves) than domestic users.

Some operators have suggested that the cost of termination and origination in these areas and at these times is higher, and that this is part of the reason why wholesale roaming prices are higher than comparable domestic services. In particular, some base stations may become unprofitable (and may therefore be decommissioned) if wholesale roaming tariffs decline. This could potentially lead to a decline in rural mobile coverage.

A similar argument was made by the GSM Association in a submission to the European Commission: “traffic analysis of the Austrian mobile market shows that almost 4% of mobile antenna sites in the mountainous regions in the west of Austria would no longer cover their costs, if the European Commission’s proposal for regulation of international roaming in Europe is implemented.... [O]perators may... stop offering mobile services at these locations”<sup>11</sup>.

This argument is sustainable up to a point but it should be noted that some sites have a wider purpose other than supporting traffic. That additional purpose is the acquisition and retention of visiting roamers. For example, operators who focus on visitor roaming will be hard pressed to justify losing roamers at key locations such as points of entry and tourist destinations as it could reduce their traffic volumes and, from their partner networks’ point of view, create significant commercial and quality of service issues.

The inability to provide preferred partner coverage at key sites may lead roaming partners to direct their traffic to competitors, maybe even leading to a change of preferred partner preference. In summary, competition for visitor roaming will probably dictate the viability of roaming sites with seasonal or geographical characteristics.

### 5.2.2 The impact on smaller operators

The major impact on smaller operators is generally their lack of bargaining power in wholesale roaming markets. There are two major reasons for this:

- Small operators struggle to match the bargaining power of the operator groups. The retail innovators are Zain, MTN and the other groups. The answer in European markets has been the

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<sup>11</sup> GSM Association, “GSM Association’s response to the second phase public consultation on a ‘Proposal for a Regulation (EC) of the European Parliament and of the Council on mobile roaming services in the Single Market’”, 12 May 2006.

operator alliance: two alliances were set up in response to the growing power of Vodafone. The survivors are the Telefónica group and the Freemove alliance including members such as Orange, T-Mobile and Telecom Italia. The Starmap alliance, consisting of smaller operators, closed in 2007. One reason for this is thought to have been a mismatch in bargaining power and commercial objectives. Therefore, a key prerequisite in any successful alliance is an alignment of these two factors; difficult among smaller operators with their entrepreneurial “outsider” culture. Nevertheless, such alliances have gained a new credibility following the collaboration of six operators in East Africa to offer the Kama Kawaida roaming service, a competitor to Zain’s One Network.

- It is difficult for small operators to obtain new roaming agreements and, hence, the volumes to compete in wholesale markets. They are generally second or third operator in a country where most potential partners have coverage and little incentive, commercial or strategic, to add to it any further. The key to changing this is the roaming hubs and the development of peering between them as discussed in Section 5.1.

Related inputs to roaming services (DCH / FCH, signalling and technology related capability such as traffic steering) all require volume in order to reduce their unit cost. However, they are becoming more competitive and so a vendor push to increase market size does work in favour of small operators. There is a competitive market for these services even among smaller operators.

The key market factor for smaller operators remains the IOT which, as previously stated, can account for up to 90% of costs. A 5% reduction in this cost element will yield a greater margin improvement than more significant reductions in other overheads. Hence a view that even a large-scale transfer of roaming to hubs will not result in a reduction in the number of commercially focused roaming staff. If some functions transfer to the hubs, these staff would be refocused on IOT negotiation. This is understandable if the hubs have the positive volume effects already discussed.

Any regulation of roaming rates, retail or IOT, will have to recognise a cost base that is, for smaller operators, higher on a unit level. The EU included questions about smaller operators in its 2008 review of roaming regulation. Its solution was to set maximum IOTs and retail rates at a level that recognised operators with a higher cost base whilst suggesting that it was looking to see the development of competition below those levels in the period to the 2011 review. It will be examining these effects further in that review.

#### **Issue 5.2**

Due to their lower scale and lower bargaining power, smaller operators face higher costs per minute of roaming traffic than large operators or those that are part of a group. The largest element of these costs remains the IOT. There are emerging opportunities to increase roaming volume and, hence, small operator bargaining power.

## 6 Price of roaming in SADC

Few decisions that mobile operators make create as much interest as those concerning price. Pricing decisions involve not only the customer, operator's personnel and intermediaries, but also, particularly in aggregate, affect political and economic processes and therefore receive attention from regulators, economists, ministers and commentators.

A number of stakeholders in the roaming ecosystem in SADC believe that roaming is subject to excessively high prices that are unjustified by costs. On this basis the RATT was established to investigate mechanisms for reducing the high cost of roaming in the region.

In this section we provide an overview of the current wholesale and retail roaming rates that are being charged within the SADC region and consider the factors contributing to high/low prices.

- Section 6.1 provides the methodology for the collection and analysis of retail and wholesale pricing information
- In Section 6.2 we present an overview of the IOTs currently being charged for voice, SMS and data roaming services in SADC and offer analysis of the reasons for high/low wholesale costs
- In Section 6.3 we present an overview of the retail prices currently being charged for voice, SMS and data roaming services in SADC
- In Section 6.4 we discuss the current lack of transparency and consumer awareness regarding roaming the region and the impact on consumer choice and competition.

### *Key findings*

There is strong evidence to suggest the IOTs are not cost based, but are in fact above cost, which has a direct impact on retail tariffs (which most operators in SADC calculate on the basis of IOT plus mark-up)

Retail margins vary significantly between operators and in some cases may also be above cost. These problems are compounded by a lack of transparency and consumer awareness of prices at the retail level, which has affected consumer choice and competition. In addition, operators frequently require subscribers to pay a deposit before they are allowed to roam of up to USD500, which may prove a barrier to adoption.

There is strong qualitative evidence to suggest **low consumer awareness**. Transparency for the end user is currently a commercial, rather than a regulatory decision. Only 56% of operators interviewed had taken any steps to increase consumer awareness

## 6.1 Methodology for price benchmarking

Tariff information can be complex and is not always transparent. When comparing tariffs there are multiple factors to consider, including: whether the tariff is prepaid or postpaid; whether it is on-peak or off-peak; whether there are any addition charges (such as fixed-fees per call, or per month charges to access international roaming services); what the billing increment is; and any special roaming offers.

For the purposes of this study, we sought to gather wholesale and retail information for voice, SMS and data from operators for their top-five “roamed to” destinations in SADC (see Figure 6.1):

<i>Wholesale/retail</i>	<i>Type of roaming service</i>	<i>Description</i>
Wholesale	Voice	Local call while roaming
Wholesale	Voice	Call home while roaming
Wholesale	Voice	Receiving a call while roaming
Wholesale	Data	Send 1MB of data while roaming
Wholesale	Data	Receive 1MB of data while roaming
Wholesale	SMS	Send a local SMS while roaming
Wholesale	SMS	Send an SMS home while roaming
Wholesale	SMS	Receive an SMS while roaming
Retail	Voice	Local call while roaming
Retail	Voice	Call home while roaming
Retail	Voice	Receiving a call while roaming
Retail	Data	Send 1MB of data while roaming
Retail	Data	Receive 1MB of data while roaming
Retail	SMS	Send a local SMS while roaming
Retail	SMS	Send an SMS home while roaming
Retail	SMS	Receive an SMS while roaming

Figure 6.1: *Roaming pricing gathered as part of the study [Source: Analysys Mason]*

Pricing was then collated in an Excel database and converted into USD to be analysed.

### *Other considerations*

Few operators made reference to special roaming offers. At present, operators exclude international voice calls from minute bundles.

This analysis does not take the billing interval into consideration.

Where operators have supplied us with both peak and off-peak tariffs, we have taken the peak tariff.

*Overview of responses*

Although 20 operators participated in the study, it should be noted that fewer than half were willing or able to share information on wholesale tariffs. Of those operators who did provide pricing information, a number requested that their data remain confidential.

Two operators declined to provide retail rates on the grounds that the information was confidential and a further three operators expressed their retail tariffs as IOT + mark-up, and declined to supply information on the level of their IOTs.

Difficulties in gathering wholesale and retail pricing data raises key questions, both relating to the ease of analysing this market and also consumer transparency (discussed in Section 6.4).

These difficulties raise the question of whether the disclosure of information relating to roaming should be voluntary or mandatory. Unless full and clear information about roaming pricing is provided for each market within SADC, its usefulness will be significantly eroded and it will be very difficult to accurately assess whether prices are currently over-inflated. It therefore seems sensible that the provision of basic information, including retail and wholesale rates for voice, SMS and data services, should be mandatory for operators in each market.

**Issue 6.1**

To be able to conduct a fuller assessment of the impact of regulating roaming in the region, a much fuller and clearer picture of current retail and wholesale tariffs is required. Consideration will be required as to how best to collect this information, bearing in mind the commercial sensitivities regarding wholesale tariffs.

CRASA should be sensitive to the fact that information relating to IOTs is commercially sensitive and can represent a competitive advantage for operators. As such, CRASA may need to consider appointing a third party (for example, a consultant) to gather and analyse the data, to maintain confidentiality.

Sufficient time will be needed to collect such information. Operators may not currently have such information at their disposal. Systems may need to be put in place to capture the information and staff trained to extract and interpret the data. Therefore we strongly recommend that this process be initiated as a priority.

**6.2 Wholesale roaming prices****6.2.1 Overview of current wholesale tariffs**

There are IOTs for voice, data and SMS.

Operators bill IOTs in different ways. Some use destination-specific charges, while others have a flat-rate tariff structure. Some operators use per-second billing, while others charge in intervals of up to 60 seconds. Some operators distinguish between peak and off-peak tariffs, while others do not. More recently, operators charge different IOTs for on-net and off-net calls within the visited country.

There is significant variation between the wholesale rates charged by different operators in the SADC region when roaming, notably for data, which has obvious implications for retail tariffs (which are generally calculated as retail tariff, plus mark-up) and therefore the consumer. Figure 6.2 provides an overview of wholesale tariffs for voice, SMS and data roaming charged by operators in the SADC region.

<i>Local call</i> (USD/min)	<i>Call home</i> (USD/min)	<i>Received call</i> (USD/minute)	<i>Send local</i> <i>SMS</i> (USD)	<i>Send SMS</i> <i>Home</i> (USD)	<i>Receive</i> <i>SMS</i> (USD)	<i>Data sent</i> (USD/ 1MB)	<i>Data</i> <i>received</i> (USD/1MB)
0.25 to 1.95	0.34 to 5.00	0.25 to 1.43	0.11 to 0.46	0.11 to 0.46	0.14 to 2.50	0.82 to 71.67	0.58 to 71.67

Figure 6.2: Overview of the minimum and maximum wholesale tariffs for voice, SMS and data for international roaming within the SADC region [Source: Analysys Mason]

*Wholesale tariffs for voice roaming within SADC*

IOTs for a call home range from USD0.34 to USD5 per minute; the average charge is USD1.29 per minute. There is a fairly even distribution in the range USD0.5 to USD3 per minute (see Figure 6.3(b)). Some of the highest IOTs observed were between Zimbabwe and Mauritius; some of the lowest IOTs observed were between Botswana and South Africa and Zimbabwe and South Africa.

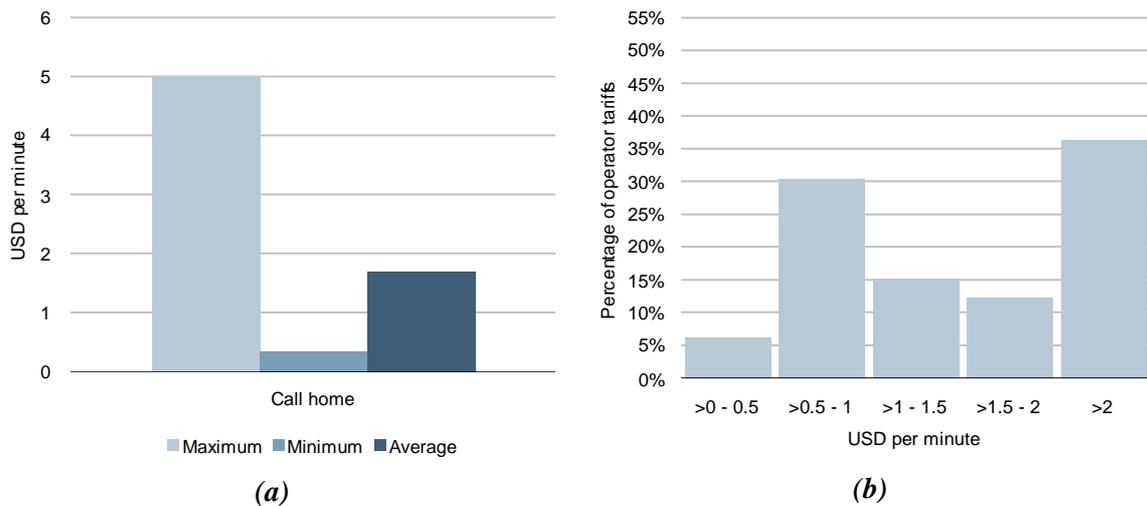


Figure 6.3: Min-max chart and chart showing distribution of wholesale tariffs for a call home while roaming, based on operators surveyed [Source: Analysys Mason]

*Wholesale tariffs for SMS roaming within SADC*

The wholesale tariffs for sending and receiving an SMS whilst roaming ranges from USD0.11 to USD0.46; the average was USD0.21. 85% of the benchmarked tariffs are less than USD0.30, however, these prices are still more than 5 times higher than the current wholesale caps applied in the European Union. Some of the highest IOTs in the region observed were between Mauritius and Tanzania; some of the lowest IOTs observed were between Mauritius and South Africa; and Zimbabwe and South Africa.

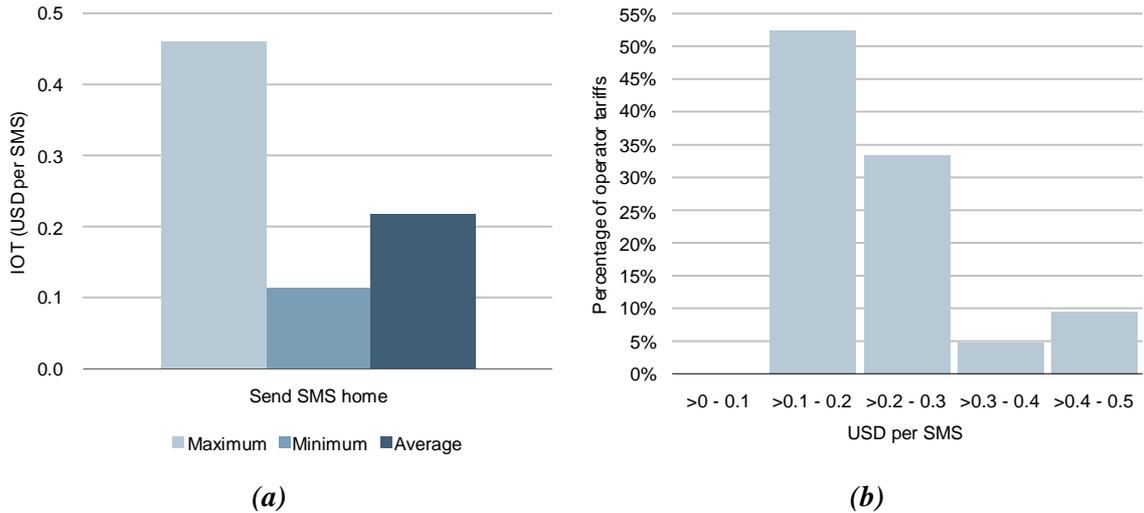


Figure 6.4: *Min-max chart and chart showing distribution of wholesale tariffs for an SMS sent home while roaming, based on operators surveyed [Source: Analysys Mason]*

*Wholesale tariffs for data roaming within SADC*

Wholesale tariffs for sending 1MB of data range from USD0.82 and USD71.67; the average is USD10.74. Some of the highest IOTs observed were between Mauritius and Mozambique; some of the lowest IOTs observed were between South Africa and Namibia.

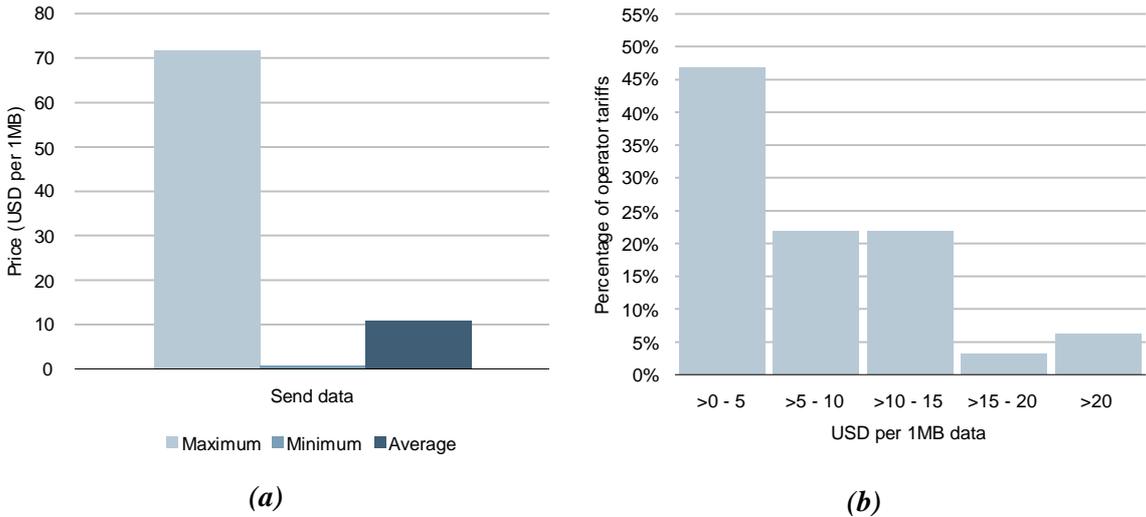


Figure 6.5: Min-max chart and chart showing distribution of wholesale tariffs for 1MB data sent while roaming, based on operators surveyed [Source: Analysys Mason]

6.2.2 Reasons for high/low wholesale pricing

**Issue 6.2**

There is strong evidence to suggest that many IOTs are not cost based, but are in fact above cost, which has a direct impact on retail tariffs (which most operators in SADC calculate on the basis of IOT plus mark-up).

