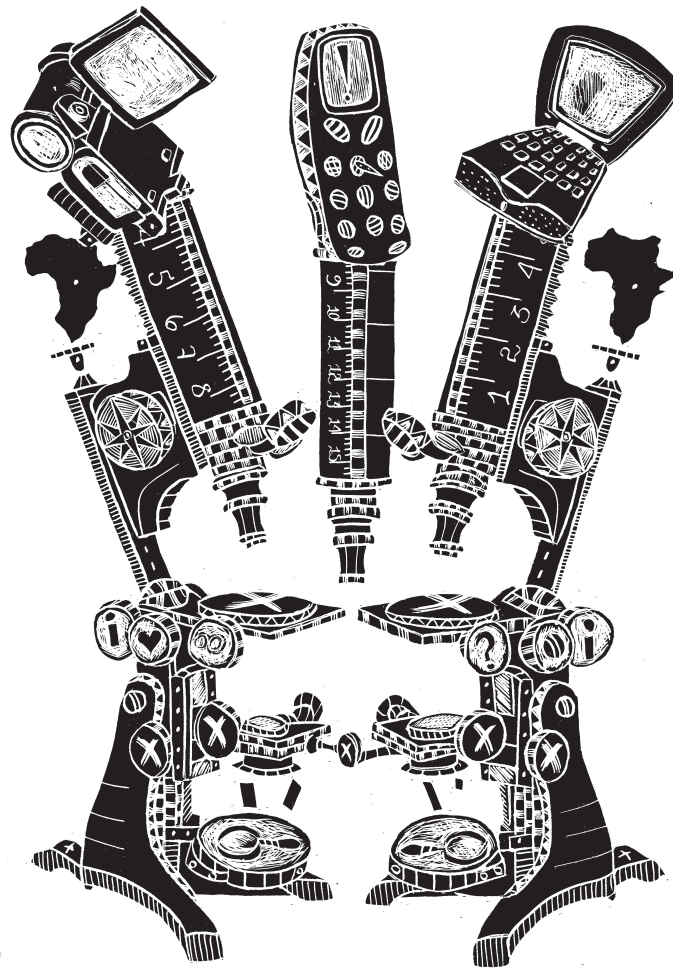


LINK



# *International mobile roaming in Africa*

*Ewan Sutherland*

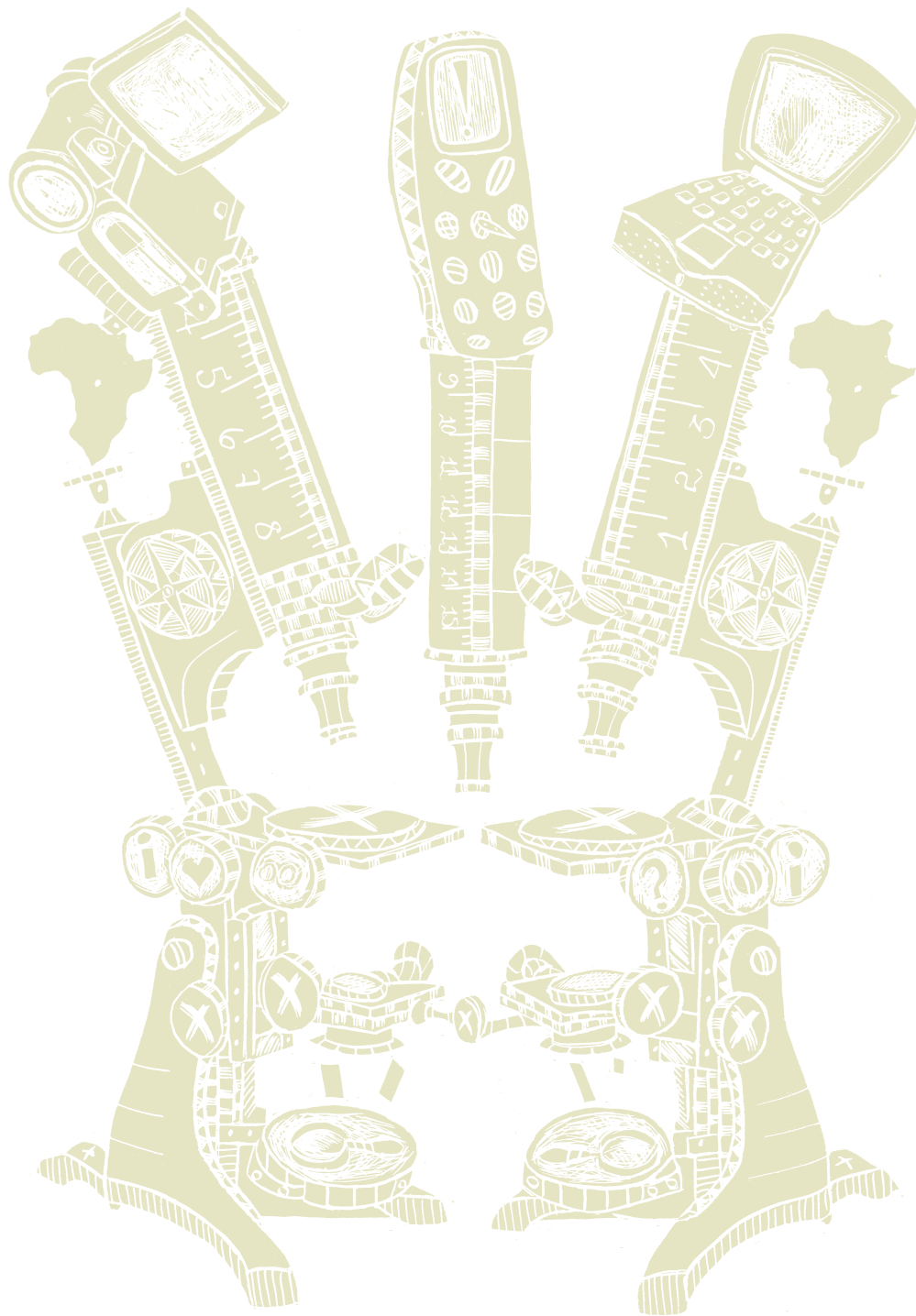
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*ICT, THE NETWORK KNOWLEDGE ECONOMY AND DEVELOPMENT*

The LINK Centre was founded in 1999 at the Graduate School of Public and Development Management, University of the Witwatersrand, Johannesburg. On the African continent as elsewhere, knowledge is becoming an increasingly dominant factor of production, resulting in the reshaping of societies and economies, mediated by new electronic media. LINK's mission, therefore, includes the preparation of research papers on policy and regulatory issues and developments in the broad ICT sector. These papers are presented as a contribution to the debates on the changing patterns of ICT adoption and e-development in the 21st century African economy and society. This work is organised as independent, non-profit, public interest research.

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- e-development, connected cities and e-governance
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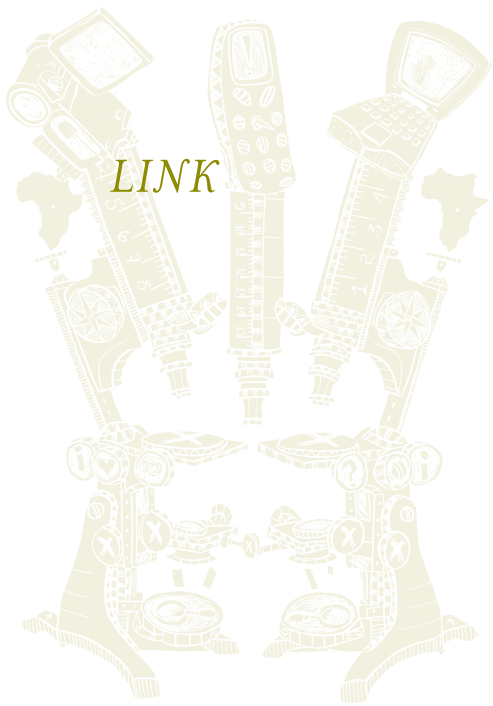
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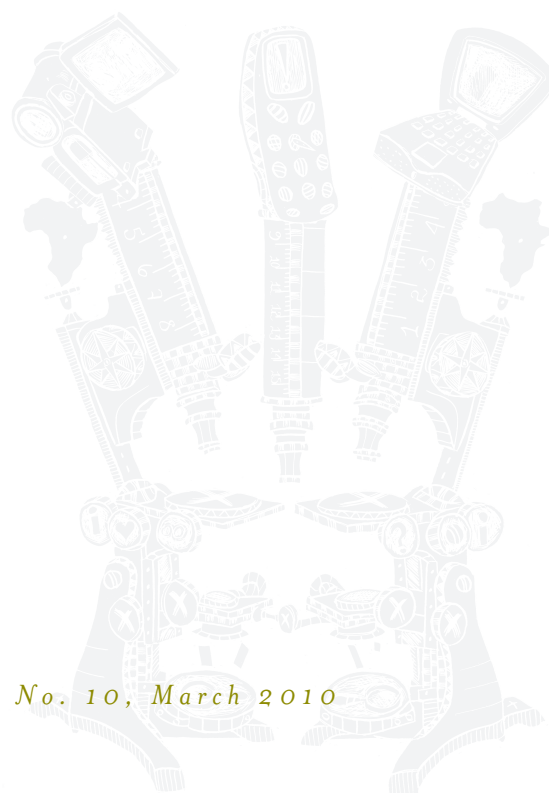
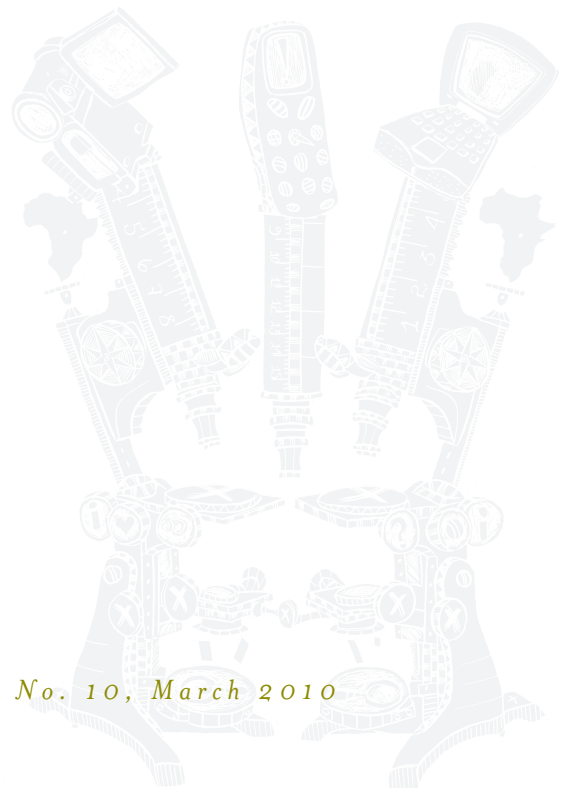