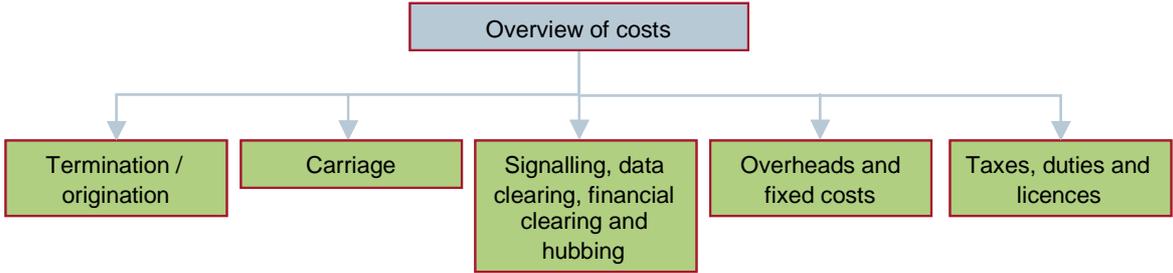


Figure 6.6: Overview of costs [Source: Analysys Mason]

In the absence of full and clear information on the costs of providing roaming in SADC, we have identified three indicators, which suggest that the IOTs are in some cases not cost based, but are in fact above cost: mobile termination rates; the variation in IOTs charged between countries and operators; examples from East Africa.

- Mobile termination rates** – MTRs are already regulated in the majority of SADC countries. In the context of EU regulation, it was proposed to allow a higher rate of three times the MTR as a benchmark ceiling for the price of a call home or within the EU to reflect some additional costs such as higher transit, as well as current commercial practice whereby rates are differentiated between, *inter alia*, calling home and making a local call. In SADC we can see, based on data collected as part of this study, that the average IOT for a call home is over ten times the MTR for select SADC countries (see Figure 6.7).

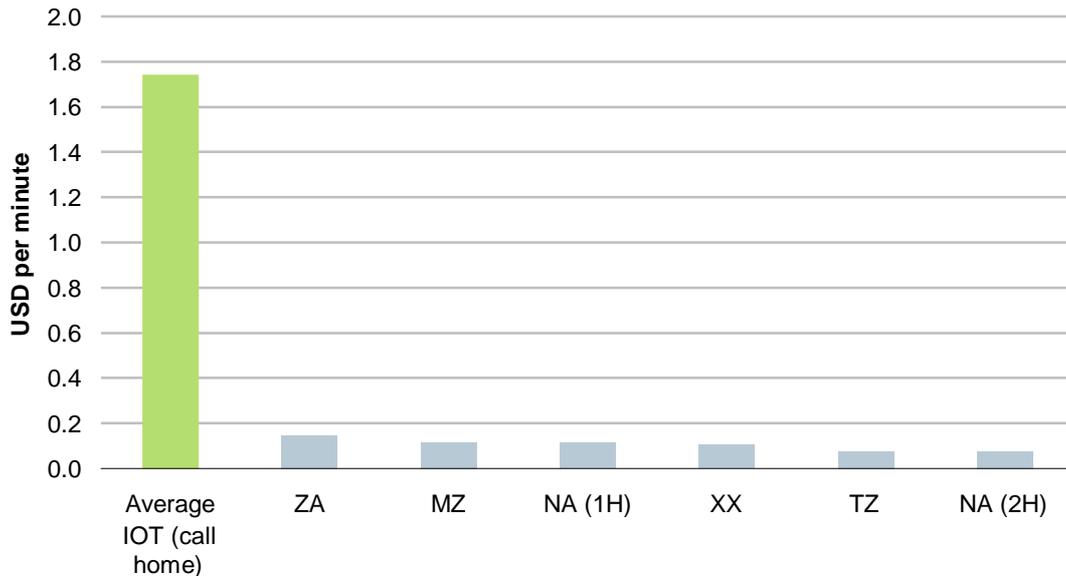


Figure 6.7: Average IOT (call home) vs. MTRs for select SADC countries [Source: Analysys Mason]

- Huge variation in IOTs** – based on initial data collected as part of this study, we have observed significant variation in IOTs charged to different operators within the same country. For example, for subscribers roaming in Madagascar, one operator is charged an average outbound IOT of USD1.38; USD2.80 and USD3.12 per minute by the country’s three operators.
- Competition initiatives in East Africa** – Zain’s ONE Network allows roamers to receive free incoming calls and to make outgoing calls and to send SMS at local rate. The internalised IOT is effectively zero to the Zain group.

In many cases, IOTs are conducted as **bilateral agreements** between operators – it is often in operators interests to agree high wholesale rates for the benefit of their own operation.

A **lack of regulation and regulatory oversight** of the commercial agreements has allowed mobile operators to reach agreements without consideration of the consumer.

Exchange rate volatility can significantly impact IOTs. In markets with a volatile currency, operators may factor in high margins to cushion them from potential loss.

*Traffic steering is necessary to promote price competition*

‘Steering’ technologies enable a home operator to influence the networks to which their subscribers’ mobile phones connect when roaming. Control over the allocation of roaming volumes between potential visited networks in any given country is necessary to promote price competition.

Multinational group structures, however, can act to mitigate this effect, since the preferred visited country roaming partner will always be the group company.

### 6.3 Retail roaming prices

Retail roaming prices are largely ‘cost plus’ in the SADC region. Calls initiated by internationally roaming subscribers usually result in a wholesale charge from the visited network to the home network (IOT). The exact scale and nature of such charges are usually the result of bilateral negotiations between operators (the exception being when bilateral routes are negotiated by multinational groups, or where a roaming aggregator intermediates). The actual level of an IOT chargeable for an individual call may vary based on time of day, call destination, total bilateral volumes of roaming traffic etc.

The wholesale IOT cost, together with any other relevant costs are passed to the roaming user in **retail charges** that also include a mark-up for the ‘home’ operator. It therefore follows that high IOTs will have a marked impact on the retail roaming prices.

**Issue 6.3**

Most operators interviewed claim to apply a mark-up of 10–25% on the IOT to generate the retail tariff, although there was variation between operators, with some operators charging as much as 60% mark-up.

#### 6.3.1 Overview of retail roaming tariffs in SADC

As one might expect, the large disparity in IOTs is reflected in the retail tariffs, especially for data services (see Figure 6.8).

Local call (USD/min)	Call home (USD/min)	Received call (USD/minute)	Send local SMS (USD)	Send SMS Home (USD)	Receive SMS (USD)	Data sent (USD/ 1MB)	Data received (USD/1MB)
0.11 to 1.98	0.37 to 6.73	0.30 to 2.12	0.07 to 0.94	0.14 to 0.94	Not available	0.37 to 69.34	1.73 to 69.34

Figure 6.8: Overview of regional retail roaming tariffs for voice, SMS and data [Source: Analysys Mason 2010]

*Retail tariffs for voice while roaming internationally within SADC*

Retail tariffs for calling home while roaming internationally within the SADC region range from USD0.37 to 6.73 per minute; the average price is USD1.90 per minute. Figure 6.9(b) provides an overview of the distribution of retail tariffs for a call home whilst roaming:

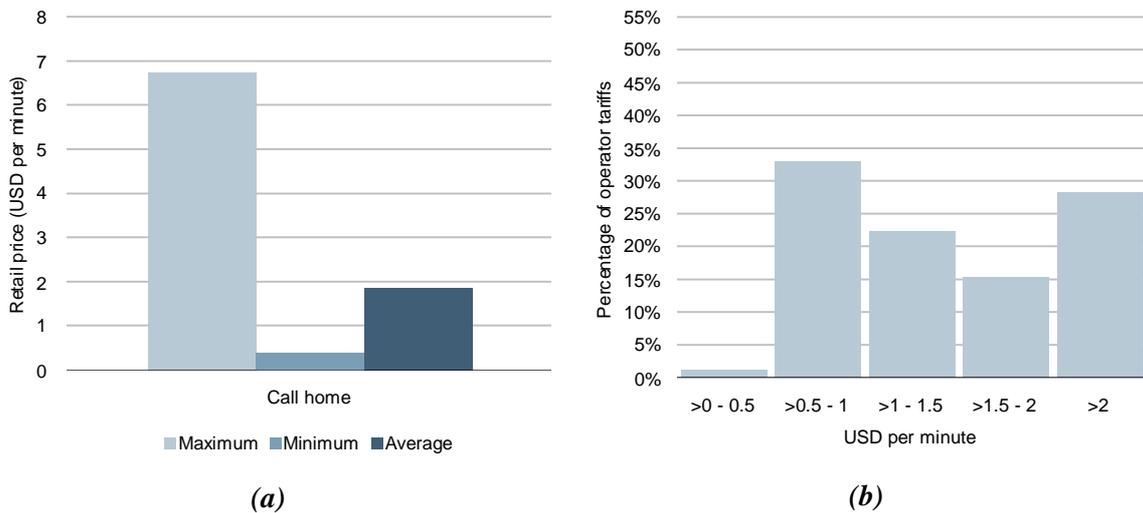


Figure 6.9: Min-max chart and chart showing distribution of retail tariffs for a call home while roaming based on operators surveyed [Source: Analysys Mason]

Retail tariffs for receiving a call while roaming internationally within the SADC region range from USD0.30 to 2.12 per minute; the average price is USD0.39 per minute.

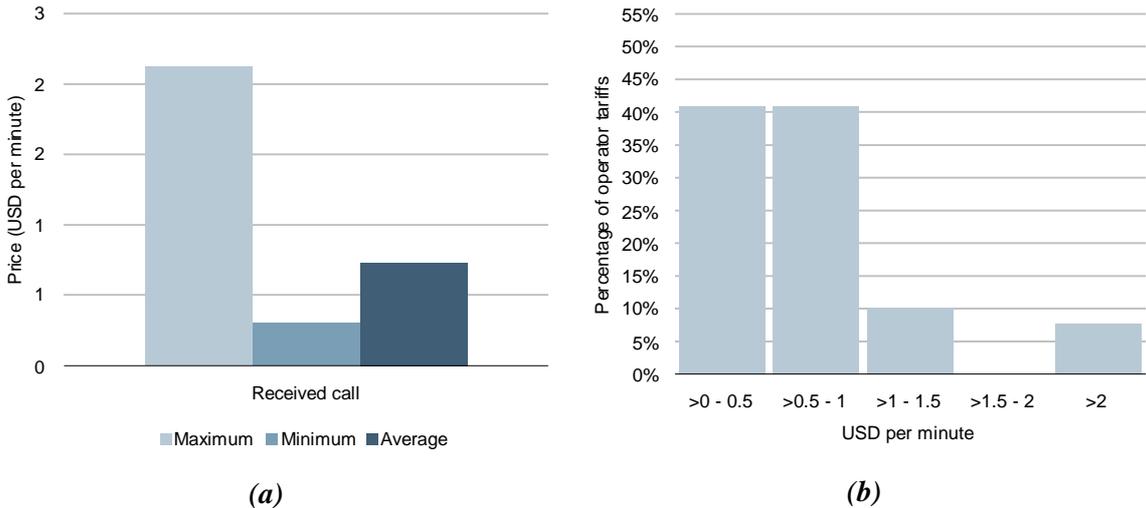


Figure 6.10: Min-max chart and chart showing distribution of retail tariffs for a call received while roaming based on operators surveyed [Source: Analysys Mason]

*Retail tariffs for SMS while roaming internationally within SADC*

Based on the data collected as part of this study, 85% of tariffs for sending an SMS while roaming within the region are below USD0.4. The minimum price observed for sending an SMS home was USD0.14; the maximum price was USD0.94, with the average price USD0.32. With a couple of exceptions, the retail tariff for sending an SMS home is the same as sending an SMS locally while roaming within the region.

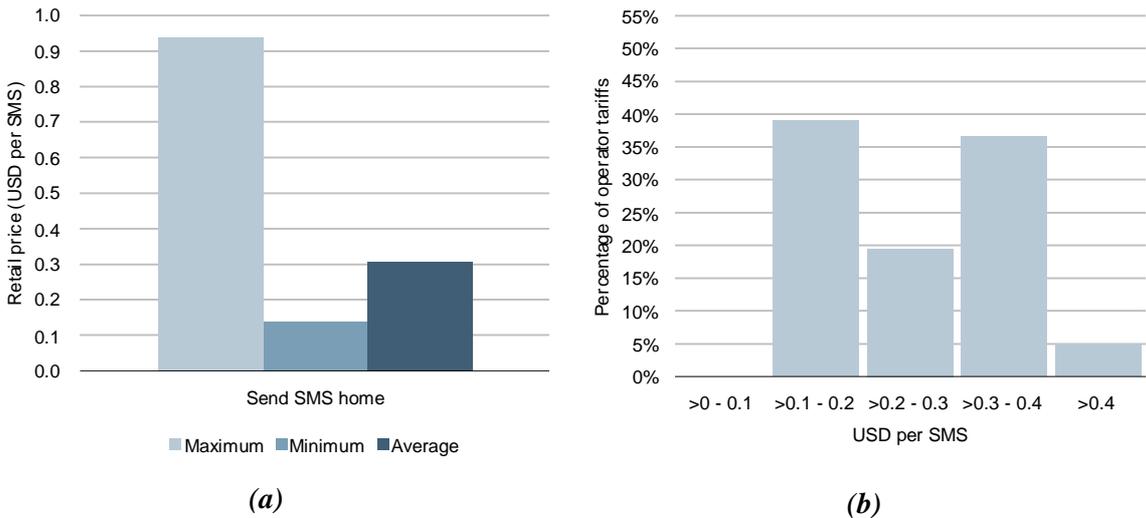


Figure 6.11: Min-max chart and chart showing distribution of retail tariffs for an SMS sent while roaming based on operators surveyed [Source: Analysys Mason]

*Retail data tariffs for roaming internationally within SADC*

More than 75% of retail tariffs for sending data are below USD10 per MB and the average tariff for sending 1MB of data while roaming internationally within SADC is USD9.73. There is, however, huge variation between different operators and countries.

The cheapest tariff we observed was USD0.48 per MB of data charged by Econet Zambia for subscribers roaming on MTN South Africa’s network. Our research showed, however, that there are operators who currently charge as much as USD69.34 to send/receive 1MB data while roaming within region.

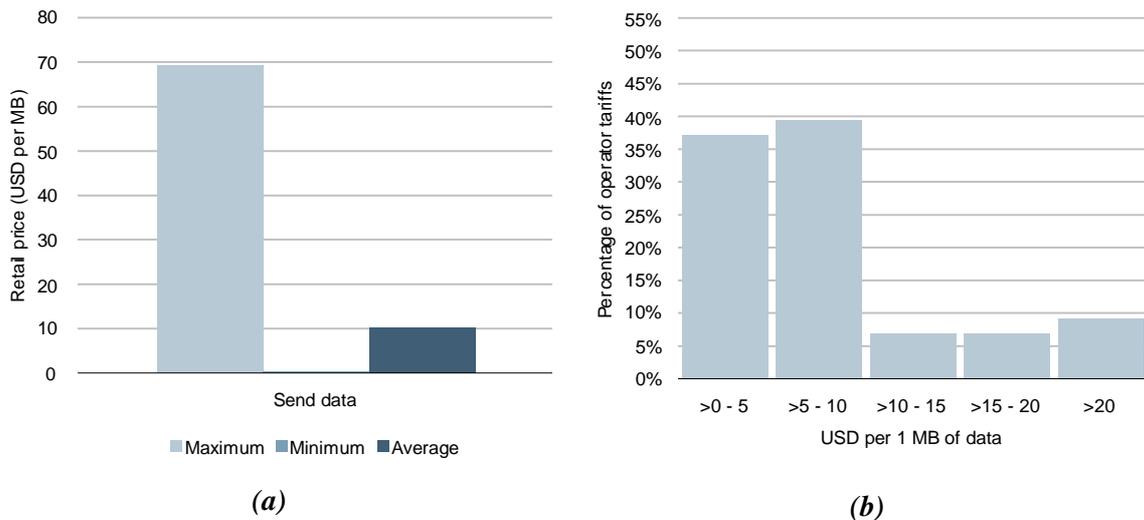


Figure 6.12: *Min–max chart and chart showing distribution of retail tariffs for 1MB data sent while roaming based on operators surveyed [Source: Analysys Mason]*

**6.3.2 Roaming deposits may be a barrier to roaming**

Almost all contributors to the study stated that a deposit was required before postpaid customers were allowed to roam. The size of the deposit varied, for example Telekom Networks Malawi (USD336) and Zain Zambia (USD500). Some operators base the size of the deposit on the account history, which may include factors such as the time for which the account has been active, the payment history of the customer, and the average spend of the account.

A number of operators, including Telekom Networks Malawi and Cellplus Mauritius require a deposit for personal postpaid customers, but not for corporate customers.

Prepaid customers are generally not required to pay a deposit for roaming, since they are only able to roam if their account balance is positive. One operator, however, suggested that it may be

necessary to require prepaid subscribers to pay a deposit, to safeguard against failings in the billing system.

Select operator responses follow:

- “We do require deposits on subscribers having individual accounts (postpaid). The deposit is MWK48,000 (USD314), which is refundable after roaming costs are deducted. We don’t require deposits for subscribers whose accounts are under companies. Organisations and government departments. we only require official instruction from an authorised personnel from the company to avoid defaulters. We don’t require deposits for prepaid subscribers, who have roaming service activated by default” (Telekom Networks Malawi)
- A deposit of USD150 is required for personal accounts only; corporate accounts are not required to pay a deposit (Zain Malawi)
- “We require a deposit of MUR5,000 (USD158), however this is very often waived for loyal/good credit rating customers” (Emtel Mauritius)

**6.3.3 Is the retail roaming mark-up ‘fair’?**

A number of considerations underlie the concept of a ‘fair’ price. For the operator, the fair price is probably the amount it charges to make a reasonable profit. For the consumer, the fair price is probably related to affordability, coupled with a perception of value. In determining pricing policies, there is a need to understand both sides of the equation: on the one hand, the costs involved and the alternatives open and on the other, the values consumers place on the roaming service.

As we have discussed, the majority of operators in SADC operate a ‘cost plus’ pricing model for roaming. Most operators interviewed claim to apply a mark-up of 10–25% on the IOT to generate the retail tariff to cover ‘administrative costs’, although there is variation between operators, with some operators charging as much as 60% mark-up. Figure 6.13 shows the mark-ups on IOTs charged by a selection of SADC operators.

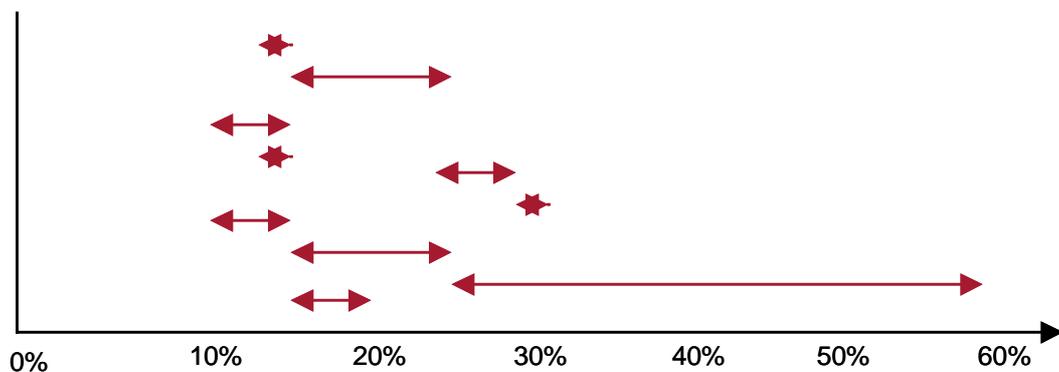


Figure 6.13: Mark-ups on IOTs charged by SADC operators [Source: Analysys Mason]

So what are the key factors which determine the mark-up and why do some operators charge a higher mark-up than others?

- **Need for reasonable profits** – most operators would desire to achieve what they consider to be reasonable profits across their product set, although individual products might not contribute to overall profit. Some operators in SADC are looking to offer roaming at a profit sufficient to cover attributable costs such as salaries and clearing costs. Others operators, for example, MTN Group said they “work on a breakeven basis as far as roaming is concerned”. Exchange rate volatility in particular can have a marked impact on profit margins and, in some cases, can result in losses if operators do not sufficiently cushion themselves. For example, Mascom observed that Vodacom SA is now billing in Euros, increasing the exchange rate impact on retail rates to Mascom subscribers when they roam in SA on Vodacom.
- **Competition** – Competitors cannot be ignored. Even though operators are reluctant to divulge wholesale pricing information, and to some degree retail pricing information, a number of operators interviewed stated that they were conscious of the competition and had undertaken some sort of internal effort to benchmark their tariffs against those of their peers. Depending on individual or group aims, operators may then decide to charge the going rate, seek to undercut or keep a good price, though clearly in a situation where few operators advertise their retail rates, there is limited incentive for operators to adopt a competitive pricing stance. However, the various operator groups (e.g. Zain, MTN, Vodacom) have developed preferential roaming among their own customers on their networks in the various countries.
- **Need for consumer-oriented pricing** – a relatively small number of operators in SADC currently advertise their retail roaming prices, but operators do need to establish prices that are, at least, broadly acceptable to consumers or risk that once consumers have experienced bill shock they stop using it altogether.

While there is variation in the mark-up charged by different operators in the region, it is clear that behind the seemingly high price of roaming in SADC are high IOTs, and it is with the wholesale costs that regulatory efforts should focus.

#### 6.4 Lack of transparency of roaming charges is a major issue

Our own desk research revealed that very few operators publish retail tariff information on their website for countries where they have roaming agreements with operators, instead simply indicating to subscribers that the roaming charge will depend on the charge of the roaming partner for inbound and outbound calls as well as within the same network, which make it extremely difficult for consumers to determine the exact price for a roaming call.

**Issue 6.4**

There is clear evidence of low consumer awareness of costs and available pricing schemes when travelling in the region. A lack of transparency for the end user limits choice and competition.

75% of operators we contacted as part of the study claimed that consumers were aware of the impact of roaming on their bills, however less than a third of respondents advertised roaming retail tariffs to their customer base (see Figure 6.14).

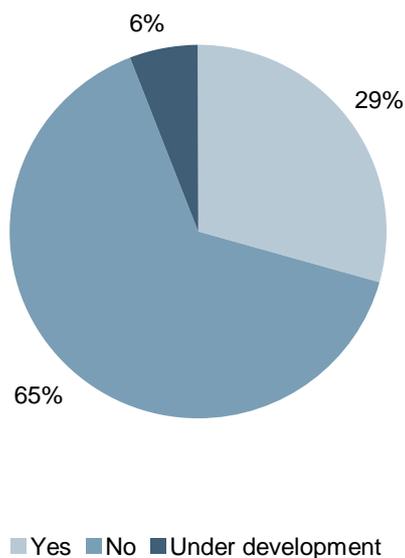


Figure 6.14: Do you advertise roaming charges to your consumers? [Source: Analysys Mason]

More detailed discussions with operators and regulators offered valuable insight into low levels of consumer awareness:

- “There is substantial evidence in that whenever we carry out any random survey to know what they are charged, they cannot tell. This is true even when they are at home. Worse to that local networks do not publicise roaming tariffs apart from advertising the names of countries where their subscribers can roam” (Regulator)
- “Bill shocks are frequent for the first time user” (Mobile operator)
- “MNOs do not provide specific charges for roaming in countries where they have roaming partners. They have indicated to subscribers that the roaming charge will depend on the charge of the roaming partner for inbound and outbound calls as well as within the same network.” (Regulator).

### 6.4.1 Steps are being taken to improve consumer awareness

Operators have taken a number of (complementary) different measures to help improve consumer awareness, including the provision of information online, as well as in paper form; educational efforts and advertising campaigns:

- “We have undertaken SMS campaigns, distributed various marketing information at service centres” (Mascom, Botswana)
- “Advise customers to select networks with low charges” (Comet Telecom Lesotho)
- “We have created printed roaming brochures and our online marketing efforts also contain travel tips. Educational examples we have provided to customers on how to control roaming costs. How to divert all calls to voicemail to reduce MT charges (prevent trombone charge effect). Customer care calls and calls to retrieve voice mails are not free (as would be on the home network). Specifically there has been a concerted effort to make customers aware of data roaming charges and prevent bill shock (typical usage examples have been provided of how much data is used in specific transactions) and how to reduce data usage whilst roaming (i.e. disable apps on Smartphones, set email clients to only download headers, disable automatic software updates etc.)” (Vodacom South Africa)
- “The use of pamphlets specifically prepared for roaming customers” (NetOne, Zimbabwe)
- “Normal media (electronic radio, paper adverts, user group meetings, customer care centres, promotions, customer visits, outdoor advertising and website” (Telekom Networks Malawi)

However, there is limited consistency between markets and individual operators. Although 56% of operators interviewed claim to have taken steps to increase consumer awareness, there is still some way to go to ensure a unified approach.

Inter-operator agreements may be one reason for this. According to one operator in Namibia: “There has been no strong drive to increase customer awareness on prices [...] [We] cannot inform their subscribers about which network to use in a country as they are prohibited by the agreement of disclosing the rates. To advise a customer about which network to use would indicate which network offers the lower roaming charge.”

What is reassuring is that a number of operators in the region are now putting mechanisms in place to prevent “bill shock”.

- For example, MTC Namibia and NetOne Zimbabwe both have a ceiling cap monitored through High Usage Report generation. Each time a HUR is generated the customer is contacted to inform them of the impact of the calls being made to their bill
- MTC Namibia offers real-time notifications via SMS as well as limit implementations, which will allow a customer to commit to a finite limit for roaming and not exceed this amount when travelling: “On contracts each contract has a credit limit set. The subscriber receives three

SMSs at 80%, 90% and 95% of usage. At 80% usage, international roaming service is switched off; at 90% usage, international calls from Namibia are barred; at 95% usage, off-net calls from the network in Namibia to other domestic networks are barred. On prepaid there is no mechanism in place as the subscriber must have a positive balance in order to roam. When this balance is exceeded the prepaid subscriber cannot roam” (MTC Namibia)

Half of the operators interviewed, however, have no such mechanisms in place. Clearly, there is a need for greater consistency across markets and individual operators.

There are also further measures that could be put in place, including:

- self-regulatory options that rely on initiatives by individual MNOs or industry associations aimed at simplifying tariff schemes
- the creation of a national or international website providing tariff information – for example, in Europe, both the European Commission and the NRAs at national level responded to the need for greater transparency with the introduction of websites on international roaming in 2005.
- tariff information to be provided through WAP.

Improved transparency is important – placing a spotlight on charges allows consumers to make an informed choice about their home operator; visited operator and their levels of consumption, which may increase competition within the regional roaming. However, at the same time, if parallels can be drawn with the European situation, measures to increase transparency alone are unlikely to be sufficient to resolve the problem of high charges.

A lot more can be done within to improve the current levels of transparency. A proposal for improving transparency of roaming charges is outlined later in the options section of this report.

## 7 Market forces affecting roaming in SADC

In this section we discuss the market forces which are impacting roaming in SADC and their effect on pricing:

- In Section 7.1 we discuss the competitiveness of the region
- In Section 7.2 we consider the impact of roaming partnerships, competitive initiatives such as Zain's One Network, and regional initiatives that have emerged in response on roaming within SADC
- In Section 7.3 we consider whether visitor roaming tariffs have had any impact on national roaming tariffs within SADC
- Section 7.4 we discuss the impact of EU regulation on roaming in SADC.

### *Key findings*

Some operators in SADC claim that competition at the wholesale level is working and is helping to bring down wholesale prices (IOTs). While there may be competition among operators and genuine consumer choice that drive competitive forces in some roaming markets in SADC, there is evidence to suggest that wholesale prices may be above cost and that not all operators are benefiting from reductions.

Zain's 'One Network' initiative, which allows subscribers to receive free incoming calls and to make outgoing calls and send SMS at local rate while roaming has had a marked impact on competition, driving large operators with a similar footprint in the region, like Vodacom and MTN, to offer similar roaming packages. However, smaller operators without partners have found themselves at a disadvantage.

### 7.1 Competition

#### 7.1.1 Competition between operators

Competitors cannot be ignored. Even though operators are reluctant to divulge wholesale pricing information, and to some degree retail pricing information, a number of operators interviewed stated that they were aware of the competition and had undertaken some sort of internal effort to benchmark their tariffs against those of their peers. Depending on the aims of individual operators or group, operators may then decide to charge the going rate, seek to undercut or keep a good price, though clearly in a situation where few operators advertise their retail rates, there is limited incentive for operators to adopt a competitive pricing stance.

## 7.1.2 Consumer pressure

For many consumers, the ability to roam and the price for doing so are likely to be a secondary purchase considering when taking out a new mobile phone contract or buying a new SIM. This, in combination with a lack of transparency regarding roaming pricing, is one reason why there has been relatively little downward pressure on roaming pricing from consumers.

Roaming can, however, be an important customer retention and acquisition tool, particularly for high-end subscribers.

Subscribers who roam are often attractive subscribers from the mobile operator perspective. They are typically higher-end customers, with high ARPU and less tendency to churn. For the visited network, roamers may generate higher ARPU than local customers.

## 7.2 Roaming partnerships, alliances and groups

### 7.2.1 Impact of competition initiatives

In this section we explore Zain's "One Network" initiative, which has not only had a significant impact on its market share, but has also altered the roaming landscape in the 22 countries in Africa and the Middle East where it has launched the service, as well as having had wider effects in the region.

*Case study: Zain 'One Network'*

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#### Zain 'One Network'

Zain Group is wholly owned by Mobile Telecommunications Company (MTC) which was established in 1983. As of September 2009, the company had a reported 71.8 million customers across 23 countries in the Middle East and Africa<sup>12</sup>, including four countries in SADC: the DRC, Malawi, Tanzania and Zambia. Zain launched its One Network roaming offer in September 2006 across the three East African countries. The service was then extended to the rest of Africa November 2007, then to the Middle East in April 2008. One Network currently provides a seamless roaming platform across its 22 African and Middle Eastern operations<sup>13</sup> (with the exception of Lebanon and Zambia due to governmental and regulatory restriction on the international gateway).

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<sup>12</sup> Operations in the Middle East: Bahrain, Jordan, Kuwait, Iraq, Saudi Arabia, Sudan and Lebanon; Operations in Africa: Burkina Faso, Chad, Democratic Republic of the Congo, Republic of the Congo, Gabon, Ghana, Kenya, Madagascar, Malawi, Niger, Nigeria, Sierra Leone, Tanzania, Uganda and Zambia.

<sup>13</sup> Bahrain, Burkina Faso, Chad, Republic of Congo, Democratic Republic of Congo, Gabon, Ghana, Iraq, Jordan, Kenya, Kuwait (data roaming only), Madagascar, Malawi, Niger, Nigeria, Saudi Arabia, Sierra Leone, Sudan, Tanzania and Uganda.

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Zain's One Network allows subscribers to keep the same phone number and SIM card across participating countries. Prepaid and postpaid subscribers can make outgoing calls and send SMS at a local rate, and receive incoming calls free of charge while roaming on Zain networks abroad. Prepaid customers can purchase top up cards anywhere in the home and visited countries and use them while travelling into participating countries. The roaming service is automatically activated on crossing borders: no registration or deposit is required. Home services, such as voicemail, corporate private networks, use of short code, check balance and access mobile portals, are also available when roaming. In May 2009, Zain added Internet access, email, MMS, BlackBerry services and mobile portal applications to the 'One Network' roaming scheme, enabling subscribers across the Zain networks to access data services at a local rate. 'One Network' was expanded to include the first non-Zain operator, Egypt's Mobinil, in November 2009, to take advantage of lower roaming tariffs<sup>14</sup>.

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### *Impact of Zain's One Network on roaming SADC*

Zain was the first mobile operator to introduce flat-rate roaming across the different countries of SADC. The introduction of 'One Network' drove operators with a similar footprint in the region, like Vodacom and MTN, to offer similar roaming packages:

- **MTN** launched its "One World" roaming offering in the first half of 2009 across 21 countries in Africa and the Middle East enabling prepaid and postpaid customers to make calls whilst roaming at a local rate and to receive free incoming calls whilst roaming on MTN networks whilst abroad.
- **Vodacom South Africa** offers its subscribers three packages: Vodafone Passport, to make calls and send SMS while abroad; SMS Roamer for messaging service; and Vodafone World that offers flat rate prices divided between 8 World zones and is most suited to regular business or leisure travellers.

Learning from its experience in East Africa, Zain soon extended 'One Network' to its other subsidiaries in the Middle East, and more recently, to the Southern part of Africa. Clearly, Zain has taken advantage of the lack of roaming regulations in those countries and has leveraged its own gateway infrastructure to offer harmonised flat rate roaming tariffs across the two continents.

But given the disparities between mobile operators in the SADC region, it is unlikely for a common set of regulations to work favourably for everybody, especially for small operators who depend heavily on third-party service providers (e.g. international gateways) and have less power in negotiating roaming agreements.

Since Zain and its key competitors in the region operate in different countries of the SADC (with some exceptions such as Zambia and South Africa), we have not witnessed a rush of operators to offer reduced roaming tariffs until very recently. This has been illustrated by the delay it took MTN and Vodacom to offer a competing region-wide roaming package.

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<sup>14</sup> <http://www.zain.com/muse/obj/lang.default/portal.view/content/Media%20centre/Press%20releases/OneNetworkExpandsToEgypt>

In addition, across the SADC region in general, roaming revenues represent a small proportion of the total revenues, and are used primarily to improve customer retention and satisfaction, and reduce churn. It can be said that Zain's 'One World' is offered primarily as an added value service in those countries rather than as a key revenue stream. As such, operators may be less keen to get involved in the establishment of roaming tariff regulations.

Offering roaming services at very reasonable price can act a powerful retention tool, and a way to attract new customers. Such offers have a big impact given that consumers were used to exorbitant charges when making or receiving calls outside their home countries.

### 7.2.2 Regional roaming offers have emerged as a result of competition initiatives

In response to Zain's 'One Network' offer, other large operators in the region – including MTN and Vodacom – began to create their own roaming packages across their footprints. In this section we take a detailed look at MTN's "One World" roaming offer: how it was implemented and the impact it has had on the SADC region.

#### *Case Study: MTN 'One World' roaming offer*

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##### **MTN 'One World' roaming offer**

The MTN Group Limited (MTN Group) is a telecommunications service provider based in South Africa founded in 1994. Its main operations are in Africa and the Middle East where it operates 22 MNOs, including operations in four SADC countries: Botswana, South Africa, Swaziland and Zambia. MTN has also indicated an interest in entering the Zimbabwean market. As of June 2009, MTN had 103.2m customers, of which 25.46m (24.7%) were in the South East Africa (SEA) region.

As a direct response to Zain's "One Network" roaming offer, MTN launched its "One World" roaming offer in the first half of 2009 across 21 countries in Africa and the Middle East. Pre- and postpaid customers receive free inbound calls and can make outbound calls and send SMS at the local rate whilst roaming on MTN in other countries. The retail fixed roaming charges apply only to voice and messaging service and do not cover data services. For MTN's SEA operators, there are reduced IOTs and tariffs for fixed for voice, data and SMS roaming across these networks.

In January 2009, MTN South Africa announced that it would deploy a 5000km fibre-optic backhaul network with fixed line operator Neotel to connect a number of major cities in the country at a cost of about R2 billion<sup>15</sup>. Their aim is primarily to increase network capacity so to offer more data services over greater distance. There are also savings on transmission costs, as it enables the operators to bypass incumbent (and competitor) operator

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<sup>15</sup> (Source: <http://www.southafrica.info/business/economy/infrastructure/mtnneotel-160109.htm>)

Telkom's infrastructure and the related interconnection charges. The two companies estimated that they could save between R400 million and R500 million in capex and opex<sup>16</sup>.

In November 2009, Telkom confirmed that it will launch mobile services<sup>17</sup> and a converged mobile–fixed line package in 2010<sup>18</sup>. Telkom is investing heavily in mobile telephony with the aim to offset declining profits from its fixed-line operations. It expects to enter the mobile market by signing a roaming pact with an existing mobile operator (unnamed at the time of writing), rather than build out its own network. Vodacom has been predicated to be the wireless traffic carrier, however, in March 2010, it has been reported that Telkom was in talks with MTN for a roaming agreement where it can use its own wireless infrastructure<sup>19</sup>. Clearly, Telkom wants to leverage MTN's large mobile presence in Africa, and launch mobile services in 2010, instead of building its own network.

### *Impact of MTN 'One World' on roaming in SADC*

MTN has a presence in some key SADC markets in terms of mobile penetration, GDP per capita and size, such as South Africa and Botswana. As such, the impact of flat rate tariffs are likely to have a more visible impact in the region than by other operators. The lack of regulations in those countries is considered to be an advantage, giving more freedom to the operator to apply its own tariffs, which may not be in favour of consumer's interests. However, when an operator like MTN operates in a competitive market such as South Africa, roaming tariffs tend to be more aligned.

MTN's plan to extend its footprint to the rest of Africa by partnering with fixed operators such as Telekom and taking advantage of the market liberalisation legislation, like in the case of Zimbabwe. As a result, it is likely that MTN will extend its 'One World' package to countries where it will operate in the future.

In a region characterised by large disparity at many levels, such as the market shares of operators; incurred opex costs for roaming services; regulatory environment; and the size of roaming traffic, it is unrealistic to expect that pricing caps can be applicable uniformly across the different countries. However, roaming prices offered by operators like MTN, may serve as reference points to set the retail tariffs that are country-specific, and guide the setting of wholesale roaming tariffs that can be applied across the countries of the SADC region.