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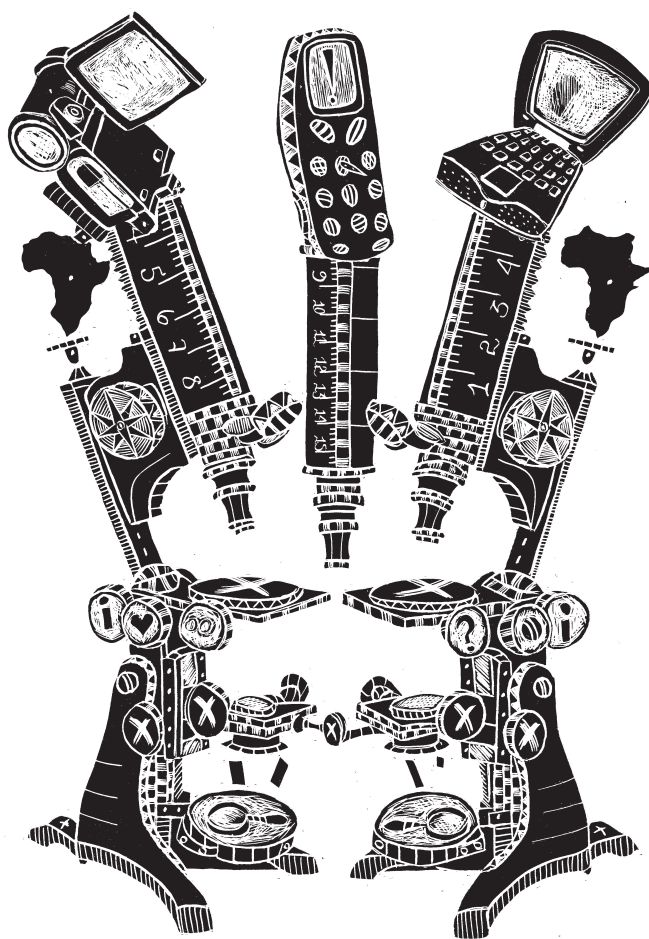
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*ABSTRACT: INTERNATIONAL MOBILE ROAMING IN AFRICA*

The persistence of high prices for international mobile roaming has been part of the global policy agenda for half a decade. In Africa, there have been studies but as yet no legislative or regulatory action. Yet the initiative of one large operator has seen the introduction of trans-national tariffs without a roaming surcharge, forcing competitors to respond, in order to attract and to retain customers. This has both saved money for consumers and avoided the need for policy interventions that might have proved counterproductive. In some countries this offer remains impossible, because the market for international gateways has yet to be opened.







## *International mobile roaming in Africa*

**EWAN SUTHERLAND**, Research Associate, LINK Centre, Graduate School of Public & Development Management, University of the Witwatersrand.

### *INTRODUCTION*

Recent years have seen remarkable growth in cellular wireless telecommunications in Africa, rising to over 300 million reported connections or around one-third of the population (see Figure 1). The predominant technology has been GSM, with some CDMA networks and a very few individual users of satellite telephony (eg Inmarsat and Thuraya).<sup>1</sup> These numbers are significantly overstated due to the ownership by some individuals of multiple SIM cards – with the need to take around 20% off the estimated mobile teledensity (Sutherland, 2009).

<sup>1</sup> The CDMA Development Group (CDG) reported 19.4 million customers at the end of 2008 and 22.9 million in March 2009. [http://www.cdg.org/worldwide/cdma\\_world\\_subscriber\\_cdma2000region.asp](http://www.cdg.org/worldwide/cdma_world_subscriber_cdma2000region.asp)



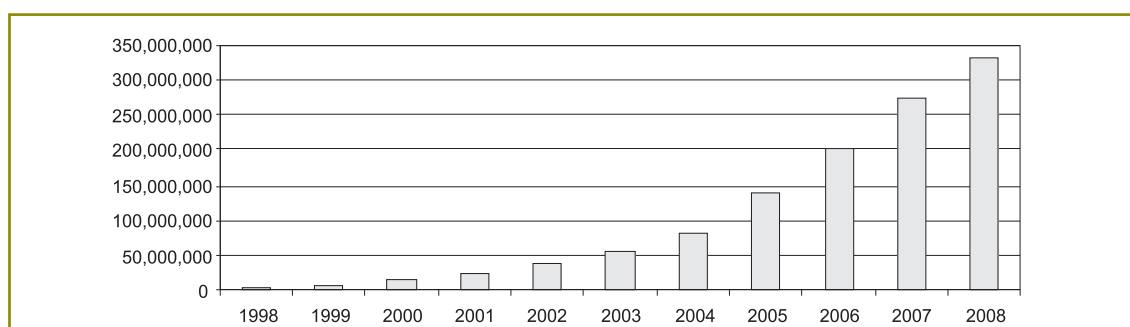


FIGURE 1 GROWTH OF MOBILE CONNECTIONS IN AFRICA

Source: ITU World Telecommunication/ICT Indicators Database 2009.

Overwhelming numbers of these customers are pre-paid (see Figure 2), as has been almost all the recent growth. This reflects low levels of disposable income, uncertainty about future cash flows and a lack of experience of using credit. Moreover, the operators do not have access to credit records for prospective customers, making risk assessment impracticable.

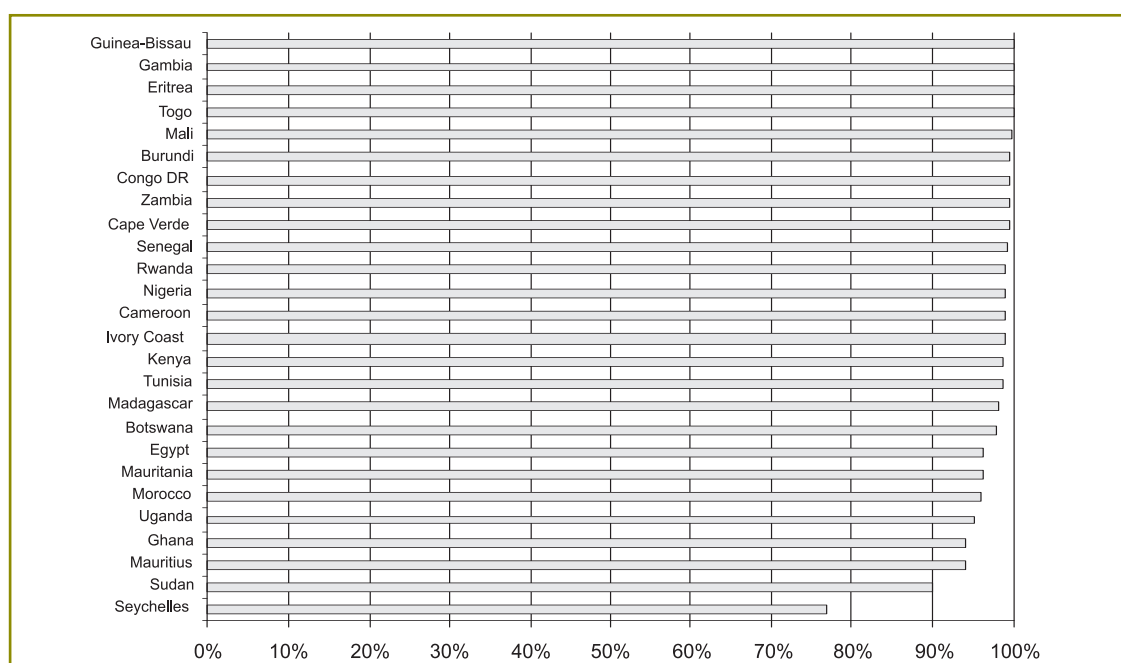
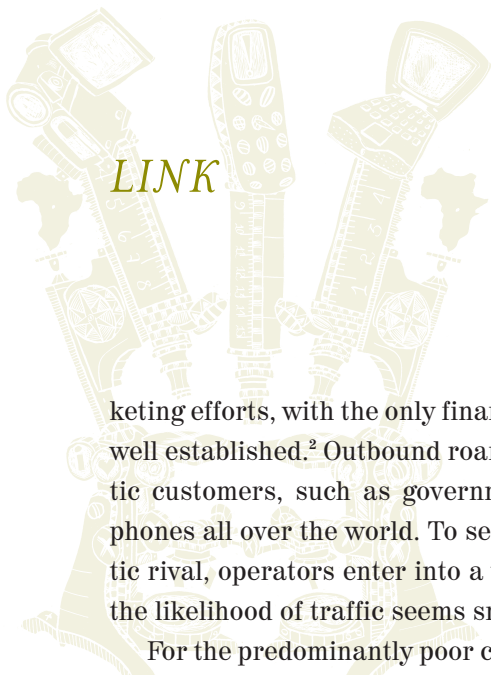


FIGURE 2 PREPAID CUSTOMERS IN SELECTED AFRICAN COUNTRIES IN 2008

Source: ITU World Telecommunication/ICT Indicators Database 2009.