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<sup>16</sup> (Source: <http://www.southafrica.info/business/economy/infrastructure/mtnneotel-160109.htm>)

<sup>17</sup> (Source: <http://mybroadband.co.za/news/Business/10580.html>)

<sup>18</sup> (Source: [http://www.telegeography.com/cu/article.php?article\\_id=26076](http://www.telegeography.com/cu/article.php?article_id=26076))

<sup>19</sup> (Source: [http://www.itweb.co.za/index.php?option=com\\_content&view=article&id=31427:telkom-mum-on-mtn-roaming&catid=76](http://www.itweb.co.za/index.php?option=com_content&view=article&id=31427:telkom-mum-on-mtn-roaming&catid=76))

### 7.3 Potential interference of visitor roaming tariffs with in-country tariffs

If visitor roaming tariffs are lower than national tariffs available to country residents, then national operators may see churn to overseas operators operating solely on a roaming basis. If international roaming rates are low relative to the national rates in place, then it can potentially ‘import’ competition.

This situation is more likely to arise from roaming unions such as Zain’s One Network, rather than regulation, which is unlikely to see a sharp decline in prices.

### 7.4 Europe

The ‘waterbed effect’ is where a reduction in roaming charges can result in an increase in other tariffs so that an operator achieves targeted average revenue levels per subscriber.

As a result of regulatory intervention, the market for international roaming within the EU now operates at significantly lower cost levels than in 2006. However, EU roaming retail rates to non-EU destinations have risen (along, incidentally, with IOTs for some non-EU roaming partners) – presumably influencing demand, lowering revenue for non-EU operators.

In addition, regulation in Europe has impacted regulatory expectations outside of the EU and has prompted regulation in certain countries to the extent that regulation is being discussed, or in some cases has been implemented. For example, according to a recent analyst survey<sup>20</sup> 33.3% of operators said potential regulation was being discussed since the EU took a stance on roaming; 7.4% said regulation had been implemented since that time.

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<sup>20</sup> Informa Telecoms and Media Operator Survey 2008

## 8 Analysis and options

The complexity of international roaming from a regulatory perspective should not be understated. Based on the preceding tasks we have developed an understanding of the roaming landscape in SADC (including market structure; the wholesale and retail price of roaming in SADC; market forces affecting roaming in the region and service delivery issues) and the core problems that they present. In this chapter we define and analyse the challenges currently facing roaming markets in SADC and possible options for addressing them.

- In Section 8.1 we summarise key issues that have emerged from our research into roaming markets in SADC
- Section 8.2 provides a statement of the core problem which goes to the heart of the roaming market in SADC
- In Section 8.3 we provide an overview of objectives
- In Section 8.4 we develop a list of potential actions that could be taken to adjust the dynamics of the roaming markets in SADC and their degree of fit with CRASA's priorities for the functioning of international roaming; perceived problems with the functioning of the international roaming market, based on the findings of this study; the priorities of individual NRAs, as identified through our interviews.

These analyses will support the development of recommendations of the project, which are likely to be a combination of the highest impact initiatives that best fit with our identified prioritisation criteria.

### 8.1 Overview and analysis of key issues

In the previous chapters we have identified key issues for developing policy options based on our analysis of responses from operators, policy makers and NRAs in the areas of market structure, cost, price, market forces and service delivery. Figure 8.1 summarises the key issues:

<i>Issue</i>	<i>Description</i>
4.1: Lack of data on roaming	Complete and clear information about the status of roaming for each country in the region will be required, if national regulators or consultants are to accurately assess the potential impact of policy at a regional level.
4.2: Forex impact	Any regulatory action to lower IOTs charged by mobile operators may reduce the inflows of foreign currency, which could have a proportionally large impact on those countries that have a significant tourist trade. As such, further research will be required to determine the impact of lower IOTs, which may vary substantially by country.
4.3: Limited prepaid roaming available	While postpaid roaming is well established in the region, prepaid roaming is still in a development phase: some operators do not currently offer prepaid roaming services; others offer prepaid roaming, but only offer voice services. Only the larger operators (Vodacom and MTN) have prepaid roaming in place with the majority of countries
4.4 Impact of SIM registration ('RICA')	Purchasing a local SIM card is a common substitute for roaming. The introduction of SIM registration across the region may in future make it difficult for non-residents to acquire or maintain local SIM cards. While it is too soon to draw firm conclusions, SIM registration may lead to increased demand for roaming in the region.
5.1 IOT and international gateway costs	The major cost components for international roaming are the IOT and, for some countries, the international gateway costs. These are variable depending on an operator's roaming traffic volume but can form up to 90% of costs. Most other overheads are variable and outsourcing opportunities exist for their reduction.
5.2 Lower scale of small operators	Due to their lower scale and lower bargaining power, smaller operators face higher costs per minute of roaming traffic than large operators or those that are part of a group. The largest element of these costs remains the IOT. There are emerging opportunities to increase roaming volume and, hence, small operator bargaining power.
6.1: Limited access to pricing data	To be able to conduct a fuller assessment of the impact of regulating roaming in the region, a much fuller and clearer picture of current retail and wholesale tariffs is required. Consideration will be required as to how best to collect this information, bearing in mind the commercial sensitivities regarding wholesale tariffs.
6.2: IOTs are above cost	There is strong evidence to suggest that many IOTs are not cost based, but are in fact above cost, which has a direct impact on retail tariffs (which most operators in SADC calculate on the basis of IOT plus mark-up)
6.3: Retail mark-ups may be inflated	Most operators interviewed claim to apply a mark-up of 10–25% on the IOT to generate the retail tariff, although there was variation between operators, with some operators charging as much as 60% mark-up.
6.4: Lack of consumer awareness and transparency	There is clear evidence of low consumer awareness of costs and available pricing schemes when travelling in the region. A lack of transparency for the end user limits choice and competition.

Figure 8. 1: Overview of key roaming issues in SADC [Source: Analysys Mason]

## 8.2 Problem definition

As a result of our research, we have defined what we perceive to be the core problem, which goes to the heart of this study:

**Problem definition:**

Prices for SADC-wide roaming at wholesale level appear to be in many cases above the cost of providing the service. Retail margins vary significantly between operators and also appear in some cases to be above cost. These problems are compounded by a lack of transparency and consumer awareness of prices at the retail level, which have affected consumer choice and competition. Moreover, policy makers have little access to data on roaming costs, service volumes and revenues on which to make policy judgements.

There is a lack of adequate and appropriate infrastructure in the region – many operators only offer prepaid roaming to a limited number of destinations in SADC, which is a significant barrier to consumer adoption.

SADC markets are at different stages of their development, in regards to the degree of market liberalisation and market competition, which has a direct bearing on costs. Accordingly, there is no one-size-fits-all regulatory approach for SADC at this stage.

In the course of our primary research, policy makers have alerted us to the fact that they are concerned about these problems. A key issue which has been raised by participants, however, is that regulatory initiatives, if required, will require cross-border policy. Initiatives may also have cross-border impacts, and will need to take into account concerns of all stakeholders including small operators and operators/countries that depend on roaming to generate foreign exchange.

### 8.3 Objectives

The objectives of any action at SADC level are:

- to reduce the tariffs to end users of mobile roaming services within SADC to be more consistently aligned with operator costs
- to identify and address any costs or conditions unique to SADC or its member states that might objectively lead to high roaming tariffs
- to improve competition at all levels, including through the removal of regulatory barriers
- to encourage more widespread availability of prepaid roaming across the region
- to improve consumer awareness of roaming services, including tariffs.

### 8.4 Options available to achieve the objectives

In this section, we review some of the options available to SADC member states to achieve their objective of reducing the cost to end users of mobile roaming within the region. Each option is

described in terms of the type (unilateral or multilateral), a summary of the measure, the rationale, expected impact (based on this partial impact assessment) and cost, and suitability given CRASA, SADC and individual member state concerns.

Options concentrate on voice and SMS services. The reasons for this are twofold. Firstly, in relation to data services it remains difficult at this stage to foresee how access to Internet will develop. At this stage there are clearly significant risks of applying inappropriate regulation which could hinder the development of this market. Secondly, the lack of regulatory cohesion in SADC compared to the EU will make a wider net approach difficult.

The options considered in the following subsections are divided into soft interventions (those that do not require the exercise of regulatory authority), hard interventions (those that require regulatory authority or change in policy) and speculative options (technical or market solutions that have the potential to affect the roaming market, but are considered unlikely to make any impact in the short term).

<i>Soft interventions</i>	<i>Hard (regulatory) interventions</i>	<i>Speculative options</i>
No policy change	Lowering regulation and costs of international voice gateway	Mobile VoIP
Self-regulation	Increased transparency and consumer protection	Unbundling roaming from mobile national services
Co-regulation	Regular roaming data collection	International SIMs and multi-national MVNOs
Statement of policymakers' goals	Price control regulation by agreement	
Public education and awareness		
Promotion of multilateral cost-reduction measures and roaming hubbing		

### 8.4.1 Soft interventions

#### *No policy change*

<b>Type of initiative</b>	Unilateral
<b>Summary</b>	No policy change would see a continuation of the status quo
<b>Rationale</b>	Relevant for comparison with other approaches
<b>Expected impact</b>	With limited market competition and downward pressure on pricing, retail roaming rates would remain constant or may even rise, which would negatively impact the consumer and have a significant knock-on effect on the wider regional economy. There may be limited attempts by some operator or operator groups to improve the customer experience of roaming – for example, by offering definite, clear tariffing – but their ability to do so is constrained by the actions of other operators
<b>Cost</b>	There is no incremental cost associated with leaving policy unchanged.
<b>Suitability</b>	While easy to implement, this approach leaves SADC operators free to make their own decisions and as such will have no co-ordinated impact.

#### *Self-regulation*

<b>Type of initiative</b>	Multilateral by operators (regulators not involved)
<b>Summary</b>	Self-regulation involves co-operation between operators from different countries (and possibly other actors, such as non-governmental bodies and perhaps even the regulator) to adopt guidelines that will lead to the reduction of international roaming charges. Historically, there have been attempts to create such co-operative fora between operators elsewhere (which have led to operator alliances, such as Freemove and Starmap) but these have not led to reductions in tariffs. Typically regulators and policymakers will take an interest in such cooperative arrangements to ensure that they do not lead to cartel behaviour (such as maintaining high prices)
<b>Rationale</b>	Self-regulation can be implemented more quickly and with fewer resources than most other approaches, and is also desirable in that it is a market-driven approach rather than a regulatory approach
<b>Expected impact</b>	Given past experience in self-regulation and the limited progress to date by SADC operators in achieving comprehensive roaming between themselves, it is unlikely that a self-regulation approach will lead to any change in roaming charges in the short to medium term
<b>Cost</b>	There is no incremental cost to regulators or policymakers apart from oversight to ensure that competition is not being undermined. Operators will incur transaction costs in negotiating amongst each other and may require additional business analysis resources to evaluate the impact of self-regulation on their company performance
<b>Suitability</b>	Although market-led approaches such as this should be supported where they emerge, it is unlikely that they will be effective

*Co-regulation*

<b>Type of initiative</b>	Multilateral
<b>Summary</b>	Similar to self-regulation, co-regulation requires cooperation between operators across the region. However unlike self-regulation, co-regulation involves the adoption of a regulatory framework which defines overall objectives, deadlines, monitoring procedures and sanctions to be applied in case non-compliance is observed. In Europe co-regulation could have been implemented using a Communication or Recommendation from the European Commission, but in SADC it would require country-by-country implementation of regulation or legislation
<b>Rationale</b>	Co-regulation combines the flexibility and market-based innovation of self-regulation with the binding nature of legislation. However it requires country-by-country implementation and the establishment of monitoring arrangements to ensure that operators are complying. Monitoring and enforcement may in themselves be problematic since under co-regulation, formal objectives and deadlines are relatively loosely defined
<b>Expected impact</b>	Likely to be effective in reducing international roaming charges, although given the effort required to introduce new legislation or regulation it may be more effective to simply impose retail or wholesale price controls in each country
<b>Cost</b>	Co-regulation will require significant resources (including resources for facilitating meetings and study groups) at the SADC level to coordinate a regulatory framework. Individual member states would further need to ensure that appropriate monitoring is in place. Operators would also incur administration costs for agreeing a mechanism to implement the framework
<b>Suitability</b>	Without a supra-national regulatory framework such as that available in the European Union, there is unlikely to be any benefit to implementing co-regulation in SADC

*Statement of policymakers' goals*

<b>Type of initiative</b>	Unilateral (led by CRASA, but with input from stakeholders)
<b>Summary</b>	<p>CRASA should publish a set of detailed goals for the roaming market. This could include but is not limited to: achieving a minimum standard of availability of roaming across SADC (including seamless prepaid roaming); provision of personalised call costs to roamers; and target wholesale and retail prices for roaming. This should include a deadline by which CRASA expects these outcomes to be achieved. This could be coupled with reporting of wholesale revenue per minute for each roaming partner (under existing regulatory powers in most SADC member states) to ensure compliance.</p> <p>Particular goals that could be defined relate to:</p> <ul style="list-style-type: none"> <li>• Number of roaming partners and type of roaming services available</li> <li>• Retail prices and structure of retail tariffs</li> <li>• Wholesale prices</li> <li>• Consumer awareness</li> <li>• Traffic volumes and roaming subscriber numbers.</li> </ul>
<b>Rationale</b>	Without a clear statement of concrete, realistic goals, there is little hope of industry action to achieve those goals. CRASA should carefully consider what goals should be set, failing which further regulatory action may be required.
<b>Expected impact</b>	The industry may prefer to act on its own rather than face additional regulatory burden. There is a chance that roaming rates remain high, so it would be advisable for CRASA to consider further measures in case this is not achieved. There is also a potential danger, if the goals are not aggressive enough, that their achievement may not impact consumers' experience of roaming as intended
<b>Cost</b>	There is very little cost involved in drafting a set of goals, and indeed these could be based on the factors identified in this report. It would be advisable to publish these goals for consultation in order to ensure that they are realistic, which may involve some administrative overhead cost and may introduce a delay (of the order of months), but these should be relatively modest
<b>Suitability</b>	This option is highly suitable because it requires few resources but effectively crystallises the views of policymakers and regulators in a way that allows progress to be measured. It also provides a firm platform for any subsequent regulatory intervention

*Public education and awareness*

<b>Type of initiative</b>	Unilateral
<b>Summary</b>	Governments and regulators can promote higher awareness of the issues around international roaming among consumers. This could take the form of advertising campaigns, educational leaflets, accreditation of mobile operators' products as being "fair priced" and marketing campaigns targeted specifically at multi-national enterprises that may benefit from lower international roaming tariffs. Such actions could be taken by government, regulators or even by SADC (and indeed, SADC on its own could develop a regional "fair price" accreditation that could also be used beyond the telecoms sector)
<b>Rationale</b>	Mobile subscribers are commonly unaware for international roaming, instead choosing their mobile telephony supplier on the basis of national calling tariffs. Given the prevalence of multiple-SIM usage (i.e. each subscriber may have two or more SIMs in different phones), subscribers may choose to use roaming from the supplier with lower charges or which has undertaken to price international roaming services more fairly
<b>Expected impact</b>	Public education and awareness raising may be more effective than they were in Europe, in which numerous campaigns by the European Commission and national regulators had little impact on wholesale or retail tariffs. In SADC, the phenomenon of multiple SIM ownership could potentially lead to more competitive pressure on mobile operator roaming tariffs than was found in Europe; on the other hand, business users (who constitute the bulk of SADC regional roaming users, and generate most of the roaming revenue) are less likely to be multiple-SIM owners
<b>Cost</b>	The cost of developing marketing campaigns, or authoring and distributing leaflets is likely to be relatively high, and will be borne by each regulator or government individually. Establishing a "fair priced" accreditation scheme is also likely to be very costly, and will take time and political will
<b>Suitability</b>	Education and awareness-raising are immediate, unilateral steps that can be taken by regulators and governments and may coincide with other policy initiatives on raising consumer awareness. However, due to the high cost and little indication that it will have any impact, this option is unlikely to prove cost effective

*Promotion of multilateral cost-reduction measures and roaming hubbing*

<b>Type of initiative</b>	Unilateral (initiative by CRASA, SADC or individual member states, but for the benefit of operators)
<b>Summary</b>	A minority of operators have indicated that the costs of signalling and data clearing are particularly burdensome, and the new technology of hubbing does not appear to have had much impact on the structure and cost of roaming in SADC. SADC, CRASA or other parties could support measures to aggregate demand for these services across the region and thereby negotiate better prices with suppliers. Promoting the use of interconnected hubs (for example, by offering hub operators a structured opportunity to market their solutions to SADC operators) could help combat the lack of roaming service, particularly for prepaid subscribers, between some countries
<b>Rationale</b>	<p>Africa has historically suffered from poor economies of scale when procuring international telecommunications services due to low demand and limited aggregation between operators. It may be advisable to hold further discussions with operators' roaming staff to identify specific cost challenges that may be addressed through a more coordinated approach</p> <p>Roaming hubbing is a relatively new technology, first implemented in 2008 and not yet fully operational<sup>21</sup>. It can potentially reduce the overhead cost involved (and the time to market) in implementing roaming, particularly prepaid roaming. A regional initiative, led by CRASA, SADC or a group of countries, could promote awareness of hubbing and other roaming cost-reduction measures. A reduction in cost base could result in a market-led reduction in wholesale and retail charges</p>
<b>Expected impact</b>	<p>If there is going to be downward pressure on roaming tariffs within SADC, it is crucial that operators are equipped to deal with such pressure by having ways to cut their costs or gain some other benefit from the process</p> <p>However, offering assistance to the operators in reducing their costs and introducing cost-effective new technology into their networks may not have any direct impact on tariffs. This is because such measures do not introduce any new competitive pressures into roaming, and most significantly they don't have any direct impact on IOTs which are the largest single driver of retail prices</p> <p>Nevertheless, working with operators will give CRASA and regulators a better idea of the drivers of roaming cost and better position them to impose price regulation in future, should that be deemed necessary. It also increases the scope to apply regulatory pressure</p>
<b>Cost</b>	This can be done at relatively low cost if there is wide participation from SADC member states, and if the actions are carefully chosen. To achieve the best effect, however, there will have to be an individual or organisation taking responsibility for this initiative. The incremental cost to and regulatory impact on operators is minimal
<b>Suitability</b>	<p>This is likely to be a valuable option because</p> <ul style="list-style-type: none"> <li>• it imposes no cost or regulatory burden on operators,</li> <li>• it transfers knowledge to local staff, including regulatory staff, and</li> <li>• it gives regulators and governments better insight into roaming costs, to inform any future decision on imposing price regulation</li> </ul>

<sup>21</sup> Interlinking between two hubs, a crucial requirement for a fully interconnected roaming market, has not yet been operationally demonstrated.