For an operator in a developing country, International Mobile Roaming (IMR) is a very attractive service, both for inbound and outbound roamers. Inbound traffic generated by visiting tourists, business travellers, journalists, government officials and the like can be lucrative even in war zones, with visiting foreigners making expensive IMR calls from airports, hotels and offices. The traffic is paid for by foreign operators in foreign currency and requires no mar-



keting efforts, with the only financial risk being fraud control for which the procedures are now well established.<sup>2</sup> Outbound roaming is appealing to an equivalent set of high-spending domestic customers, such as government ministers and business leaders, who wish to use their phones all over the world. To secure these customers and to avoid them switching to a domestic rival, operators enter into a very wide range of contracts for IMR, even in countries where the likelihood of traffic seems small.

For the predominantly poor customer base, the option of paying very high rates for IMR simply does not exist. Instead, customers will find cheap options, of which the most obvious is to purchase a local SIM card and to engage in “plastic roaming”. This is inconvenient for colleagues, family and friends, who are no longer able to call the known number.

Africa now has a number of geographically extensive operator groups (see Table 1). This allows them to internalise IMR traffic, where they can obtain an international gateway licence. There remain formal monopolies which require all international traffic to pass through an incumbent operator in: Angola, Burkina Faso, Cameroon, Eritrea, Ethiopia, Gambia, Zambia and Zimbabwe (ITU, no date).

Historians and political scientists have commented on the arbitrary boundaries imposed on Africa by the colonial powers in the 19th century and retained at independence in the 20th century (Touval, 1999; Laremont, 2005). These boundaries affect often-ignored language and cultural groupings which may straddle a line drawn on a map by someone in Berlin, London or Paris. One consequence of this is that people quite naturally cross borders and wish to continue using their GSM handsets. Nomadism is an ancient tradition in many parts of Africa, developed as a solution to a shortage of resources.

This paper examines the overall market for roaming in Africa. It then considers the *One Network* tariff initiated by the Zain Group and the responses from other operators. The various regulatory initiatives undertaken in the regional economic communities are examined. The introduction of hubbing for roaming is also considered. Finally, conclusions are drawn and issues identified for future research.

<sup>2</sup> See, in particular, GSM Association’s Billing, Accounting and Roaming Group (BARG) and Certified Fraud Training Programme.

TABLE 1 GEOGRAPHICAL FOOTPRINTS OF TRANS-NATIONAL OPERATORS

	Zain	Millicom†	MTN	Orange	Orascom	Portugal Telecom	Vodafone‡
Algeria					X		
Angola						X	
Benin			X				
Botswana			X	X			
Burkina Faso	X						
Cameroon			X	X	X		
Cape Verde Islands						X	
Central African Republic				X			
Chad	X	X					
Congo (Brazzaville)	X		X				
Congo (DR)	X	X					X
Egypt				X	X		X
Equatorial Guinea				X			
Gabon	X						
Ghana	X	X					X
Guinea (Conakry)			X				
Guinea Bissau			X			X	
Ivory Coast			X	X			
Kenya	X			X			X
Lesotho							X
Liberia			X				
Madagascar	X			X			
Mali				X			
Malawi	X						
Mauritius		X		X			
Mozambique						X	
Namibia						X	
Niger	X			X			
Nigeria	X		X				
Rwanda		X	X				
São Tomé & Príncipe						X	
Senegal		X		X			
Sierra Leone	X	X*					
South Africa			X				X
Sudan	X		X				
Swaziland							
Tanzania	X	X					X
Tunisia					X		
Uganda	X		X	X			
Zambia	X		X				
Zimbabwe							

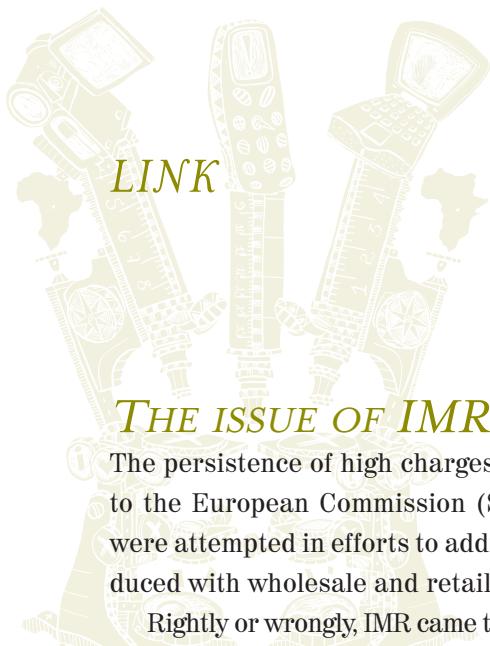
Sources: Websites of Zain, Millicom, MTN Group, Orange, Orascom, Portugal Telecom, Vodafone, GSM World (nd)

† Trading as Tigo

‡ Including Safaricom and Vodacom

\* Sold by Millicom to Africell, but still trading as Tigo.

## II



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## THE ISSUE OF IMR

The persistence of high charges for IMR was noted as early as 1999, in complaints addressed to the European Commission (Sutherland, 2001). A number of competition law mechanisms were attempted in efforts to address the problem, with little success, until legislation was introduced with wholesale and retail price caps (European Commission, 2009).

Rightly or wrongly, IMR came to be seen as a policy or regulatory problem, rather than a commercial issue or opportunity. IMR became a feature of regulatory discussions, being raised at regional bodies for Asia-Pacific and the Americas, and at the OECD. It was discussed at the ITU-T in Study Group 3, first in 2002 and again in 2009.<sup>3</sup> The ITU-D held discussions at the 2006 Global Symposium for Regulators (GSR) and included a chapter on IMR in the 2008 edition of *Trends in Telecommunications Reform* (ITU, 2008). IMR was also included in the ICT Regulatory Toolkit.<sup>4</sup>

The issue of IMR is complex. Indeed, a significant part of the problem has been the poor level of understanding of the economics.<sup>5</sup> Individual operators can do little and seem to have strong incentives not to reduce prices for large numbers of their customers. Individual governments and regulators are caught in a catch-22 situation, being expected to act but unable to do much that is unlikely not to be counterproductive. Collective action requires a legal basis that, outside the EU, does not exist except, possibly, in commitments under the World Trade Organisation (WTO) agreements.

## THE AFRICAN ROAMING MARKET

In 2008, the global market for roaming was estimated to be worth US\$24.5 billion, with some 365 million roamers. Of that total, African countries represented only one percent of outbound roamers, forecast to grow to around three percent by 2013 (see Figure 3). A substantial majority of African roamers are consumers, rather than business travellers, though both groups are expected to grow strongly.

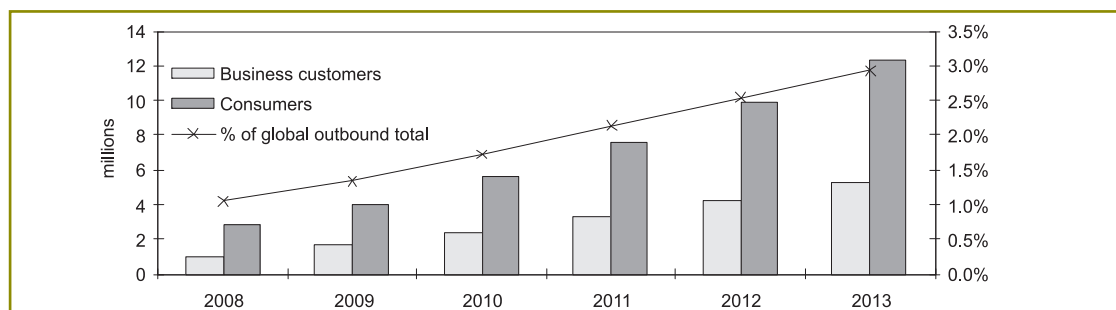


FIGURE 3 FORECAST OF TOTAL OUTBOUND ROAMERS FROM AFRICAN OPERATORS

Source: Informa (2008) Figure 7.37, page 252

Unfortunately, there are no equivalent estimates for inbound roamers, making it very difficult to assess the market dynamics or to understand the cash flows. Only when inbound and

<sup>3</sup> <http://www.itu.int/ITU-T/studygroups/com03/index.asp>

<sup>4</sup> <http://www.ictregulationtoolkit.org/>

<sup>5</sup> One useful contribution is: Fabio Manenti & Paolo Lupi, 2006. "Roaming the Woods of Regulation: Public Intervention vs Firms Cooperation in the Wholesale International Roaming Market," Marco Fanno Working Papers 0019, Dipartimento di Scienze Economiche, <http://www.decon.unipd.it/assets/pdf/wp/20060019.pdf>

outbound roamers are both accounted for can the net effects of IMR be seen. Countries in North Africa and some of the Small Island Developing States (SIDS) are likely to have heavy volumes of inbound traffic from tourists and from returning migrant workers.