## 8.4.2 Hard (regulatory) interventions

### *Lowering regulation and costs of international voice gateway*

<b>Type of initiative</b>	Unilateral
<b>Summary</b>	<p>Any aspect of the regulatory environment that leads to higher international call costs will increase the cost of roaming. Regulators and governments should be urged to review any policies or regulations related to international traffic, including but not limited to: international gateway monopoly or restricted market entry; high international gateway licence fees; monopolistic pricing for terrestrial telecommunications capacity; taxes or duties</p> <p>CRASA may have a role here in performing a survey of international call costs between SADC member states, and of the competitive situation of international voice markets</p>
<b>Rationale</b>	<p>Most countries in SADC have liberalised their international voice and data gateways. This is a necessary condition for the reduction of roaming tariffs, but is not sufficient. Where this market is liberalised but gateway licence fees are an obstacle to entry, high international voice tariffs may be sustained by limited supply from those operators holding licences. Likewise, any other circumstances that might raise international voice call prices above cost – such as monopolistic pricing for terrestrial telecommunications capacity – should also be addressed. Any taxes or duties imposed on international roaming calls will likewise impair the ability to reduce roaming charges</p> <p>If no action is taken to lower international call costs that may be artificially high (due to actual or de facto monopolies), then roaming charges cannot be reduced without imposing material losses on operators in other SADC member states. It is also in the wider interests of SADC to ensure that calling costs within the region are not inflated</p>
<b>Expected impact</b>	This may not have any direct impact on roaming charges, but it is an essential precondition to promoting regional economic integration and lowering roaming costs
<b>Cost</b>	This will not impose any cost or regulatory burden on operators, although in some situations it may reduce profits in markets that are currently uncompetitive. Political will is required on the part of governments and regulators if there need to be regulatory or legislative changes
<b>Suitability</b>	<p>This option supports the aims of CRASA and SADC in promoting regional economic integration and the strategic role of ICT in supporting that integration. Cutting the cost of regional communication is critical for any number of reasons, including cutting roaming tariffs.</p> <p>Individual SADC member states may cite security, quality of service and market stability as reasons why they find this approach unsuitable in their jurisdiction</p>

*Increased transparency and consumer protection*

<b>Type of initiative</b>	Unilateral
<b>Summary</b>	Operators should be required by regulation to display accurate and accessible information on their roaming conditions and tariffs where appropriate (including in retail stores and on websites). Mobile subscribers arriving in a new country or connecting to a new visited operator should be given information on roaming conditions and tariffs through an SMS or other means. This should include instructions on how to access customer services at low or no charge. Consumer protection measures (such as imposing bill cut-off mechanisms to avoid “bill shock” or supporting consumer action against operators when obviously unfair bills are sent to customers) could also be introduced
<b>Rationale</b>	We have found that mobile subscribers and, more surprisingly, customer service staff of mobile operators are largely unaware of the conditions and costs of international roaming. Many operators do not display roaming charges in retail stores or on their websites. It is not unreasonable for regulators to require such information to be available, and indeed there may already be telecoms-specific or general consumer regulations that can be used to enforce such disclosure
<b>Expected impact</b>	The consumer experience of roaming will be greatly enhanced. There is no evidence to suggest that this will result in lower roaming charges, as consumers are likely to continue to choose mobile tariffs on a basis other than roaming prices. Increased consumer awareness may nevertheless increase market pressure, and given the large number of SADC mobile subscribers that own SIMs from multiple operators, it may actually result in discernible consumer preference for roaming and hence increase competitive pressure
<b>Cost</b>	Regulators will be required to dedicate resources to this, although in many cases there will already be a team within the regulator dedicated to consumer protection so the incremental cost may be low. There will be a further cost imposed on operators to comply with any new requirements. Some operators already do this in their normal course of business (e.g. Orange Botswana and Vodacom South Africa both publish useful information leaflets) and have indicated that the implementation cost can be high
<b>Suitability</b>	All of the measures described above are suitable in all SADC member states and coincide with wider aims of enhancing consumer protection and promoting consumer choice through provision of information. Individual countries may choose to implement only some of the measures suggested, depending on whether those measures can be introduced under existing regulation or whether new regulation is required

*Regular roaming data collection*

<b>Type of initiative</b>	Unilateral
<b>Summary</b>	<p>CRASA should compile a roaming data collection template to be completed by operators every quarter. In many SADC member states, such data collection can be justified under existing disclosure regulation or licensing terms (indeed, many regulators already collect quarterly subscriber and traffic data from licensees). Information that may be included in such data requests could be:</p> <ul style="list-style-type: none"> <li>• Number of inbound roamers from each SADC country, and from the rest of the world</li> <li>• Number of outbound roamers to each SADC country, and to the rest of the world</li> <li>• Volume of inbound roaming traffic from SADC countries and the rest of the world, split by destination and by originating/terminating</li> <li>• Volume of roaming traffic generated by subscribers that roam within SADC, split by destination</li> <li>• Wholesale roaming revenue from each SADC country, and from the rest of the world</li> <li>• Retail roaming revenue charged to subscribers who roam to each SADC country, and to the rest of the world</li> <li>• Company total operating revenue</li> <li>• Wholesale roaming payments to each SADC country, and to the rest of the world</li> <li>• Roaming overhead costs (signalling, data and financial clearing, capex, staff)</li> </ul>
<b>Rationale</b>	<p>During the present study we had limited time to collect data, and limited authority to demand it. As a result, we have a limited basis on which to draw firm conclusions about either the consumer harm arising from high roaming charges, or indeed whether the charges are substantially above cost. Before any regulation is imposed, it would be advisable to collect such information using the regulatory authority at the disposal of CRASA members</p>
<b>Expected impact</b>	<p>This measure is unlikely to have any direct impact on roaming prices, but will allow CRASA and its members to make informed decisions on how to promote and co-ordinate regulatory action on lower roaming prices</p>
<b>Cost</b>	<p>Regulatory bodies already tend to collect data from operators, and so this measure is unlikely to require significant additional resources from them (beyond minor development expenditure). Sourcing and submitting the data is likely to increase operator roaming staff workload by several hours per quarter, for a total of perhaps two man-days per year – and this could be reduced through automation of the process</p>
<b>Suitability</b>	<p>Although this measure will not have any direct impact on roaming prices, it will significantly contribute to the effectiveness and relevance of any subsequent policy intervention on roaming</p>

*Price control regulation by agreement*

<b>Type of initiative</b>	Multilateral (by member states, on a voluntary basis)
<b>Summary</b>	<p>Any SADC member states that are willing to devote resources can author a multilateral agreement (effectively a treaty) to reduce roaming charges. Such an agreement would specify a minimum set of criteria that would entitle a country to become party to the agreement – in particular, each signatory to the agreement would need to have the authority, within their own jurisdiction, to implement access and price control regulation over wholesale and/or retail roaming. Further stipulations may include a requirement to have consulted with stakeholders, conducted a local impact assessment, introduced SIM registration, and removed all obstacles to a competitive international voice market</p> <p>The agreement would then specify a set of regulations which would have to be implemented in each signatory state. Such regulation could include:</p> <ul style="list-style-type: none"> <li>• <b>Wholesale price control.</b> It is likely that wholesale prices are well above cost, and it may be appropriate to regulate them. However this would not necessarily increase competitive pressure on retail prices, so a trigger for retail regulation may be required if wholesale savings are not passed on to consumers</li> <li>• <b>Retail price control.</b> Regulating only retail prices would be required if it could be shown that wholesale prices were uniformly low, and this was not being passed to consumers. Retail price regulation risks forcing some operators (typically smaller operators) to sell below cost and would likely favour large operator groups</li> <li>• <b>Wholesale and retail price control.</b> The approach adopted in Europe for voice and SMS is simultaneous price capping of wholesale and retail roaming tariffs. Subsequent assessments have not found evidence that would support the removal of price caps, and this is therefore likely to be the most appropriate approach</li> <li>• <b>Other controls.</b> Operators could be required to offer wholesale prices similar to those of their competitors in the same market, or could be required to offer reciprocal rates to those offered by a potential partner. Such indirect wholesale price regulation could be coupled with retail price caps</li> </ul> <p>Signatories would only be obliged to impose these price control regulations with respect to roaming to or from other signatory countries, to avoid putting operators in signatory countries at a disadvantage compared with operators in non-signatory countries. The agreement would also stipulate how the price control caps would be decided in future years, and include procedures to allow further countries to accede to the agreement</p>
<b>Rationale</b>	<p>Given the lack of a supra-national regulatory framework, or even uniform regulatory powers across SADC member states, individual member states will need to determine whether it is feasible to regulate these prices in their own markets. A multilateral agreement offers flexibility in the manner of implementation within each country, while being specifically targeted at capping roaming charges between countries that are able to implement the agreement</p> <p>It should be noted that such multilateral agreements would need to comply with World Trade Organisation (WTO) obligations. Furthermore, this approach is largely untested. The roaming regulation in Europe, for example, was introduced through a regulation from the European parliament that was legally binding in all member states. The Arab League is currently implementing a Memorandum of Understanding which offers parallels to this option</p>

<b>Expected impact</b>	By definition this approach will lead to the reduction of roaming charges between signatory countries. Accession to the agreement need not be restricted to SADC member states (although WTO obligations may impose a limit), and so the impact could end up being greater due to achieving a wider reach – perhaps spreading across the EAC-COMESA-SADC area
<b>Cost</b>	<p>This option will involve significant amounts of political and administrative overhead for governments and regulators in negotiating the contents of an agreement, initially through circulation of an aide-mémoire or non-paper. The negotiation and implementation of such regulation is likely to take two or more years, and may not immediately apply to all SADC member states</p> <p>The loss of revenue imposed on mobile operators could be significant, and should be carefully evaluated in each country before being implemented</p>
<b>Suitability</b>	This is the most direct possible approach to achieving lower roaming charges within SADC. Since it is based on voluntary accession to an agreement, member states can individually determine whether it is suitable for their situation. There is a risk that this approach could create a “two-tier system” (signatories versus non-signatories) within SADC; however even if such a distinction arose, there will still be a greater level of ICT integration within SADC than there is today

### 8.4.3 Speculative approaches

Any perceived problems in the international roaming market could potentially be addressed through new technologies or through radical regulatory intervention. In this section we briefly describe three potential approaches to cutting roaming costs: mobile VoIP, unbundling roaming from domestic service, and the use of international SIMs.

It is worth noting that the European Commission, as part of its review of the existing international roaming regulation, is intending to examine new technologies (such as mobile VoIP and international SIMs) and alternatives (such as unbundling). A report on these issues may be produced<sup>22</sup> before the end of 2010, and it will be worth following the outcome of that review.

#### *Voice-over-IP (VoIP) over mobile*

VoIP is probably most familiar to consumers through computer software that allows them to speak with other users over a broadband internet connection. However VoIP more generally allows the calling environment (including caller line identity, short codes and value-added services such as voicemail) to be available to users anywhere they can access an IP-based network such as the Internet. Corporate users, in particular, tend to make use of VoIP to seamlessly manage the routing of calls within a corporate campus or across multinational points of presence.

It is technically possible for mobile operators to offer a similar service: access to the subscriber’s own mobile number and other home-network services via any Internet connection. In this way, a

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<sup>22</sup> European Commission, “Tender specifications: Study on the options for addressing competition problems in the EU roaming market”, (INFSO/B - SMART 2010/0018).

roaming user could make and receive calls on their home mobile number whenever they are connected to the Internet – whether in a hotel, conference centre, using a Wi-Fi network or even using mobile broadband with a local SIM in the visited network. Only the last of these is a complete substitute for mobile roaming; the other options are all “nomadic” rather than fully mobile, since they are only available in limited areas.

VoIP over mobile, while technically possible, is both technologically untested and represents a significant change from the current business model of mobile operators. Indeed, some mobile operators specifically block the use of VoIP over mobile broadband. It may eventually be introduced due to natural market forces, particularly given that many operators are beginning to upgrade to data-oriented 4G mobile technology, but is unlikely to have much impact in the next five years.

#### *Unbundling roaming from mobile national service*

Historically, some competition and pricing problems in telecommunications have been addressed through the introduction of unbundling (allowing wholesale or retail users to purchase smaller units of service from a primary telecoms provider). For example in the USA in the 1980s, telephony service was split into local service (provided by a local exchange operator) and long-distance service (provided by any operator that could convey traffic between distant exchanges). Unbundling of services tends to force the individual service elements to become more cost-oriented, since the option of cross-subsidising is no longer available.

It is conceivable that a similar remedy may work in the international roaming context. Customers could separately choose to have their domestic mobile telephony service provided by one operator, and their international roaming service provided by another. Indeed, the international roaming operator need not even own any mobile network assets: it could simply be a broker, seeking the cheapest tariffs for roaming in any given country. As with the separation of local and long-distance telephony, such a solution could force the roaming part of the service to become cost-oriented.

However, unbundling is an untested solution and presents significant technical challenges, and as with mobile VoIP is unlikely to yield a solution within five years.

#### *International SIMs and multi-national MVNOs*

The African Telecommunications Union (ATU) indicated<sup>23</sup> in 2005 that it would be pursuing a feasibility study for an “African SIM card” with support from the African Development Bank and the ITU, and this is reported to remain a work item for ATU. Such a service would probably require the co-operation of at least one mobile network in each participating country. It therefore

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<sup>23</sup> Nabwowe, A., 3 February 2005, “One SIM-card to cover the whole African continent”, Newspaper of the World Summit on the Information Society, Accra – Ghana.

faces similar challenges to some of the hard and soft interventions mentioned previously, although the unique perspective of ATU, ITU and development agencies may bring interesting results. Nevertheless, the ATU proposal would potentially still require the subscriber to carry two SIMs and is not a full substitute for roaming.

It is also conceivable that the introduction of more competitive domestic mobile markets, through the introduction of infrastructure-light mobile virtual network operators (MVNOs) could lead to innovative solutions to perceived problems in the roaming market. MVNOs encompass a wide variety of different business models, including widely differing infrastructure requirements (from “light” MVNOs that require only billing and customer service capabilities, to “heavy” MVNOs that deploy their own switching equipment). Currently MVNOs have no visibility of inbound roamers. If the MVNO had the ability to control aspects of the subscriber’s roaming experience, this could lead to greater competition in international roaming.

Given the commercial uncertainty around international SIMs, the technological uncertainty around MVNO roaming (combined with the absence of MVNOs in most African markets), neither of these solutions is likely to substantially change the landscape of international roaming in SADC in the next five years.

## **8.5 Qualitative evaluation of options**

The options in Section 8.4 are qualitatively evaluated in Figure 8.2.

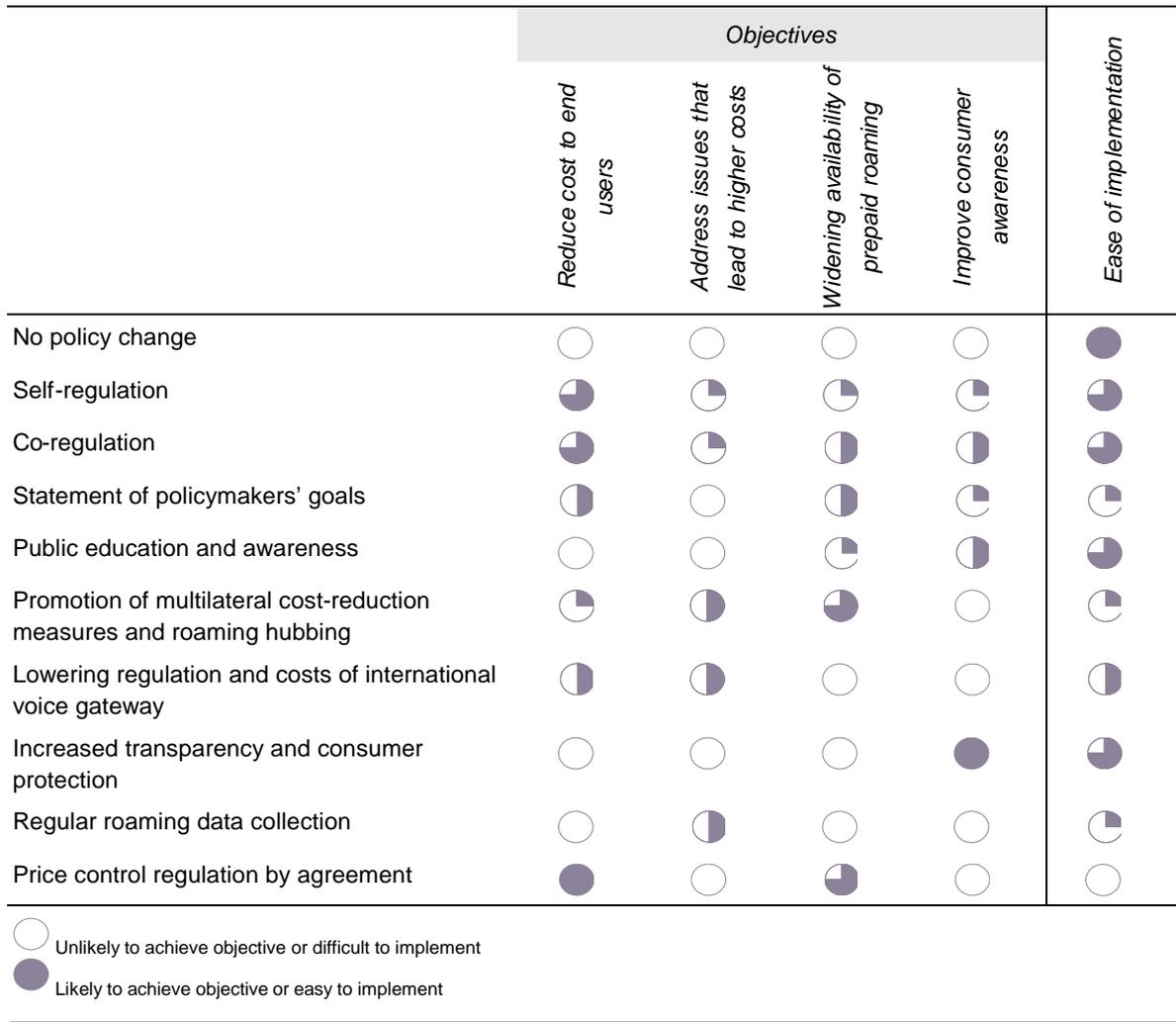


Figure 8.2: Qualitative comparison of the suitability of options [Source: Analysys Mason]

## 9 Recommendations

The present study is a partial regulatory impact assessment, and the costs and benefits of the options presented in Section 8.4 have not been analysed quantitatively. Nevertheless, it is important that concrete actions are identified to maintain the momentum that Ministers have imparted to the process – and that any intervention is proportionate and based on accurate information and analysis.

The following actions are recommended to be taken in the short term:

- **Statement of policymakers' goals.** CRASA should seek views from its member regulators and their governments on what goals are deemed realistic in a five-year time frame, given the SADC Ministers' determination that roaming is a policy priority. It should then put those goals out to consultation before finalising them.
- **Regular roaming data collection.** CRASA should compile a data collection template to be distributed to all member regulators, which should be completed on a regular basis (perhaps quarterly). The data collected could relate to costs, revenues, traffic volumes, number of roamers and prices. Regulators will need to be aware of the sensitivities relating to such data and define rigorous data handling procedures, which may involve having the data collected, validated and interpreted by a third party. Such data collection may also require minor development expenditure by mobile operators. The GSM Africa and SATA have a role to play in engaging their members in the process and soliciting their support and involvement. Such data will prove critical if further policy intervention is required.
- **Promotion of multilateral cost-reduction measures and roaming hubbing.** Data gathered from operators on a regular basis, supplemented by questionnaire feedback, could help to identify costs and conditions specific to SADC that are contributing to high roaming tariffs. CRASA or a number of other regional bodies may be able to coordinate initiatives to address those issues. Vendors and solution providers are likely to be cooperative if offered the opportunity to market their services to a regional audience offered by industry stakeholder groups.
- **Lowering regulation and costs of international voice gateway.** Regulatory obstacles to lowering international telecommunications costs (including but not limited to gateway licensing policy) persist in some countries. Unless there are compelling reasons to retain them, these should be removed in the wider interests of promoting electronic communications between SADC member states.

The key feature of all the actions recommended for short-term implementation is that they do not impose significant incremental costs or regulatory burden on mobile operators, and they also do not require appreciable resources from regulators or CRASA. They further provide a robust

platform on which to base any subsequent policy intervention. Following this, the following actions could be taken in the medium term (one to three years):

- **Increased transparency and consumer protection.** Some operators are already offering consumers clear tariffs and accurate information about the use of roaming, both in retail outlets and on their websites. While transparency is generally desirable, other operators have made a commercial decision not to publish their rates. Instead they charge retrospectively using the exchange rate in force during the roaming settlement period (rather than when the call is made). In doing so they may be able to offer consumers a lower average price than if they applied a mark-up that simply hedged the exchange rate risk. There is a risk therefore for both operators and consumers in forcing companies in competitive markets to adopt a particular tariff strategy. Moreover, introducing increased transparency and consumer protection as a regulatory requirement may, however, impose major regulatory burden on some operators (particularly small ones) and this should be evaluated more carefully before it is widely introduced. We would recommend that in the short term that industry stakeholder groups should look to begin a period of consultation with operators on this matter with a view to implementing a solution in the mid-term.
- **Price control regulation by agreement.** Price regulation will require protracted negotiation and careful consideration of the underlying cost of providing roaming services. It is therefore advisable to conduct a full regulatory impact assessment before adopting this approach. However, it may be worthwhile for regulators or governments to circulate a non-paper in the short term to identify as early as possible the challenges facing policymakers.

We therefore do not recommend that a full regulatory impact assessment be undertaken in the short term, until further data has been collected to support such an assessment.

# Annex A: Discussion guide – mobile network operators

## *Scene setting*

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Name

Name of organisation

Country

Current role

Number of years in role

Length of time within organisation

## *Introduction*

1. Introduction discussion around home and away roaming in **[country name]** For example:
  - a. What factors are driving roaming in **[country name]** [NB enquire about roaming in / out i.e. visitors to a territory, vs. travellers from a territory]
  - b. Thinking about your country, which countries do people most commonly roam to / from in the SADC region? (please mark with a 'T' for countries that people roam to and 'F' for countries that people roam from, selecting up to three of each)

---

*Name of country*

Angola

DRC

Madagascar

Mauritius

Namibia

South Africa

Tanzania

Zimbabwe

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*Name of country*

Botswana

Lesotho

Malawi

Mozambique

Seychelles

Swaziland

Zambia

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## *Retail roaming tariffs – high level overview*

2. Which market factors have the most influence on international retail roaming charges in **[country name]**?
3. Which regulatory factors have the most influence on international retail roaming charges in **[country name]**?

*Retail roaming tariffs: Home roaming product overview*

- 4. Do you operate national roaming in [country name]? If so:
  - a. Which operators do you have home roaming agreements with?
  - b. Is there any impact on retail tariffs when subscribers roam nationally? If so, what?
  - c. Do you offer voice and data roaming on all your tariffs? Please tick as appropriate:

Type of customer	Voice	Data	SMS
Prepaid			
Contract			
Customer / Personal			
Business / Corporate			

*Retail roaming tariffs: Away roaming product overview*

- 5. Do you require a deposit before allowing subscribers to roam internationally within the SADC region? If so, please describe (e.g. a deposit is only required if the mobile phone account has been active for less than six months, business and corporate accounts are not required to pay a deposit etc)
- 6. Thinking about your current retail roaming tariffs:
  - a. Thinking about your away roaming tariffs, do you offer voice and data roaming on all your tariffs? Please tick as appropriate:

Type of customer	Voice	Data	SMS
Prepaid			
Contract			
Customer / Personal			
Business / Corporate			

- b. Thinking now about your top five 'roamed to' countries in SADC, can you tell us about your retail roaming tariffs for each country (NB please specify the currency and the billing unit e.g. per minute, per second; and whether the tariff varies by time/day e.g. peak, off-peak, weekend etc):

<i>Name of country</i>	<i>Name of 'roamed to' operator</i>	<i>Peak / Off-peak / N/a</i>	<i>Local call</i>	<i>Call home</i>	<i>Received call</i>	<i>Send 1MB of data</i>	<i>Receive 1MB data</i>	<i>Sending local SMS</i>	<i>Sending an SMS home</i>	<i>Receiving an SMS</i>
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c. Thinking about these tariffs, are there any other charges (such as fixed-fees per call, or per month charges to access international roaming services)? Please describe.

7. Thinking still about your top five 'roamed to' countries in SADC, what is your total volume of roamed-in and roamed-out minutes?

<i>Name of country</i>	<i>Number of roamed in minutes</i>	<i>Number of roamed out minutes</i>
------------------------	------------------------------------	-------------------------------------

8. Do you offer any retail voice bundles/add-ons that include international roaming? Can you tell us about the cost of some of the more common bundles/add-ons, how many minutes are included and the cost of 'out of bundle' minutes?

<i>Name of voice bundle/add-on</i>	<i>Price</i>	<i>Description</i>
------------------------------------	--------------	--------------------

a. What about retail data bundles/add-ons?

<i>Name of data bundle/add-on</i>	<i>Price</i>	<i>Description</i>
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9. Do you offer any other tariff options for roamers – for example, ‘home market’ pricing (i.e. no roaming premium, with a connection fee, e.g. Vodafone passport)?

10. Approximately how many subscribers do you have on each of these service plans?

<i>Name of service plan</i>	<i>Number of subscribers</i>
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11. Thinking about your neighbouring countries, are there any countries in which high roaming rates are motivating international travellers to use an alternative approach to call home, for example “plastic roaming” (local SIM card), prepaid local number (PLN), IDD calls, satellite, VoIP, Wi-Fi? Please describe [NB anecdotal evidence is fine here]

#### *Consumer awareness*

12. Are first-time consumers who roam automatically aware that they are roaming when they travel to these countries and of the impact this will have on their bill?

13. Do you advertise international roaming charges to your customers? If so, how?

14. Have you taken any measures to increase customer awareness of international roaming charges and how they might reduce roaming charges? (e.g. advising customers that prices vary according to the network; advising customers how to manually select the network etc)

15. What mechanisms have you implemented to prevent customers from “bill shock” caused by roaming charges?

#### *Inter-Operator Tariffs (IOTs)*

16. Which market and regulatory factors have the most influence on wholesale roaming charges in [country name]?

17. Thinking now about your top five 'roamed to' countries in SADC, can you tell us about your IOTs for each operator in those markets (NB please specify the currency and the billing unit e.g. per minute, per second; and whether the tariff varies by time/day e.g. peak, off-peak, weekend etc):

<i>Name of country</i>	<i>Name of 'roamed to' operator</i>	<i>Peak / Off-peak / N/a</i>	<i>Local call</i>	<i>Call home</i>	<i>Received call</i>	<i>Send 1MB of data</i>	<i>Receive 1MB of data</i>	<i>Sending local SMS</i>	<i>Sending an SMS home</i>	<i>Receiving an SMS</i>
------------------------	-------------------------------------	------------------------------	-------------------	------------------	----------------------	-------------------------	----------------------------	--------------------------	----------------------------	-------------------------

a. Are there any other relevant costs other than the per minute fees [NB prompt with signalling costs, which may be charged back, annual fees, connection fees etc]

18. Which countries in SADC do you not have prepaid/postpaid roaming agreements with? Why?

<i>Name of country</i>	<i>Reason for absence of roaming agreement</i>
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a. Are there any countries within the SADC region in which you only have prepaid/postpaid roaming agreements with a single operator? Why?

<i>Name of operator</i>	<i>Reason for absence of roaming agreement</i>
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- b. Which operators within the SADC region do you not have prepaid/postpaid roaming agreements with that you would like to have roaming agreements with? Why?

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<i>Name of operator</i>	<i>Reason for wanting roaming agreement</i>
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19. Are the roaming agreements stand-alone or tied in with agreements concerning points of interconnect, traffic transit or anything else?
20. Do you have concerns about international bandwidth reliability or other quality of service issues in connection with your roaming partners within your country or within the SADC region?
21. Do you work with any roaming brokers?

*Traffic direction techniques*

22. Do you use traffic direction techniques (that is to say the techniques adopted to date by mobile operators to direct the traffic of their roaming customers abroad to specific and preferred foreign networks)? Please provide us with an overview.
- a. What proportion of traffic do you direct onto a preferred network?
23. Can you give us an overview of any groups / alliances with a bearing on IOTs of which you are a part?

*Other*

24. Do you know of / have you been involved in any disputes relating to roaming costs / rates?
25. Can you provide us with an indication of the margins are on roaming traffic (inbound and outbound)? [NB an estimate would be fine]

*Wrap*

26. Are there any other points that you would like to make?

27. May we tell CRASA that we spoke with your organisation?
28. May we say with whom we spoke?
29. May we attribute comments in the client report – (of course, all contributors will be completely anonymous in the executive summary)? (NB Tell contributors that the executive summary will be sent to contributors by email in April)
30. May we follow up with you directly if we have further questions relating to this study? (NB Check direct contact details, including phone number, fax and email)

# Annex B: Discussion guide – regulators and policy makers

## *Scene setting*

---

Name

Name of organisation

Country

Current role

Number of years in role

Length of time within organisation

## *Introduction*

### 1. Introduction discussion around home and away roaming in [**country name**]

For example:

- a. Is there any regulation around voice roaming in [country name] and internationally within the SADC region? What about data roaming?
- b. Do you think regulation of home (national) roaming is necessary?
- c. What about the regulation of international roaming within the SADC region?
- d. How much involvement does your organisation have with operators in connection with roaming, both at a national level and also internationally within SADC?
- e. Have you ever made, or considered, specific roaming interventions in the past? What was the outcome? If they were abandoned, what was the reason?
- f. Thinking about roaming in [**country name**], which countries do people most commonly roam to / from in the SADC region from your country? (please mark with a 'T' for countries that people roam to and 'F' for countries that people roam from, selecting up to three of each)

<i>Name of country</i>	<i>Name of country</i>
Angola	Botswana
DRC	Lesotho
Madagascar	Malawi
Mauritius	Mozambique
Namibia	Seychelles
South Africa	Swaziland
Tanzania	Zambia
Zimbabwe	

*Overview of current roaming (both wholesale and retail) tariffs*

2. How is ‘home’ retail and wholesale voice and data roaming regulated in [country name]?
3. How is ‘away’ retail and wholesale voice and data roaming regulated in [country name]?
4. Which market factors have the most influence on retail and wholesale roaming charges within SADC?
5. Which regulatory factors have the most influence on retail and wholesale roaming charges within SADC?
6. Thinking now about retail roaming prices in [country name], do you have any figures [estimates] on the average price for the following:

	<i>Consumer</i>	<i>Business user</i>	<i>Total</i>
Inbound minutes			
Outbound minutes			
Sending data (per MB)			
Sending an SMS			

7. Thinking about wholesale costs, do you have any information as to the level of charges both that the home operators charge and have to pay out for wholesale services to third-party international operators?
  - a. What sort of retail mark-up do operators in your country add to the wholesale charge?
8. Are there any other relevant costs other than the per minute fees [NB prompt with signalling costs, which may be charged back, annual fees etc]
9. What reasons can you think of for the high/low prices for the following (please refer to specific market examples):

<i>High or low</i>	<i>Reasons</i>
Inbound minutes	
Outbound minutes	
Sending data	
Sending an SMS	

10. Tell me about groups / alliances of mobile providers that have (e.g. through special agreements, cooperative ventures) had a marked impact on retail and/ or wholesale roaming costs within your country?

*Impact of regional roaming tariffs on national tariffs*

11. Have you seen any evidence that a reduction in roaming charges has resulted in an increase in other tariffs, or a reduction in the rate at which non-roaming tariffs fall (the ‘waterbed’ effect)? Do you expect that there might be if roaming charges were to be lowered by regulation?
12. In **[country name]**, what proportion of total mobile industry revenues is derived from voice, data and SMS roaming (NB please complete as available)?

<i>Revenue from service</i>	<i>Revenue as a proportion of total mobile industry revenues</i>
Voice roaming - retail	
Voice roaming - wholesale	
Voice roaming - total	
Data roaming - retail	
Data roaming - wholesale	
Data roaming - total	
SMS roaming - retail	
SMS roaming - wholesale	
SMS roaming - total	

13. Have you seen any evidence that reductions in wholesale roaming charges are passed through to customers in the form of cheaper retail roaming charges or that different levels of wholesale charges with different partners are reflected at retail level?
14. We understand that prepaid registration has recently been introduced in most SADC countries. Is this the case in your country and what impact (if any) has this had on roaming? (e.g. An increase in international roaming (‘calling home’) because illegal immigrants are now unable to acquire SIMs or because visitors to the country have found it more difficult to acquire a local SIMs)

15. Thinking about your neighbouring countries, are there any countries in which high roaming rates are motivating international travellers to use an alternative approach to call home, for example “plastic roaming” (local SIM card), prepaid local number (PLN), IDD calls, satellite, VoIP, Wi-Fi?

*Consumer awareness*

16. Are consumers aware that they are roaming when they travel to these countries and of the impact this will have on their bill?
17. Do you have any evidence of low consumer awareness of IR charges – both in relation to billing (whether they will be billed per second or per minute) and additional charges (such as taxes or fees)
18. Have you conducted any market surveys to look at consumer awareness of roaming tariffs and the problems experienced when roaming?
19. Is there a national website which contains relevant information on roaming and pricing of roaming?
20. Are there any push mechanisms in place (e.g. ‘welcome SMS’) when subscribers roam onto other networks?

*Market share*

21. Thinking now about market share, do any operators in your country singly or jointly have designated Significant Market Power (SMP)<sup>24</sup> in any of the areas relating to international roaming?

*Market share - Wholesale*

22. Are you able to provide us with information for 2009 on the following originated (i.e. overseas travellers visiting [country name] and initiating calls) metrics (ideally split by operator) (NB, if any operator has a particularly high market share, why do you think that is?)

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<sup>24</sup> Significant market power refers to an operator who individually or jointly with another operator has a position of economic strength affording it the power to behave to an appreciable extent independently of competitors’ customers and the interests of consumers

	<i>Total</i>	<i>Operator 1</i>	<i>Operator 2</i>	<i>Operator 3</i>
Originated voice volumes				
Originated voice revenues				
Originated data volumes				
Originated data revenues				
Originated SMS volumes				
Originated SMS revenues				

*Service delivery and performance*

23. In what way do you think network infrastructure and architecture impacts on the ability to deliver roaming?
24. Do you have concerns about international bandwidth reliability or other quality of service issues in connection with roaming within your country or within the SADC region, particularly at times of network congestion?

*Other*

25. Do you have any authority to impose price caps on wholesale roaming tariffs?
26. Do you have any authority to impose price caps on retail roaming prices?
27. Do you know of any disputes relating to roaming costs / rates?

*Wrap*

28. Are there any other points that you would like to make?
29. May we tell CRASA that we spoke with your organisation?
30. May we say with whom we spoke?
31. May we attribute comments in the client report – (of course, all contributors will be completely anonymous in the executive summary)? (NB Tell contributors that the executive summary will be sent to contributors by email in April)
32. May we follow up with you directly if we have further questions relating to this study? (NB Check direct contact details, including phone number, fax and email)

## Annex C: Perspectives from Europe

Here we analyse roaming regulations that have been implemented in Europe, including consideration of the motivation for such regulations, the process of implementing regulations and also the effects of such regulation.

Although the SADC finds itself in a very different regulatory situation from Europe, not least because there is currently no supra-legal framework for the regulation of the communications sector, valuable insight can still be gained from understanding recent regulatory developments that have taken place in the European Union, as well as the fact that these developments have had a wider impact on regulatory expectations outside Europe.

### C.1.1 Background

The process through which the European Commission (EC) has begun regulating the whole voice, SMS and data markets has been progressive, occurring in stages, starting with increasing the awareness of the consumers of the current charges applied by the operators when using mobile phones while travelling in Europe. Prior to June 2007, retail charges were particularly high due in part to the high wholesale prices and the mark-ups applied by MNOs. As calls for the market to self-regulate failed, the EC initiated a number of consultations from 2005 to analyse the wholesale and retail charges in the different EU countries. This was followed by a series of regulations that came in force starting from July 2007, and which set price caps to retail voice calls and SMS, and the wholesale price of data services.

### C.2 Key events in the regulation of intra-EU roaming

In the past five years, the European Commission (EC) has taken a series of steps to curb the once very high cost of using mobile services (both voice and non-voice) while travelling within the European Union (EU).<sup>25</sup> The latest EU regulation came into force on 1 July 2009 in all member states, setting maximum charges for roaming SMS messages (at retail and wholesale levels) and data transfers at the wholesale level.<sup>26</sup> A previous regulation, which came into force on 30 June 2007, set maximum charges (wholesale and retail) for roaming voice calls in the EU, obliging mobile network operators (MNOs) in EU member states to offer capped 'Eurotariffs' for roaming

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<sup>25</sup> See Annex D: Timeline of EU action on international roaming charges in the member states.

<sup>26</sup> Official Journal of the European Union, (29 June 2009), *Regulation (EC) No 544/2009 of the European Parliament and of the Council of 18 June 2009 amending Regulation (EC) No 717/2007 on roaming on public mobile telephone networks within the Community and Directive 2002/21/EC on a common regulatory framework for electronic communications networks and services*. Available at <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:167:0012:0023:EN:PDF>.

voice calls.<sup>27</sup> Both regulations also made it compulsory for MNOs to provide their users, in a timely manner, with personalised and transparent pricing information on roaming services. The objective of these regulations has been to create a single EU-wide market for mobile services, in which the price of mobile services when travelling do not differ significantly from those at home. After summarising the scope of the regulations applicable to roaming services in the EU member states at July 2009, the latest paper analyses the impact of regulating roaming services, both for mobile users and for mobile network operators (MNOs), for voice and non-voice services. It concludes by assessing whether EU regulation has brought about the end of bill shock for European roaming users.