Unusually, there are data for roaming traffic for the Cape Verde Islands, showing the preponderance of inbound over outbound traffic, the result of tourists and migrants (see Table 2). Taking the 2005 data on tourists, some 198 000 visitors (cf a total population of 500 000), it represents about 13 minutes per visitor over an average stay of four to five nights.<sup>6</sup> In 2008, the outbound roaming represented only 0.1% of total mobile voice traffic, while inbound roaming was about 2.4%. It is likely to be a substantially higher portion of the international calls originating on mobile networks, given the higher charges.

TABLE 2 ROAMING TRAFFIC TO AND FROM CAPE VERDE ISLANDS (MINUTES)

	2006	2007 H1	2007 H2	2008 H1	2008 H2	2009 H1
Inbound	2 460 218	1 228 046	1 263 128	1 345 419	1 345 176	1 619 123
Outbound	66 537	49 701	62 115	61 287	101 361	490 473
Net traffic	2 393 681	1 178 345	1 201 013	1 284 132	1 243 815	1 128 650

Source: Agência Nacional de Comunicações (ANAC), Cape Verde, 2009

The revenues earned by mobile operators in Africa from outbound roaming are shown in Figure 4. There are minimal amounts from SMS and data roaming, with the vast majority of the money coming from voice traffic. The forecast growth comes mostly from roaming between countries in Africa.

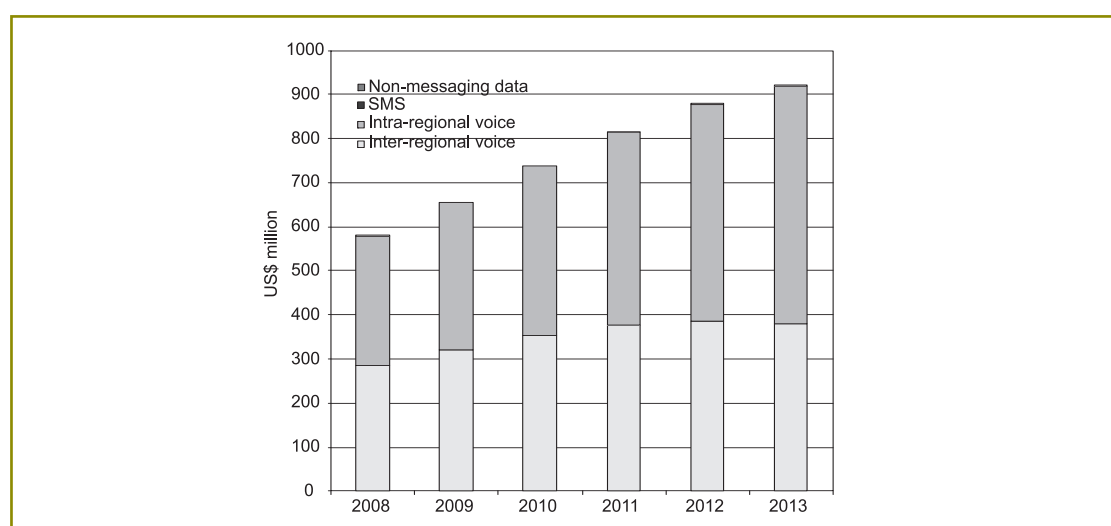
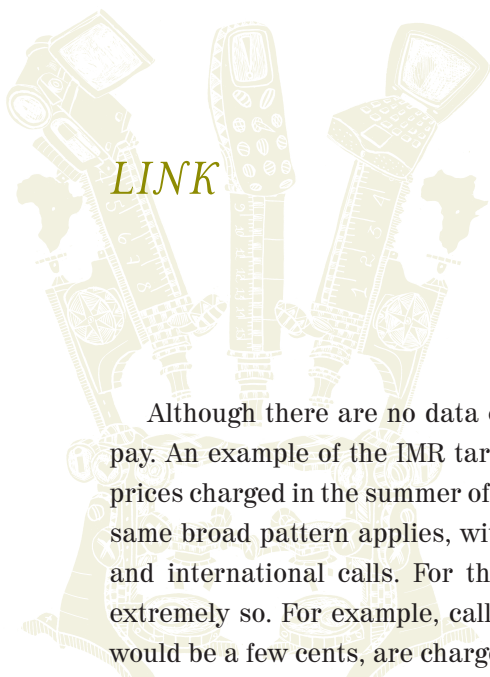


FIGURE 4 FORECAST OF TOTAL OUTBOUND ROAMING REVENUES OF AFRICAN OPERATORS

Source: Informa (2008), Figure 7.41, page 256; Figure 7.42, page 257

<sup>6</sup> For example, a visitor from Portugal calling home on TMN pays EUR.74, pays EUR0.66 per minute for a forwarded call and EUR0.54 to send an SMS, [http://www.tmn.pt/TMN%20Institucional/Roaming/Pre-Pagos/tarif\\_pps.pdf](http://www.tmn.pt/TMN%20Institucional/Roaming/Pre-Pagos/tarif_pps.pdf)



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Although there are no data on inbound roamers, it is possible to consider the prices they pay. An example of the IMR tariffs for visitors from the US is given below. Table 3 shows the prices charged in the summer of 2006, while Table 4 shows prices from the summer of 2009. The same broad pattern applies, with a *flat rate* charge, the same per minute for incoming, local and international calls. For the most part, the prices are quite expensive, in some cases extremely so. For example, calls forwarded to Kenya from the US, where the wholesale cost would be a few cents, are charged at US\$3.99 or US\$4.99 per minute. The differences between the two tables suggest there is little, if any, competition between operators in the US. Although some customers engage in plastic roaming, it would appear not to exert any pressure on the operators in the US.

**TABLE 3** INTERNATIONAL ROAMING CHARGES FOR US-BASED CUSTOMERS IN AUGUST 2006

	<b>Cingular Standard</b>	<b>Cingular World Traveler</b>	<b>Sprint</b>	<b>T-mobile</b>	<b>Verizon Global phone</b>
South Africa	2.49	1.69	1.50	1.49	2.49
Mozambique	3.49	3.49	1.50	1.99	1.29
Malawi	4.99	4.99	-	1.99	1.29
Tanzania	3.99	3.99	1.50	4.99	1.29
Kenya	3.49	3.49	1.50	4.99	4.99
Ethiopia	3.49	3.49	-	-	-
Sudan	3.49	3.49	-	-	-
Egypt	2.49	2.29	1.50	1.99	-

Source: Sutherland, 2006

**TABLE 4** INTERNATIONAL ROAMING CHARGES FOR US-BASED CUSTOMERS IN AUGUST 2009

	<b>AT&amp;T Standard</b>	<b>AT&amp;T World traveler</b>	<b>Sprint</b>	<b>T-Mobile*</b>	<b>Verizon Global phone+</b>
South Africa	2.49	1.69	2.49	1.49	2.89/2.29
Mozambique	2.49	2.49	2.49	1.99	2.89/2.29
Malawi	3.49	3.49	3.49	1.99	2.89/2.29
Tanzania	4.99	4.99	4.99	4.99	4.99/3.99
Kenya	3.99	3.99	3.99	4.99	4.99/3.99
Ethiopia	3.49	3.49	3.49	2.99	2.89/2.29
Sudan	3.49	3.49	3.49	-	2.89/2.29
Egypt	2.49	2.29	2.49	1.99	2.89/2.29

Source: Websites of AT&T, T-Mobile, Verizon (no date)

\* Roaming charges do not include local tolls or long distance charges.

+ The higher rate is the standard roaming plan and the lower rate is the value plan.

The net effect of IMR in Africa is very difficult to assess in the absence of data on the inbound number of minutes. Even the relatively expensive rates shown in Table 3 and Table 15 cannot be fully assessed without data on the wholesale rates paid by the US-based operators to their African IMR partners. It seems likely that the bulk of the profit on these calls is being retained in the developed countries.

### ONE NETWORK

Celtel was a leading African mobile operator with a substantial geographical presence, often in adjoining countries. In March 2005, the Mobile Telecommunications Company (MTC) of Kuwait announced it had a binding agreement to acquire 100% of the shares of Celtel International BV for US\$3.36 billion. At the end of 2006, MTC launched its new strategy: ACE Accelerating the growth in Africa; Consolidating the existing assets; and Expanding into adjacent markets. This was to achieve 3x3x3:

*It is the strategy that will make Zain a global player in three stages: regional, international and global, with each stage completed in three years, with an aim of reaching a customer base of 150 million. In essence, with this expansion plan, we aim to achieve in nine years what other companies have taken more than 27 years to achieve (Zain, no date).*

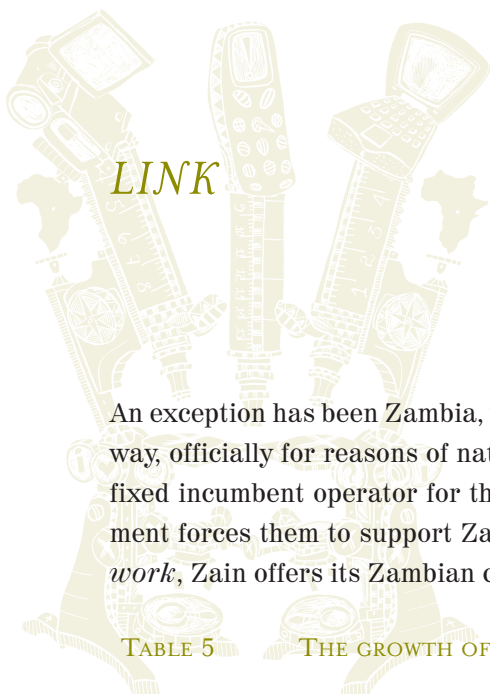
In September 2007, MTC adopted the use of the Zain brand (Zain, 2007a). In early 2010, Zain entered into exclusive negotiations with Bharti Airtel of India to sell its operation in Africa, except for Morocco and Sudan (Bharti, 2010).