Prior to preparing the first roaming regulation (Regulation (EC) No 717/2007, which came into force on 30 June 2007), the EC published an impact assessment study of the possible effects of regulating roaming services.<sup>28</sup> This study was undertaken in July 2006, and estimated that the average retail charge to EU consumers for making a roaming call was around EUR1.15 per minute.<sup>29</sup> This was five times more than the cost of providing the service, and 50% higher than the corresponding wholesale charge (the Inter Operator Tariff or IOT; this is the charge paid by the mobile caller's home network operator to the operator of another network from which the mobile user makes a call). The charge for receiving calls when abroad was estimated to be four times the actual cost of providing the service to the operator. By introducing a maximum per-minute price of EUR0.49 for calls made abroad, the 2007 roaming regulation effectively reduced retail prices by 60%, compared with the 2006 level. (In fact, by the time the 2007 roaming regulation came into full force, at the end of August 2007, MNOs had already begun to reduce retail roaming rates, so it cut the average retail price of calls made by 35% and that of calls received by 36%.) The retail price cap was further decreased in August 2008, and will continue to decrease annually until 2012; it currently stands at EUR0.43 per minute.

Similarly, when preparing its amendment to the EU roaming regulation of 2007, the EC found that prices for roaming SMS messages and data transfers were excessive. In January 2008, the European Regulators Group (ERG) began to record the average price of roaming services in biannual reports, including regulated voice services and (then unregulated) roaming SMS and data transfer services.<sup>30</sup> These reports showed that the average retail price for sending a roaming SMS message remained stable, at very close to EUR0.29 per message, during the period 2Q 2007–3Q 2008. By introducing a maximum price of EUR0.11 per SMS message sent, the September 2008 amendment to the 2007 roaming regulation cut the retail price of SMS messages by 60% (from EUR0.29, the average retail price for a roaming SMS message at 3Q 2008) when it came into force

<sup>27</sup> Official Journal of the European Union (29 June 2007). *Regulation (EC) No 717/2007 of the European Parliament and of the Council of 27 June 2007 on roaming on public mobile telephone networks within the Community and amending Directive 2002/21/EC*. Available at <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2007:171:0032:0040:EN:PDF>.

<sup>28</sup> The 2007 EU roaming regulation was extended to the EEA countries Iceland and Norway in December 2007. Commission of the European Communities (Brussels, 2006), *Impact assessment of policy options in relation to a Commission proposal for a regulation of the European parliament and of the council on roaming on public mobile networks within the community*. Available at [http://ec.europa.eu/information\\_society/activities/roaming/docs/assessment\\_en.pdf](http://ec.europa.eu/information_society/activities/roaming/docs/assessment_en.pdf).

<sup>29</sup> All prices quoted in this paper are without VAT unless specified otherwise.

<sup>30</sup> ERG reports are available at [http://www.erg.eu.int/documents/docs/index\\_en.htm](http://www.erg.eu.int/documents/docs/index_en.htm).

on 1 July 2009. In a June 2008 study, the EC found that users did not make much use of roaming data services because of their high prices (EUR5–10 per megabyte) and because of the lack of pricing transparency.

Tables C1 and C2 list the maximum charges for regulated roaming services set out in the EU roaming regulation of 2007, which concentrated on voice calls (retail and wholesale), and its June 2009 amendment, which extended the 2007 regulation until 2012, introduced per-second billing obligations on roaming voice calls, and introduced regulation for non-voice services. The amendment introduced price caps only for wholesale charges for roaming data transfers. However, although no maximum retail charges were imposed, the amendment stipulated the introduction by 1 July 2010 of a cut-off limit that users will be able to request and beyond which any roaming data transfer service will be suspended. The introduction of a cut-off limit in the amendment was an attempt to avoid what is called bill shock, which describes the situation in which users inadvertently run up bills of thousands of euros when using data services abroad. Another measure intended to avoid bill shock is the extension to non-voice services of the obligation on MNOs to provide personalised tariffing information to their roaming customers, in a timely manner and before they start to use roaming services; this obligation has applied to voice services since June 2007. Customers can also opt out of receiving such information, which can be more sensible for regular business travellers. Operators are also obliged to offer the possibility for free calls to emergency services on 112, and provide a freephone number for more personalised information.

In September 2008, the first roaming regulation (Regulation (EC) No 717/2007) was amended, which sets retail price caps for sending and receiving SMS messages and a maximum wholesale charges for data transfers. The new regulation (Regulation (EC) No 544/2009) came into force in July 2009.

As of March 2010, roaming customers are able to opt-in to receive information about accumulated data volume and expenditure and let the operator set a limit to the data usage. This is currently set to a default EUR50, after which the customer needs to explicitly request another limit. This default level is set for every single trip (i.e. entry to the visiting territory), and is reset every time the customer returns to her home country. All customers will be automatically subjected to a default limit of EUR50, and they will receive a notification when they reach 80% the usage cap. Once all the data credit is consumed, operators will send instruction on how to resume their usage. These notifications can be in the form of SMS, e-mails or popup-window (when using a dongle with a laptop).

A review of the EU regulations is scheduled for 2011. It will evaluate whether the introduction of caps and introduction of notifications have been successful in stimulating competition, reduce retail prices and make consumers more aware of roaming usage and associated charges. It will also be decided if there will be a need to further reduce retail and wholesale price caps for voice and SMS. As data services are regulated only at the whole level, if the current caps are not sufficiently reflected in retail prices, the European Commission may also introduce retail data caps in the next review phase.

**Table C1:** Details of regulated roaming services as set in the EU roaming regulation of 2007 (Regulation (EC) No 717/2007) [Source: Analysys Mason, 2010]

	30 June 2007 <sup>31</sup>	30 August 2008	30 August 2009 <sup>32</sup>	30 June 2010	Billing method
Average wholesale charge per call minute	EUR0.30	EUR0.28	EUR0.26	Regulation expiry date	Not specified; the EC estimates that billing per increment of more than one second, instead of per-second billing, results in a surcharge of 24%
Retail price per minute, calls made	EUR0.49	EUR0.46	EU0.43	Regulation expiry date	Not specified; the EC estimates that billing per increment of more than one second, instead of per-second billing, results in a surcharge of 24–25%
Retail price per minute, calls received	EUR0.24	EUR0.22	EUR0.19	Regulation expiry date	Not specified; the EC estimates that billing per increment of more than one second, instead of per-second billing, results in a surcharge of 19–20%

**Table C2:** Details of regulated roaming services as set in the amendment to the 2007 roaming regulation ((EC) No 544/2009) [Source: Analysys Mason, 2010]

	1 July 2009	1 July 2010	1 July 2011	30 June 2012	Billing method
Average wholesale charge per call minute	EUR0.26	EUR0.22	EUR0.18	Regulation expiry date	Per second
Retail price per minute, calls made	EUR0.43	EUR0.39	EUR0.35	Regulation expiry date	Per second (an initial 30-second increment is allowed)
Retail price per minute, calls received	EUR0.19	EUR0.15	EUR0.11	Regulation expiry date	Per second from the first second
Ave wholesale charge per SMS sent	EUR0.04	EUR0.04	EUR0.04	Regulation expiry date	Per SMS
Retail price for an SMS sent	EUR0.11	EUR0.11	EUR0.11	Regulation expiry date	Per SMS
Retail price for an SMS received	Free	Free	Free	Regulation expiry date	Not relevant
Wholesale charge per MB of packet-switched data transfer (inc. MMS)	EUR1.00	EUR0.80	EUR0.50	Regulation expiry date	Per megabyte

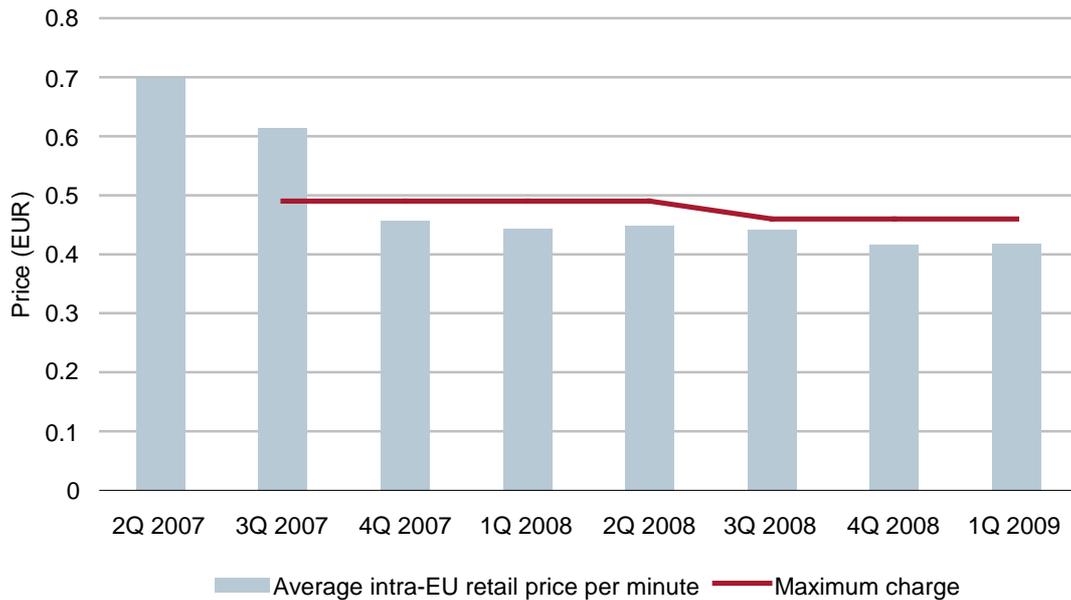
<sup>31</sup> This is the date by which MNOs had to make Eurotariffs available to customers requesting them. By 30 August 2007, Eurotariffs became applicable to all customers, including those not actively having requesting them (with the exception of customers on special roaming packages that were cheaper than the Eurotariffs).

<sup>32</sup> This was brought forward to 1 July 2009 by the September 2008 amendment of the 2007 roaming regulation.

### C.3 Regulation has benefited the end users, and price-usage elasticity allows operators partially to offset the effect of cuts in roaming charges

In its implementation report of March 2009, the EC reported that the 2007 roaming regulation has been widely and smoothly adopted by the 27 EU member states.<sup>33</sup> Figures collected by the European Regulators Group (ERG) in its biannual reports also indicate that European MNOs have decreased their average roaming charges, as indicated in Figures C1 and C2.

**Figure C1:** Average intra-EU retail per minute price<sup>34</sup>, calls made [Source: ERG<sup>35</sup> and Analysys Mason, 2010]

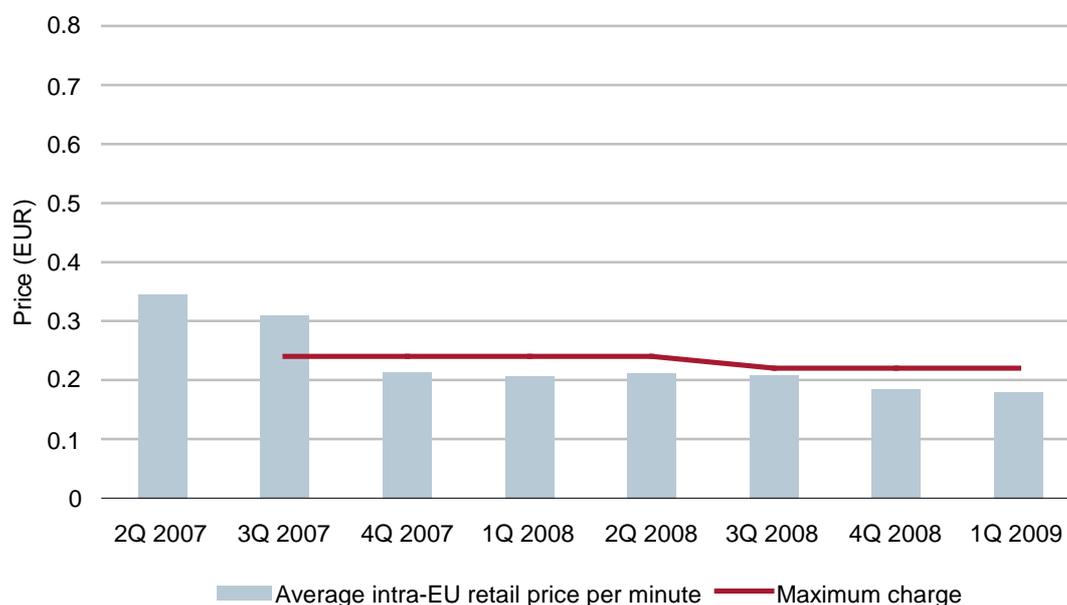


<sup>33</sup> COM(2009)140Final, *Progress Report on the Single European Electronic Communications Market 2008 (14th Report)*. Available at [http://ec.europa.eu/information\\_society/policy/ecomm/library/communications\\_reports/annualreports/14th/index\\_en.htm](http://ec.europa.eu/information_society/policy/ecomm/library/communications_reports/annualreports/14th/index_en.htm).

<sup>34</sup> From the end of June 2007, when the 2007 EU roaming regulation came into force, this is the average of (standard roaming) Eurotariffs and retail rates on special roaming packages. Previously, this was simply the average retail rate applicable to intra-EU roaming calls.

<sup>35</sup> ERG (09) 31, *International Roaming ERG Benchmark Data Report for October 2008 – March 2009*, available at [http://www.erg.eu.int/doc/publications/2009/erg\\_09\\_31\\_international\\_roaming\\_report\\_090722.pdf](http://www.erg.eu.int/doc/publications/2009/erg_09_31_international_roaming_report_090722.pdf). ERG (09) 01, *International Roaming ERG Benchmark Data Report for April 2008 – September 2008*, available at [http://www.erg.eu.int/doc/publications/2009/erg\\_09\\_01\\_intern\\_roaming\\_rep3\\_090112.pdf](http://www.erg.eu.int/doc/publications/2009/erg_09_01_intern_roaming_rep3_090112.pdf). And ERG (08) 36, *International Roaming ERG Benchmark Data Report for October 2007 – March 2008*, available at [http://www.erg.eu.int/doc/publications/erg\\_08\\_36\\_intern\\_roam\\_rep\\_080812.pdf](http://www.erg.eu.int/doc/publications/erg_08_36_intern_roam_rep_080812.pdf).

**Figure C2:** Average intra-EU retail per minute price, calls received [Source: ERG and Analysys Mason, 2010]



#### C.4 Operators' roaming revenue has decreased, but not in proportion to cuts in the charges, largely because of price-usage elasticity

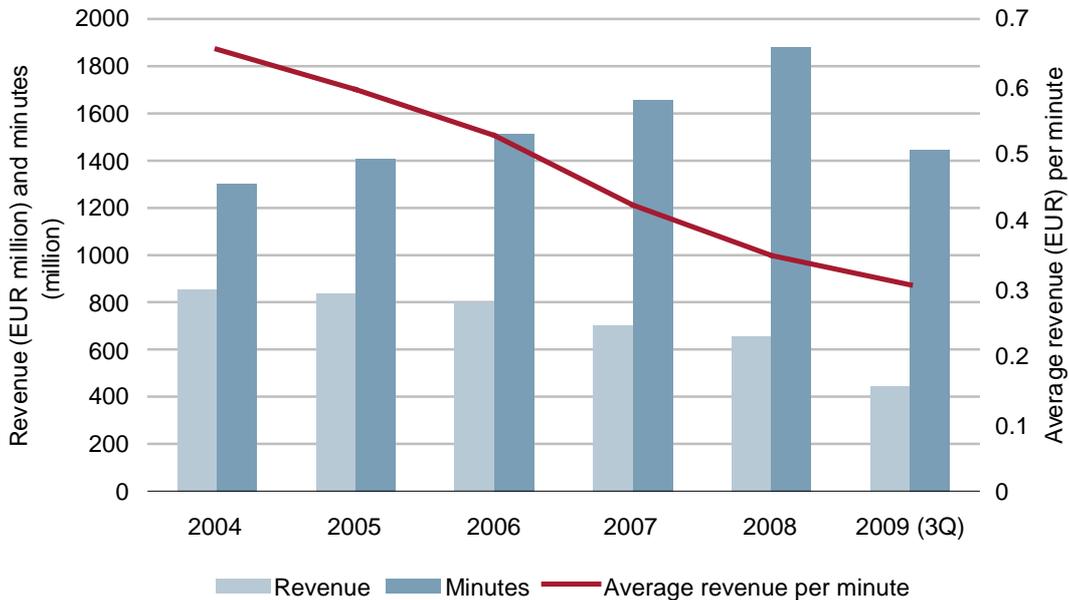
In 2006, the EC estimated that roaming revenue represented a substantial source of revenue for mobile operators, accounting for about 6% of total mobile revenue in the EU (pre-regulation). Understandably, the idea of cutting roaming rates within the EU was not welcomed by the mobile industry; the EC's calls for self-regulation in 2005 and 2006 were only partly answered by MNOs, which launched special roaming packages, but left standard roaming tariffs unchanged. (We describe special roaming packages in the four case studies at the end of this section.)

It is difficult to quantify the effect on individual mobile operators of the cuts in retail roaming charges because retail roaming call revenue (roaming-out revenue) is rolled into operators' total service revenue and ARPU, which are affected by a number of factors. However, most operators cite decreasing roaming prices (together with cuts in mobile termination rates and competitive pressure) as the cause of declining voice ARPUs.

Figures from the ERG's reports on international roaming show the following effects, comparing 2Q 2007 with 2Q 2008 (roaming traffic is seasonal, so it is necessary to compare changes in prices and traffic volumes for the same periods in different years): for calls made, the average retail rate for an intra-EU roaming call decreased by 36% and the volume of calls increased by 39%, suggesting that operators earned 11% less retail revenue for calls made. For calls received, the average intra-EU retail rate decreased by 39% and the volume of calls increased by 40%, suggesting that operators earned 14% less retail revenue for calls received. Assuming a ratio of 2:1 between calls made and received, this would indicate that the total retail roaming revenue (roaming-out revenue) for all mobile operators in EU countries decreased by 12% between



**Figure C3:** Roaming-in revenue in France, 2004–2009 (3Q) [Source: ARCEP and Analysys Mason, 2010]



It is difficult to draw any general conclusions on the effect of all cuts in charges on the total roaming revenue (retail and wholesale, or roaming-out and roaming-in). As an example, however, in April 2008, Orange France reported that its roaming revenue for February 2008 was stable, compared with February 2007.<sup>37</sup> This may not have been the case at the same period in 2009, as Orange's roaming revenue will almost certainly have been negatively affected by the slowdown in international travel caused by recession in most EU countries.