MSI, later part of Celtel, had operations on both sides of the Congo River, in DRC and in the Republic of the Congo (M2 Presswire, 2002). Although Kinshasa and Brazzaville, the two capitals, are separated by only seven kilometres, telephone traffic had been routed to the respective fixed incumbent operators who only interconnected in Europe. The costs for this were considerable and had the effect of suppressing demand. MSI obtained the necessary licences and installed a microwave link across the Congo River in 2002, allowing it to cut the charges by 80% and greatly increase traffic volumes. This problem was replicated on different scales in many border areas of Africa.

In 2006, Zain announced a *One Network* offer eliminating IMR surcharges for both post-paid and pre-paid customers in three East African countries – Kenya, Tanzania and Uganda (see Table 5). This had been preceded, the previous year, by the launch of reduced rates for calls between the three networks (Zain, 2005). Both initiatives were made possible by governments liberalising the licensing of their international telecommunications, allowing Zain to own and to interconnect gateways in the three countries – Kenya was the last in 2004. With all the traffic retained on its own network and with no roaming on the networks of rivals, there would be no out-payments – roaming had been internalised. This was better than a conventional approach to pre-paid roaming, with high charges, which would have been unlikely to stop customers switching to rivals, especially since they would have had to pay for incoming calls.

The *One Network* offer was gradually extended westward to the Atlantic, covering an area greater than the European Union and addressing nearly half the population of the continent.





An exception has been Zambia, where the government refused Zain its own international gateway, officially for reasons of national security. Since mobile operators are required to pay the fixed incumbent operator for their international traffic, this is a means by which the government forces them to support Zamtel in preparation for its privatisation. Instead, on *One Network*, Zain offers its Zambian customers only limited prepaid roaming (eg, in the UK).

TABLE 5 THE GROWTH OF THE ZAIN ONE NETWORK

September 2006	June 2007	November 2007	2009
Kenya	Democratic Republic of Congo	Burkina Faso	Ghana
Tanzania	Gabon	Chad	Sierra Leone
Uganda	Republic of Congo	Malawi	Madagascar
		Niger	
		Nigeria	
		Sudan	

Source: Zain press releases, Zain 2006, 2007b (no date); Concord Times 2009

In April 2008, Zain announced the extension of *One Network* to Bahrain, Iraq, Jordan and Sudan. The following August it added Saudi Arabia, once its licence there was finalised.

The Zain *One Network* tariff introduces a special case, which rivals would find difficult to copy. If, say, someone living in Uganda has a relative working in Kenya, then if they both use SIM cards from their countries of residence they must pay for international calls. However, if both use Zain Kenya SIM cards then the person in Kenya can call the person in Uganda for the price of a domestic call, making a considerable saving (see Table 6). All that is required is a little juggling of SIM cards, to ensure that all calls are made on SIM cards of the same nationality.

TABLE 6 PREPAID TARIFFS OF ZAIN KENYA (KENYA SHILLINGS)

	To Zain Kenya	To Zain Uganda
Pamoja - peak	7	32
Pamoja - off-peak	3	23
Vuka - peak	8	32
Vuka - off-peak	8	23
Roaming in Uganda	15	15

Source: Zain website, Zain (no date)

The *One Network* offer was extended to data and Internet access in May 2009.<sup>7</sup> Initially, the offer covered Kenya, Tanzania and Uganda and some countries in the Levant. The Zain One Office tariff allows the use of GPRS across East Africa. The prices are shown in Table 7.

<sup>7</sup> [http://www.zain.com/muse/obj/lang\\_default/portal.view/content/Media%20centre/Press%20releases/DataRoaming](http://www.zain.com/muse/obj/lang_default/portal.view/content/Media%20centre/Press%20releases/DataRoaming)

TABLE 7 ZAIN ONE OFFICE GPRS TARIFFS IN EAST AFRICA (PER MINUTE)

	Kenya		Tanzania		Uganda	
	ZAR	ZAR	ZAR	ZAR	ZAR	ZAR
Zain Kenya – Prepaid			32.79	3.36	23.96	2.46
Zain Kenya – Postpaid			27.10	2.78	19.01	1.95
Zain Tanzania – Prepaid	365	2.17			417	2.48
Zain Tanzania – Postpaid	292	1.73			333	1.98
Zain Uganda – Prepaid	524	2.10	818	3.27		
Zain Uganda – Postpaid	403	1.61	656	2.62		

ZAR1 = KES9.75 = TZS168.35 = UGX250<sup>8</sup>

Source: Zain phone services, Zain Kenya and Zain Tanzania websites (no date)

The *One Network* scheme eliminates all IMR charges for both post-paid and pre-paid customers – they simply pay the applicable national rates for outbound calls and receive inbound calls free of charge as if they were at home.<sup>9</sup> Pre-paid customers are also able to use locally purchased top-up cards to maintain their credit balance. Zain customers in Africa are almost exclusively pre-paid. Usually in excess of 95% would never pay traditional IMR charges, but would instead change their SIM cards at the border. It therefore made commercial sense to abandon established IMR charging models in order to avoid customers switching to a rival operator. It also allowed customers access to all of their stored credit and ensured cross-border communications, keeping friends and families connected.

George Held, Zain's Marketing Director for *One Network*, noted (The New Vision, 2009):

*When we launched it in DRC, there was a surge in customers in Uganda, Kenya and Tanzania because of these cross-border activities, especially the lake area.*

He also noted that

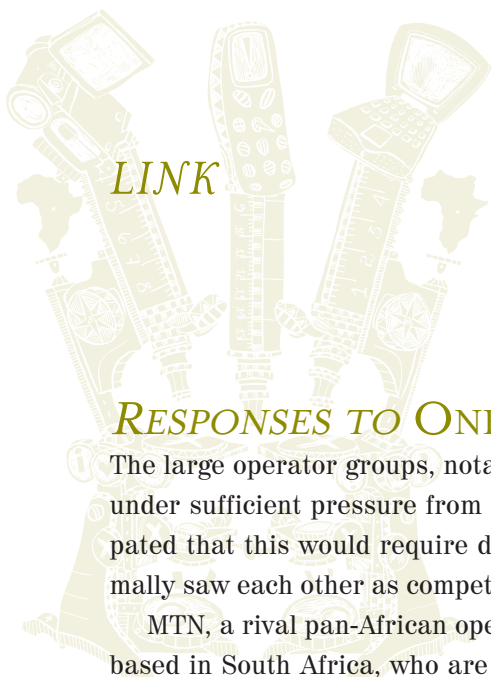
*At any given point in time, a quarter of a million people in East Africa are calling across the three borders at no extra cost* (Kisambira, 2009).

Zain offers conventional data roaming using GPRS, with both post-paid and pre-paid tariffs, to a range of destinations (Daily Trust, 2008). This is presented as a premium service, intended to attract high-spending customers. An even more exotic form of roaming is available through Aeromobile, which provides a roaming service for Zain customers on flights operated by the Emirates airline (Leadership, 2008).

Zain has obtained considerable publicity from *One Network*, which has supported the expensive process of changing and building its brand. There has been some regulatory cost in negotiating the necessary permissions. Yet there are only hints of the possible volumes of traffic and the potential numbers of users, making it difficult to assess its commercial importance. Nonetheless, it has had a significant effect on rivals, which have felt it necessary to respond, even if not on the same scale, at least on heavily travelled routes.

<sup>8</sup> [http://coinmill.com/ZAR\\_calculator.html#ZAR=1](http://coinmill.com/ZAR_calculator.html#ZAR=1)

<sup>9</sup> One of the providers of the underlying technology is the Pyro Group with its INROAM SDP. See its press release of 11 February 2008 "Pyro Networks Provides Critical InRoam Platform for the World's First Borderless Mobile Network", <http://www.pyrogroup.com/pyro/index.php?id=664>



## RESPONSES TO ONE NETWORK

The large operator groups, notably MTN, Orange and Vodafone, have all felt themselves to be under sufficient pressure from Zain to respond, at least to some extent. Clearly, Zain anticipated that this would require difficult and protracted negotiations between firms which normally saw each other as competitors.

MTN, a rival pan-African operator, launched a special *low* roaming tariff for its customers based in South Africa, who are charged ZAR5.00 (EUR0.43) per minute for both making and receiving calls across the rest of Africa (MyBroadband, 2008). Sending an SMS costs ZAR1.50 (EUR0.13), while receiving one is free.<sup>10</sup>

In 2007, MTN Rwanda launched a seamless roaming service with partners in East Africa (see Table 8) (Highway News Agency, 2007). This allowed customers free roaming between the networks, receiving calls without charge, making calls at home rates and being able to use air-time vouchers purchased from local operators. However, the scheme was modified in 2009, so that customers paid the local rather than the home rates (MTN Uganda, 2009). While this avoids problems of possible net payments by the home operator to the roamed operator, where there are price differences, it diminishes the transparency for the customer. MTN brands the service *Home & Away*, while the other partners use the *Kama Kawaida* brand. The underlying technology is provided by Red Knee.<sup>11</sup>

TABLE 8 JOINT ROAMING AGREEMENT IN EAST AFRICA

Country	Operator	URL
Burundi	U-Com‡	
Kenya	Safaricom*	<a href="http://www.safaricom.co.ke">www.safaricom.co.ke</a>
Rwanda	MTN	<a href="http://www.mtn.co.rw">www.mtn.co.rw</a>
Tanzania	Vodacom*	<a href="http://www.vodacom.co.tz">www.vodacom.co.tz</a>
Uganda	MTN	<a href="http://www.mtn.co.ug">www.mtn.co.ug</a>
Uganda	Uganda Telecom	<a href="http://www.utl.co.ug">www.utl.co.ug</a>

Source: The Monitor, 2008a  
 \* Affiliates of the Vodafone Group  
 ‡ A member of Orascom Telecom Group.

MTN announced preferred roaming in 2008, initially covering South Africa, Botswana, Swaziland and Zambia (The Monitor, 2008b). MTN further announced that it would introduce a seamless roaming as *MTN One World* for all 21 operations in Africa and the Middle East by mid-2009 (The New Vision, 2008). At present it is limited to West Africa, for example, giving Nigerian customers reduced but very different rates when roaming in Cameroon, Benin and Ghana (see Table 9).

<sup>10</sup> These prices look very similar to those required by the EU Roaming Regulation.

<sup>11</sup> [http://www.redknee.com/news\\_events/news\\_releases/224](http://www.redknee.com/news_events/news_releases/224)

TABLE 9 MTN ONE WORLD RATES FOR ROAMING NIGERIAN CUSTOMERS (NIGERIAN NAIRA)<sup>12</sup>

	Benin	Cameroon	Ghana	Nigeria
Local: Onnet	37	47	21	25.80
Local: Offnet	56	54	22	42.00
Call to MTN Nigeria	37	90	21	-
Call to MTN W. Africa	37	90	21	40.20
Call to rest of the world	43	90	90	40.20
Call to small islands	2 143	1 321	898	40.20
Incoming Voice Call	0	0	0	-
Incoming SMS	0	0	0	-

Source: MTN Nigeria (no date).

In July 2007, Glo Mobile, a Nigerian mobile operator, obtained a GSM licence for the neighbouring Republic of Benin (Okojie, 2008). In May 2009, Glo introduced *Two Nations, One Call Rate* with no roaming charges between the two countries, aimed primarily at local travellers with a view to locking them in (Ukodie, 2009).<sup>13</sup> The only rival to have licences in both countries was MTN, engaged in creating more complex roaming tariffs without surcharges.

Glo offers post-paid roaming to 140 countries. Its pre-paid roaming service, using CAMEL Phase 2, is limited to only 15 countries: Algeria, Belgium, Benin, Cameroon, France, Ireland, Italy, Ivory Coast, Poland, Russia, South Africa, Spain, Turkey, Ukraine and the United Kingdom.<sup>14</sup> Glo has said it would extend this list to the US and the Middle East.<sup>15</sup> It has even arranged distribution of top-up cards in the British Isles for pre-paid customers who visit there.

Orange also offers a special rate when roaming from Uganda to Kenya.<sup>16</sup> Incoming calls are free, while local calls and calls to Kenya are UGX420 per minute (KES15.63 or ZAR1.60). That compares to an on-net rate in Uganda of UGX270 and off-net rate of UGX310, while calls from Uganda to Kenya are UGX420.

Orange created a *zone* of West African countries in 2007, comprising Guinea, Guinea Bissau, Ivory Coast, Mali and Senegal with reduced prices for roaming (see Table 10). The operators offer limited pre-paid roaming, but extensive post-paid roaming.<sup>17</sup>

<sup>12</sup> Domestic tariff is MTN Xtra Cool off-peak. Prices are quoted per second in Kobo, of which there are 100 to the Naira, <http://www.mtnonline.com/products/xtracool.aspx>

<sup>13</sup> See also <http://www.gloworld.com/content.aspx?id=109&Cn=GloMobile>

<sup>14</sup> <http://www.gloworld.com/content.aspx?id=25&Cn=GloMobile>

<sup>15</sup> <http://www.itnewsafrika.com/?p=792>

<sup>16</sup> <http://www.orange.ug/mobile-plans/orange-zone.php>

<sup>17</sup> See, for example, <http://www.orange.gq/mobile/roaming.php>

TABLE 10 PRICES IN THE ORANGE ZONE OF WEST AFRICA (XOF OR FCFA)

Home country	Countries	Local	Call home
Ivory Coast	Orange Zone	177	177
	Orange rest of Africa	500	1 000
	Europe	500	2 000
Mali	Senegal	150	150
	Guinea, Guinea Bissau, Ivory Coast & Niger	150	150
Senegal	Guinea, Guinea Bissau, Ivory Coast, Mali & Niger	150	150

XOF1000 = ZAR17.00

Source: Websites of Orange (no date); Orange Mali (no date); Orange Senegal (no date).

When Zain launched its *One Network* in four Arab countries, IMR charges were already a subject of regulatory interest and under threat of price controls (see below). In July 2008, Saudi Telecom (STC) announced reductions of over 60% in its roaming charges (Karam, 2008). Then, in August, it offered Unified International Roaming (UIR) in thirty countries charging SAR1.00 (ZAR 2.05) per minute for forwarded calls and SAR1.50 (ZAR3.10) for local calls and for calls back to Saudi Arabia (*Arab News*, 2008). Vodafone created an Arab Zone for its Egyptian customers with discounts of 50% in Saudi Arabia and the United Arab Emirates (UAE) (*The Saudi Gazette*, 2008). A similar arrangement was announced by Etisalat covering Egypt, Saudi Arabia and the UAE (Etisalat, 2008).

Mobinil and Etisalat reduced their roaming rates to EGP0.50 (ZAR0.70) per minute for roaming customers to receive calls while performing the *umrah* pilgrimage in Saudi Arabia during Ramadan 2009 (Sharp, 2009), while Vodafone offered six roaming minutes in any 10 days of Ramadan for Egyptians in Saudi Arabia for a cost of EGP3 (ZAR4.20). Each of the Egyptian operators has negotiated agreements with a different Saudi operator, Mobinil with Zain, Vodafone with STC and Etisalat with its affiliate Mobily.

In comparison with Zain, the responses appear piecemeal but pragmatic, focusing on what can be delivered and what is significant. Ovum has noted that the volumes of traffic being generated and the revenues won and lost by such deals did not seem very significant.<sup>18</sup> Nonetheless, when faced with a non-roaming offer a significant group of customers who are nomadic or migrant or whose family and friends are nomadic or migrant see the benefits and move to or stick to operators with beneficial tariffs.



## REGULATORY INITIATIVES

Following the investigation launched by the European Commission (EC) in 1999, the persistently high charges for IMR came to be perceived to be a *regulatory* issue, one that was more likely to be solved by an authority than by the market. A number of regional economic groupings (eg APEC and OAS<sup>19</sup>) have recently joined the EC in seeking a solution, though as yet none has been found. Some confusion may have been caused by the use of the term regulation in Europe. The EC document was a trans-national statute, adopted by the Council of Ministers and the European Parliament under the European Community Treaty, and has nothing to do with regulators.

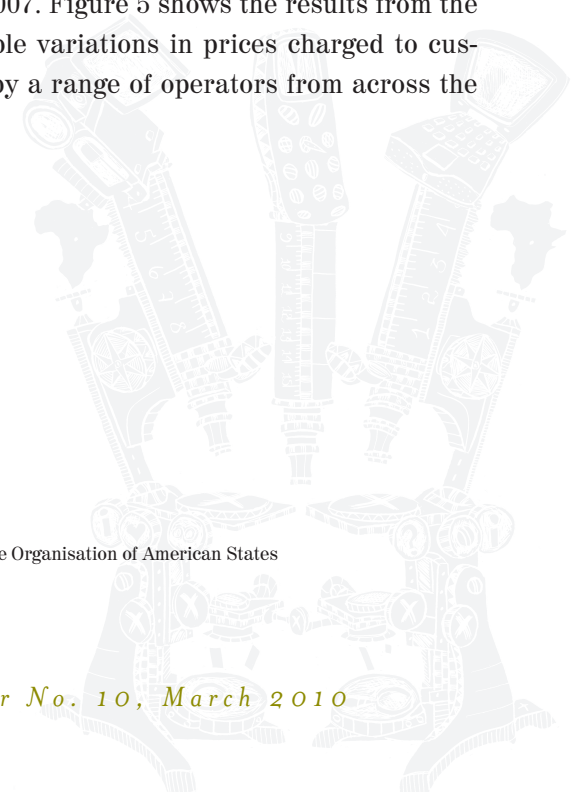
The Economic Community for the West African States (ECOWAS) has taken various steps to harmonise policies and regulations in order to facilitate regional integration of ICT markets. It adopted a road map for regulatory harmonisation and regional mobile roaming (ITU, 2006: 313-314). The West African Telecommunication Regulators Assembly (WATRA) brings together the various national regulators.<sup>20</sup> As of 31 July 2005 there were 268 roaming agreements made by 23 of the 42 West African Operators (Sanou, 2005). In three countries, not a single operator had a roaming partner in the ECOWAS area. For post-paid customers, heavy security deposits were required between US\$340 and US\$1 500, while even pre-paid customers faced one-time connection charges of between US\$19 and US\$47. There was one innovative marketing offer, with Telecel, present in six countries, called @Sim. The customer was given one SIM card for the home network and others for the networks to be visited.