## C.5 Case studies

### Vodafone Passport

**Vodafone** launched its Passport service in May 2005, initially covering thirteen EU countries (coverage had extended to 35 as of June 2009, plus the USA and Australia). Its principle was to charge roaming usage at the same tariff as the user's domestic price plan, plus a connection fee. In September 2006, Vodafone reported that more than 33% of its customers had taken up the free opt-in service, and that European roaming calls were on average twice as cheap for these customers as for an average roaming user. Vodafone Passport was extended to roaming data usage in mid-2007, with data transfer being charged at domestic rates, plus the connection fee. In 2009, Vodafone UK launched a summer roaming promotion, valid in June, July and August 2009, in which it waived the GBP0.75 (EUR0.87) connection fee on roaming calls, in effect allowing subscribers to use their price plans in any of the Vodafone Passport countries.

<sup>37</sup>

France Télécom, *Présentation sur la réglementation en Europe – Jacques Champeaux – 15 avril 2008*. Available at [http://www.francetelecom.com/fr\\_FR/finance/investisseurs/reu-thematiques-conf/att00007112/080415\\_UpdateonregulationinEurope.pdf](http://www.francetelecom.com/fr_FR/finance/investisseurs/reu-thematiques-conf/att00007112/080415_UpdateonregulationinEurope.pdf).

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### Telefónica's My Europe

**Telefónica/O2** launched its special roaming scheme, My Europe, in July 2006 (initially in the UK) as a free opt-in option for all contract and prepaid UK customers. It offered roaming calls made and received within the EU at a flat rate of GBP0.35 (EUR0.51) per minute.<sup>38</sup> In October 2006, O2 UK added the 'high roamer' option to the My Europe scheme for its residential customers: for GBP5 (EUR7.4) per month, the option offered free incoming calls and a calling charge of GBP0.25 (EUR0.37) per minute for all calls made by O2 UK's customers in Spain, while calls received in Spain were free of charge. 'high roamer' was extended to all My Europe countries in February 2007 under the name My Europe Extra at the price of GBP10 (EUR12) per month; the Spain-only option remained and was renamed Preferred country Spain. From the outset, both My Europe Extra and Preferred country Spain were made available to SMEs at half the rate offered to residential customers, but with a 12-month contract. The complete My Europe scheme was extended to non-UK subsidiaries of Telefónica during 2007.

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### Orange Travel

**Orange** had rolled out Orange Travel to all its European subsidiaries by mid-2007. Orange Travel consists of a number of offers available to residential and SME customers. The main residential offers include the following (correct for customers in France): for occasional travellers, the Pass Vacances started in 2007 at EUR5 for 10 minutes of calls made and 10 minutes of calls received, usable within one week of activation (equivalent to a flat rate of EUR0.25 per minute); in July 2008, the bundle's price increased to EUR6 for the same call allowance and 10 inclusive (sent) SMS messages. For regular travellers, Europe Sans Frontière (Europe without Borders) was launched in April 2007, offering the same call rate for intra-EU (outgoing) calls from France or intra-EU (outgoing and incoming) roaming calls: 80 minutes of calls for EUR30 (EUR0.375 per minute) or 180 minutes for EUR60 (EUR0.33 per minute). In June 2009, Europe Sans Frontière had been renamed Option Destination Europe and an Option Destination Préférée (similar to O2's Preferred country tariff) was available. In addition to Orange Travel, Orange's standard EU roaming tariffs (Eurotariffs) stood at EUR0.51 per minute for calls made, EUR0.23 per minute for incoming calls, and EUR0.13 per sent SMS message (all equal to the EU's maximum charges, with 19.6% VAT) as of 1 July 2009.

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### 3 Like Home

Until 30 June 2009, **3 UK** offered the 3 Like Home service whereby users could use mobile services on any of Hutchison Whampoa's other networks in the world (Austria, Australia, Denmark, Hong Kong, Ireland, Italy and Sweden) and be charged at their domestic rates. 3 Like Home was phased out at the end of June 2009, when 3 unveiled its Eurotariffs: GBP0.34 (EUR0.40) per minute for calls made and GBP0.15 (EUR0.18) per minute for calls received (both billed per second), while sending a text costs GBP0.11 (EUR0.13).

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### Virgin Travel Passes

In February 2010, Virgin Media launched a range of new 'Travel Passes', which allow customers to use mobile Internet and mobile broadband to surf anywhere in the EU. Price start from £6 for mobile Internet access all day or £10 for mobile broadband access.

There are two mobile Internet Travel Passes. A 1-hour Travel Pass costs £4, with a 3MB limit, while a 24-hour Travel Pass costs £6, with a 5MB data cap. To activate a mobile internet EU Travel Pass, customers simply text BUY + pass name (e.g. 24HR or 1HR) to a Shortcode 23456.

There are four mobile broadband EU Travel Passes, which allow customers to access data for one day (£10 for

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<sup>38</sup>

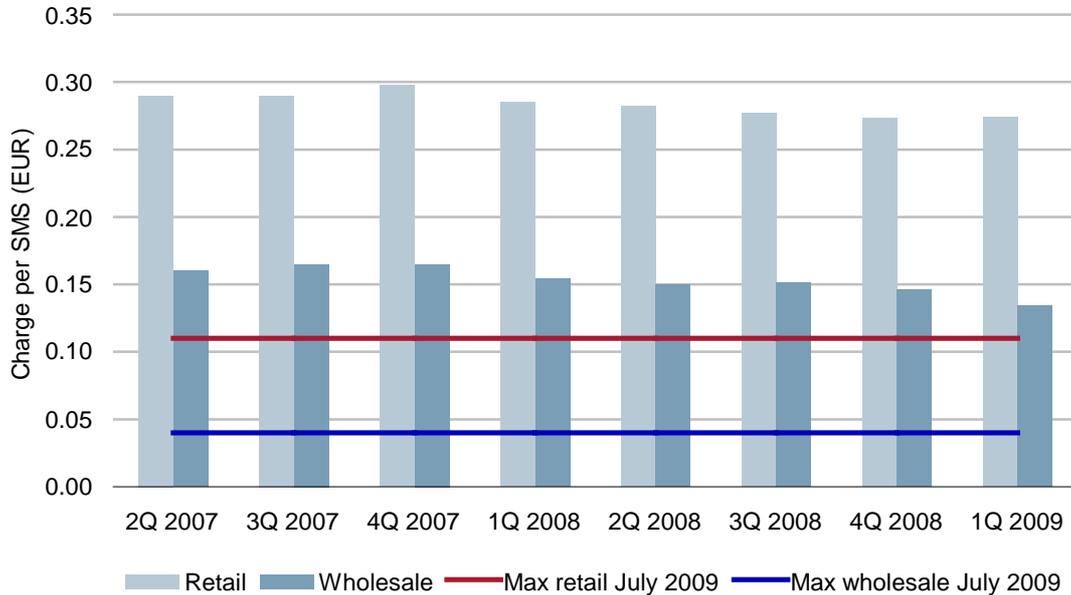
The offer also applied to other, non-EU (for some of them, at the time) countries, such as Guernsey, Jersey, Isle of Man, Malta, Slovenia, Cyprus, Monaco, Spain, San Marino, Andorra, Gibraltar, Liechtenstein, Switzerland, Faroe Islands and Norway.

10MB); three days (£15 for 15MB); seven days (£30 for 30MB); and 30 days (£60 for 60MB). To activate a mobile broadband pass, text BUY + pass name (e.g. 1DAY or 3DAY) to 23456. All passes are effective from the time they are bought, and applicable to the EU/EEA zone.

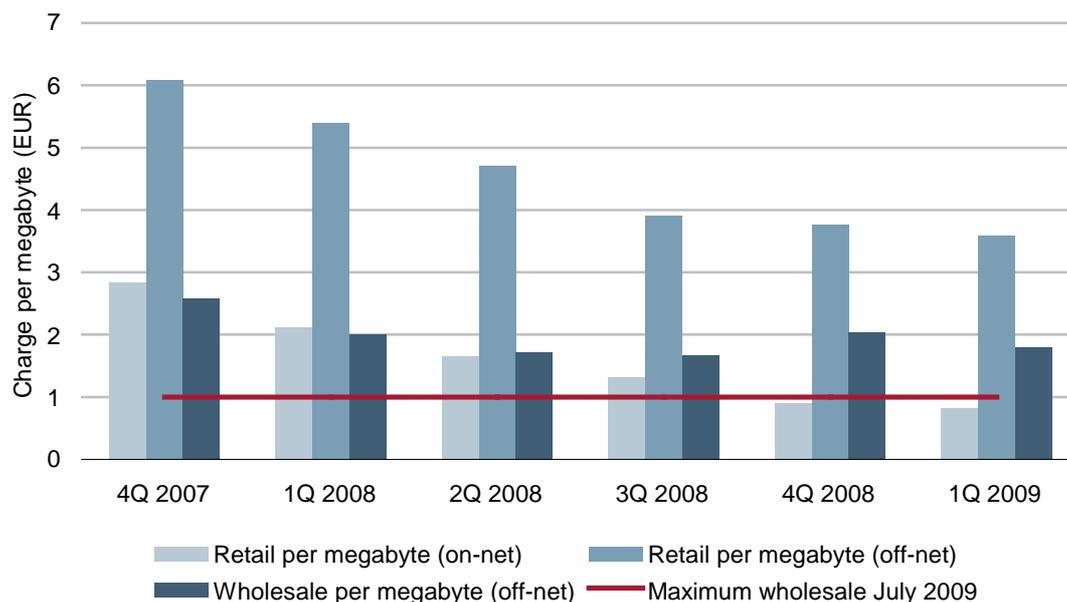
### C.6 Retail charges for roaming data transfer services may decrease enough to avert EU regulation in 2012

ERG data indicates that wholesale and retail data transfer charges have decreased at a faster rate than those for SMS messages (also unregulated during the period of observation), as indicated in Figures C4 and C5 and most importantly that savings on wholesale charges for data transfer seem to be passed on to the end-users through cheaper tariffs. One reason for the declining prices of roaming data is that the service is subject to direct competition from a number of other services, in a way that roaming voice and SMS messages are not: for data, travellers can use Wi-Fi hotspots (The Cloud charges GBP4.50 (EUR5.25) for one hour or GBP9.99 (EUR11.66) for 24 hours for Wi-Fi access in the UK) or they can simply pick up a prepaid data SIM in the country they are visiting. Therefore, it is possible that, as competitive pressure (from substitutive services and between operators themselves) continues to operate, roaming data transfers might avoid regulation altogether when the current regulation expires in 2012.

**Figure C4:** Average roaming charge per SMS message sent [Source: ERG and Analysys Mason, 2010]



**Figure C5:** Average roaming charge per megabyte of data transferred [Source: ERG and Analysys Mason, 2010]



### C.7 Roaming services still have the potential to induce bill shock, but the likelihood of this is greatly reduced for the average user

In 2009, there was a number of roaming bill shock stories. A German traveller who downloaded a TV program while roaming in France faced a bill of EUR46,000 on his return home. In another example, a UK student was reported to receive a bill of almost EUR9,000 for data roaming with an Orange USB dongle while studying in Paris.

In the hope to bring about the end of bill shock for average users, EU regulation has been to put in place to bring about the end of bill shock for average users, who use their phones mainly for narrowband services. However, the potential for bill shock did not disappear altogether in July 2009, as shown in the following examples.

- Between now and July 2010, when a user-defined cut-off limit will block mobile data transfers, mobile users can still run up large bills when using data-hungry services within the EU (although they will have been made aware of applicable charges for data transfer and should be able to monitor their costs while roaming). Assuming a retail rate of EUR1 per megabyte, it would still cost about EUR10 to watch a five-minute YouTube video (at 2MB per minute of video), or EUR200 to download a 200MB film.
- For mobile users who typically make most of their calls on their monthly allowance, using roaming voice services can quickly double their monthly bill. For instance, a French mobile user on Orange's EUR25-per-month contract (which includes two hours of domestic voice calls) will run up a bill of more than the monthly contract price (EUR30, including VAT) simply by making two calls of one minute each day for two weeks.

- But the main potential source of bill shock continues to be extra-EU, and therefore unregulated, roaming voice calls. For instance a Vodafone UK prepaid customer calling home from Turkey in the next few months will pay GBP1.45 (EUR1.78) per minute, including VAT.

As margins on intra-EU roaming services continue to fall, it will be increasingly important for operators to offer competitive segment-specific roaming packages in order to encourage roaming usage and maintain roaming revenue.

EU regulation has undoubtedly meant a better deal for consumers but they may not be sufficient to eliminate bill shock as EU regulations only apply EU operators (and those in Norway and Iceland) on intra-EU mobile traffic, making roaming outside the EU subject to high charges and no caps. With consumer getting accustomed to the price caps and notifications in place in Europe, it is likely the size of the bill that consumers are likely to accumulate during their overseas travelling will have a greater effect.

Furthermore, the regulations so far have focused on the retail prices for roaming voice and SMS and have not set caps to data services. This explains why retail charges are still high which can still lead to high bills, especially that demand for media content is set to increase. The risk of bill shock can be reduced with the introduction of user-defined cut-off limits in July 2010, which block mobile data transfers beyond a set spend.

## Annex D: Timeline of EU action on international roaming charges in the member states

Date	Action
1 March 2010	Roamers could opt-in to receive information about current data usage and to set a usage cap of EUR50. These will become enabled by default to all customers by July 1 <sup>st</sup> 2010.
1 July 2009	The amendment to the EU roaming regulation of 2007 that had been proposed by the EC in September 2008 came into force, setting retail price caps for sending and receiving SMS messages while travelling within the EU and setting maximum wholesale charges for data transfers
April 2009	The European Parliament voted in favour of the amendment to the EU roaming regulation of 2007 proposed by the EC in September 2008
September 2008	The EC proposed an amendment to the EU roaming regulation of 2007 to extend regulation to non-voice services. The amendment would cut the retail prices of SMS messages and wholesale charges for data transfers from 1 July 2009. Snapshots prepared by the European Regulators Group (ERG) indicated that from 2Q 2007 to 3Q 2008 (the latest quarter covered by the most recent ERG report) the average retail price for an SMS sent while roaming in the EU had been stable at around EUR0.29 (maximum EUR0.75); data transfer cost as much as EUR5–10 per megabyte
July 2008	EC started work on what was to become the September 2008 amendment to the EU roaming regulation of 2007
January 2008	ERG published its first international roaming report (covering 2Q 2007 and 3Q 2007)
July 2007	EU regulation on international roaming charges came into force, setting maximum prices that MNOs may charge their customers for making phone calls while travelling within the EU to EUR0.49 for made calls and EUR0.24 per minute for received calls and for wholesale charges for roaming voice calls
May 2007	The European Parliament voted in favour of a regulation applicable to roaming voice calls proposed by the EC in May 2006 and which was to become the 2007 roaming regulation (Regulation (EC) No 717/2007)
May 2006	The EC proposed regulation on international roaming voice services within the EU (to become the 2007 EU roaming regulation)
April 2006	Second-phase consultation on proposed EU roaming regulation (to become the 2007 EU roaming regulation)
March 2006	In a press release after an update of EC's roaming website launched in October 2005, Information Society and Media Commissioner Viviane Reding noted that, despite her previous calls to the industry for self-regulation, retail prices for international roaming services within the EU had not declined significantly since September 2005. The website showed retail prices for a four-minute roaming call varying from EUR0.20 to EUR13.05 (equivalent to EUR0.05–3.26 per minute and, on average, EUR1.15 per minute)
February-March 2006	First-phase consultation on the proposed EU roaming regulation (to become the 2007 EU roaming regulation)
October 2005	EC launched a roaming website to help the public understand the prices they might pay to use their mobile phones abroad within the EU member states. This website was still running at July 2009 <sup>39</sup>
July 2005	Commissioner Viviane Reding issued a press release <sup>40</sup> warning consumers of the high

<sup>39</sup>

Available at [http://ec.europa.eu/information\\_society/activities/roaming/index\\_en.htm](http://ec.europa.eu/information_society/activities/roaming/index_en.htm).

Date	Action
May 2005	<p>retail prices charged by MNOs for using mobile services abroad. She also announced the launch of a consumer website that would list international roaming tariffs from operators within the EU member states</p> <p>The ERG consultation on wholesale international roaming rates, begun in December 2004, concluded that retail and wholesale international roaming rates applied by MNOs in the EU member states were high without clear justification.<sup>41</sup> Retail charges were high because of high wholesale rates, but also because home MNOs applied high mark-ups on roaming mobile usage, and savings on wholesale charges were not always passed on to end users. On the basis of these results, national regulatory authorities in EU member states started work on the market analysis of market 17 in their own countries</p>
December 2004	The ERG, supported by the EC, began an investigation into what operators charged each other for wholesale international roaming <sup>42</sup>
July 2004	The EC challenged two UK mobile operators, O2 and Vodafone, over excessive wholesale international roaming rates charged to foreign MNOs for the period from 1997 (Vodafone) or 1998 (O2) to September 2003. The challenge was based on an investigation carried out by the EC in July 2001. <sup>43</sup>
February 2003 (published in OJ of the EU on 8 May 2003)	The EU recommendation on relevant markets (2003/311/EC), which formed part of the 2002 EU regulatory package, identified the wholesale international roaming market (market 17) as one of the 18 markets in which SMP designation could apply and <i>ex ante</i> regulation could be applied on designated SMP operators <sup>44</sup>

<sup>40</sup> Reding, V., European Commission (Brussels, 2005), *Commission warns consumers on cost of using mobile phone abroad and targets lack of price transparency*. Available at

<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/05/901&format=HTML&aged=0&language=EN&guiLanguage=en>.

<sup>41</sup> For a summary of the findings, see the European Regulators Group press release: *Regulators intensify work on mobile international roaming*. Available at [http://erg.eu.int/doc/whatsnew/reg\\_intens\\_wrk\\_intl\\_roaming\\_mtg.pdf](http://erg.eu.int/doc/whatsnew/reg_intens_wrk_intl_roaming_mtg.pdf).

<sup>42</sup> ERG press release (Brussels, 2004), *Commissioner Reding welcomes EU-wide investigation on cost of using a mobile phone abroad*. Available at <http://europa.eu/rapid/pressReleasesAction.do?reference=IP/04/1458&format=HTML&aged=1&language=EN&guiLanguage=en>.

<sup>43</sup> EC press release, (Brussels, 2004), *Commission challenges UK international roaming rates*. Available at <http://europa.eu/rapid/pressReleasesAction.do?reference=IP/04/994&format=HTML&aged=1&language=EN&guiLanguage=en>.

<sup>44</sup> The Commission of the European Communities, (Brussels, 2003), *Commission recommendation of 11 February 2003 on relevant product and service markets within the electronic communications sector susceptible to ex ante regulation in accordance with Directive 2002/21/EC of the European Parliament and of the Council on a common regulatory framework for electronic communication networks and services*. Available at [http://ec.europa.eu/information\\_society/policy/ecomm/doc/implementation\\_enforcement/article\\_7/recom\\_11022003.pdf](http://ec.europa.eu/information_society/policy/ecomm/doc/implementation_enforcement/article_7/recom_11022003.pdf).