WATRA organised a feasibility study jointly with ECOWAS on roaming and interconnection in the region.<sup>21</sup> This concluded that pre-paid roaming was a honeypot for operators, if they could provide the services (Aihe, 2007). Conferences on roaming were held in 2007 and 2008.<sup>22</sup> The subject remains under active consideration.

The European Commission (EC) and the European Regulators Group (ERG), through the NATP-II project, set out their thinking on IMR to regulators from North Africa and the Near-East (Bakker, no date). One result was a study by the Arab network of regulators (AREGNET) examining the costs of roaming first in 2006 and again in 2007. Figure 5 shows the results from the first survey, illustrating the very wide and inexplicable variations in prices charged to customers roaming on the two GSM networks in Egypt, by a range of operators from across the Arab world.

<sup>18</sup> <http://www.ovum.com/news/euronews.asp?id=7898>

<sup>19</sup> APEC is the Asia Pacific Economic Cooperation regional grouping; OAS is the Organisation of American States



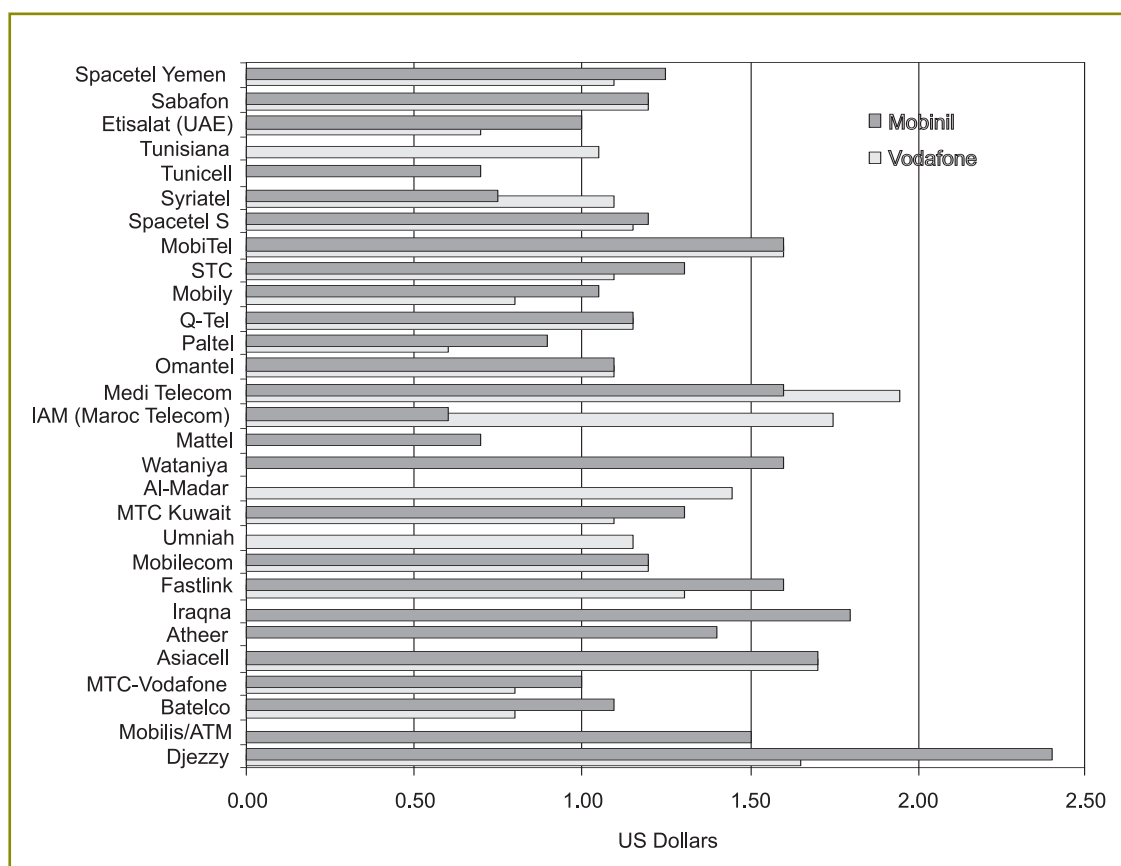


FIGURE 5 PRICES PER MINUTE FOR ROAMERS IN EGYPT ON THE TWO GSM NETWORKS (JANUARY 2006)

Source: National Telecommunications Regulatory Authority, Egypt

The Southern Africa Development Community (SADC) addressed roaming prices as a *Home and Away* initiative. It was discussed in November 2008 by the Communications Regulators' Association of Southern Africa (CRASA).<sup>23</sup> It created a Regional Alliance Task Team (RATT) with representatives from:

- SADC Secretariat;
- CRASA;
- GSM Africa;
- Southern Africa Telecommunication Association (SATA); and
- SADC Parliamentary Forum.

<sup>22</sup> <http://98.130.227.12/Conference/Conference.aspx>

<sup>23</sup> [http://www.crasa.org/sadc\\_home.htm](http://www.crasa.org/sadc_home.htm)



Its primary task was to investigate possible mechanisms to reduce the high cost of IMR in the region, with a view to a final decision by SADC Ministers. CRASA also invited consultants to undertake an impact assessment of its roaming initiative.<sup>24</sup>

In 2005, the African Telecommunication Union (ATU) and the African Development Bank (AfDB) began a project for a single African SIM card.<sup>25</sup> Subsequently, the ATU indicated it would “Develop a regulatory framework for the implementation of cross-border networks and pan-African services such as regional roaming” in the period 2008-09.<sup>26</sup> This remains a work item for ATU.

There was a general discussion about ICTs in Africa at the OECD in late 2008. The commercial progress on reduced prices and non-roaming tariffs was noted and welcomed (OECD, 2008).

The regulatory approaches to IMR have been less than productive. As in Europe any penalties were seen by the operators as highly unlikely to be imposed and thus failed to convince them of the need to act. Regional groupings have, once again, confirmed the strange variations in retail prices. However, the capacity for any one country to act is limited and many already have a trans-national commercial offer without roaming charges. Indeed, it has been commercial actions and reactions that have driven down IMR prices and consequently it would be more difficult to justify an intervention, requiring complex work on the regulatory impact assessment.

## OPEN CONNECTIVITY

Established in 2005 by the GSM Association (GSMA), the Open Connectivity (OC) programme was intended to facilitate easier and faster outbound roaming agreements. With more than 700 operators, the traditional bilateral approach is claimed to have reached its limits. OC was to be the framework in which one or more hubs provided access to multiple partners via a single commercial agreement, by reselling inter-operator roaming deals with a mark-up.

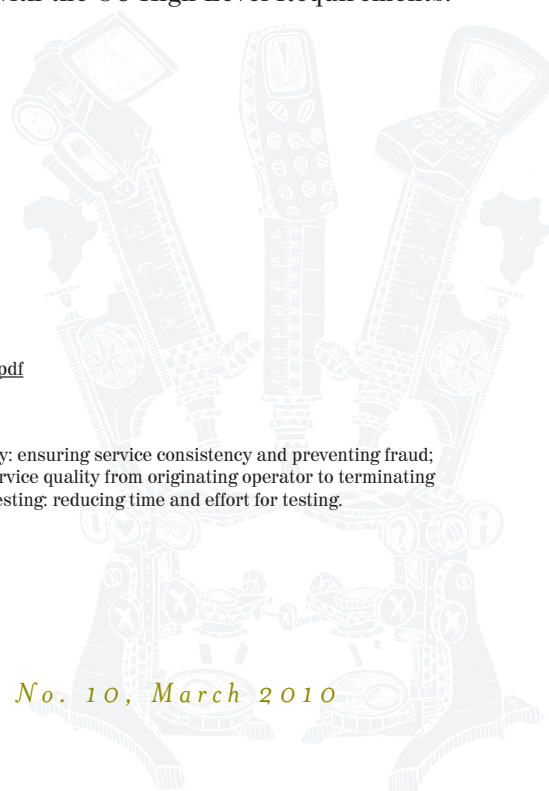
The GSMA manages a self-certification scheme to provide operators with the confidence that solutions offered by individual vendors are compliant with the OC High Level Requirements.<sup>27</sup> Table 11 shows the IMR hubs as at late-2009.

<sup>24</sup> [http://www.bta.org/bw/tenders/Tender%20No%20CRASA-SHA-01-2009%20\(3\).pdf](http://www.bta.org/bw/tenders/Tender%20No%20CRASA-SHA-01-2009%20(3).pdf)

<sup>25</sup> <http://multimedia.marsgroupkenya.org/?StoryID=9373126>

<sup>26</sup> <http://www.itu.int/md/D06-DAP1.1.1-C-0109/en>

<sup>27</sup> Openness: ensuring global interoperability and interconnection; Transparency: ensuring service consistency and preventing fraud; Efficiency: ensuring efficient use of network resources; Quality: end-to-end service quality from originating operator to terminating operator; Simplified billing: removing the need for bilateral settlement; and Testing: reducing time and effort for testing.



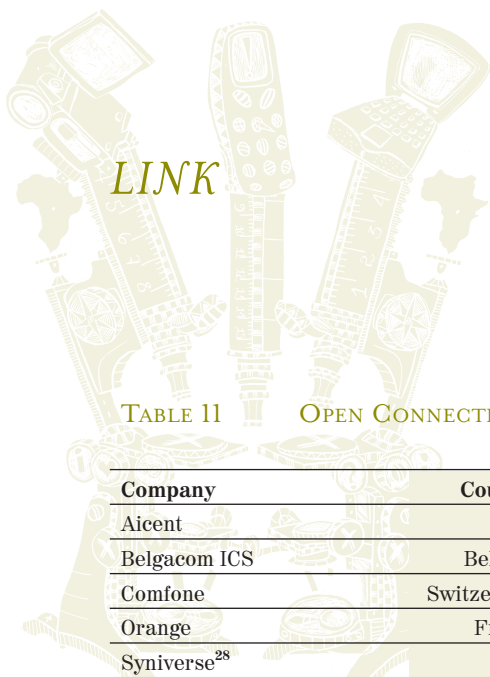


TABLE II OPEN CONNECTIVITY COMPLIANT ROAMING HUBS

Company	Country	Web site
Aicent	US	<a href="http://www.aicent.net">www.aicent.net</a>
Belgacom ICS	Belgium	<a href="http://www.belgacom-ics.com">www.belgacom-ics.com</a>
Comfone	Switzerland	<a href="http://www.comfone.com">www.comfone.com</a>
Orange	France	<a href="http://www.orange.com/wholesalesolutions/pagesinv/valeurs2.jsp">www.orange.com/wholesalesolutions/pagesinv/valeurs2.jsp</a>
Syniverse <sup>28</sup>	US	<a href="http://www.syniverse.com">www.syniverse.com</a>
United Hubbing	UK	<a href="http://www.n-tele.com">www.n-tele.com</a>
Vodafone	Luxembourg	-

Source: GSM Association Open Connectivity Programme

For example, Rwandatel announced it had struck an IMR-hub deal with Belgacom ICS, giving it access to 535 networks worldwide through Proximus, the mobile network operator subsidiary of Belgacom (Rwandatel, no date). Rwandatel customers were to be issued with SIM cards with both Rwandatel and Proximus International Mobile Subscriber Identities (IMSI). Where Rwandatel has no bilateral roaming agreement, then the SIM card would automatically present the roaming customer as being from Proximus, becoming a virtual Belgian, to use its IMR agreement. The deal is not bilateral, so that Rwandatel does not benefit from incoming roaming customers.

While the hubbing arrangement appears to open the way to easier access to outbound roaming, there is no evidence that it reduces prices. Indeed, even where a hub has access to regulated roaming prices in the EU, there appears to be neither a legal obligation nor a commercial incentive to pass on the lower price to non-EU operators. Competition between the hubs appears to focus on increased coverage for a few high-spending outbound roamers, rather than on reducing prices.

## MOBILE INTERNET ROAMING

A growing number of customers are adopting mobile data services, often as their primary form of Internet access, with technologies ranging from GPRS to HSPA. Consequently, there is a demand for data IMR. Initially data roaming had some extremely high prices but gradually these have been reduced and operators are reporting some increases in use.

The pricing for the mobile data service appears to be aimed at fairly modest levels of use. It requires considerable expertise on the part of the customer or there is a significant risk of very substantial invoices and *bill shock*.

Looking at the three South African operators, their coverage and charges vary enormously. MTN charges in zones, for example, ZAR102.20 per Mb in Africa and Europe (billed in 25Kb increments), with relatively wide coverage,<sup>29</sup> whereas Vodacom charges ZAR17.50 per Mb, billed in 10Kb increments, but only with a small number of Vodafone partners, none of which is

<sup>28</sup> In May 2009 Syniverse Technologies announced that it had acquired the assets of Wireless Solutions International (WSI), <http://www.tradingmarkets.com/site/news/Stock%20News/2324940/>

<sup>29</sup> It charges ZAR2.50 per 25Kb. Since 1Mb = 1,024Kb, the price is ZAR102.40 for 1Mb, <http://www.mtn.co.za/Travel/TravellingFromSA/Pages/RoamingTarrifs.aspx>

in Africa (Vodacom, no date). It even offers HSDPA (up to 7.5Mbps) in Austria, Portugal and the UK, again with Vodafone partners. Cell C offers GPRS coverage in a wide range of countries, though by no means all (eg, excluding Burundi, Ethiopia, Lesotho, Rwanda and Sudan) (Cell C, no date). However, its prices are extraordinarily complicated, varying by operator, making manual network selection essential. For example, the prices per Megabyte (all in ZAR):

- Madagascar: 103, 148 or 223;
- Uganda: 19, 89 or 119;
- DRC: 15 and 53;
- Tanzania: 13 or 48; and
- Kenya: 14 or 119.

Looking again at the charges of the US-based operators for roamers in Africa, these are very much simpler than for voice:

- AT&T US\$19.97 per Megabyte (ZAR 155);
- Sprint US\$16.38 per Megabyte (ZAR 127); and
- T-Mobile US\$15.00 per Megabyte (ZAR 116).

It appears to be relatively early in the development of pricing plans for data roaming. Operators are searching for models that will generate revenues and profits, though at times the prices seem almost random.

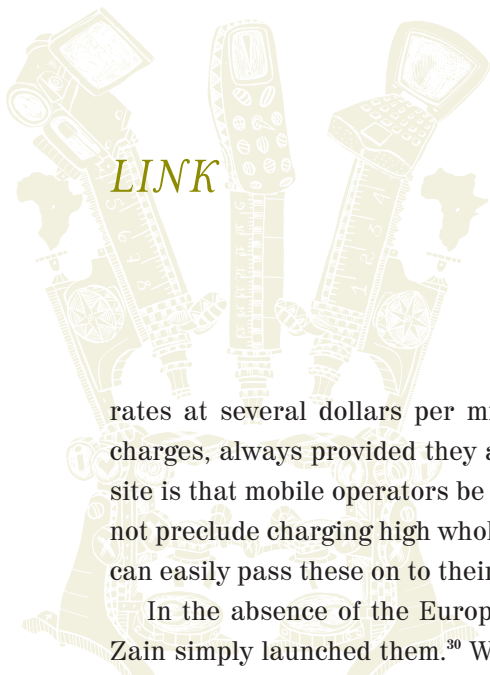
## CONCLUSION

For visitors to Africa who elect to roam with their existing mobile operators, they can maintain their home country telephone number and remain connected as usual. They have to pay heavily to do so and any local African wishing to call them has to pay the international rate to China, Europe or the US. If visitors give up their home number and roam instead with a SIM card acquired locally, they can save considerably on the charges, but then have to advise colleagues, family and friends of a new and temporary number, plus they must periodically check their home voicemail. If they are able to obtain a Zain One Network SIM card they will be able to roam quite extensively, without subsequent changes to that number.

Africans with post-paid subscriptions who leave the continent are likely to pay high IMR charges to maintain their seamless contactability, or they too can switch to local prepaid SIM cards with the associated lower costs, but increased inconvenience. While the Open Connectivity Initiative means they are more likely to have access to advanced roaming services, it has done little to reduce the prices.

Prepaid roamers have a much more limited choice – they cannot roam in Ankor Wat, Samarkand or Tahiti. Each operator has set up one or two dozen bilateral deals with operators in major travel destinations, that is with neighbours, significant trading partners and, not least, the former colonial powers. The importance of these arrangements is difficult to assess, since there is very little data on levels of use.

The European colonial powers introduced arbitrary borders that ignored ancient patterns of movement that remain today; in some cases accentuated by trading patterns established since independence. The vast majority of the individuals concerned cannot afford expensive



rates at several dollars per minute, so it is natural for mobile operators to abandon IMR charges, always provided they are allowed to minimise and internalise the costs. A prerequisite is that mobile operators be allowed their own international gateways. Moreover, this does not preclude charging high wholesale roaming prices to operators in developed countries, who can easily pass these on to their customers, admittedly with a large mark-up.

In the absence of the European Commission to block trans-national non-roaming tariffs, Zain simply launched them.<sup>30</sup> Where rivals saw the need to respond they have done so or are doing so. However, this seems likely to accelerate consolidation among the operators at continental and global levels, which requires further research and careful monitoring.

The failure to form a wholesale market remains something of a mystery. With international voice telephony and Internet traffic there are intermediaries and aggregators to facilitate smaller and niche players. There appear to be significant structural obstacles and, possibly, anticompetitive practices that require further study. There is nothing to stop Orange and Vodafone giving African customers a secondary IMSI from one of their European networks to allow them access to regulated roaming rates. While this might increase their competitiveness on the retail market, it may not be considered to be sufficiently attractive.

While regional economic groupings and associations of regulators have taken an interest in high IMR charges, they have yet to take any significant actions. They have not even introduced the national measures known to work:

- Requiring the sending of an SMS with IMR prices on arrival abroad;
- Capping spending to avoid *bill shock*; and
- Capping retail prices for call forwarding.

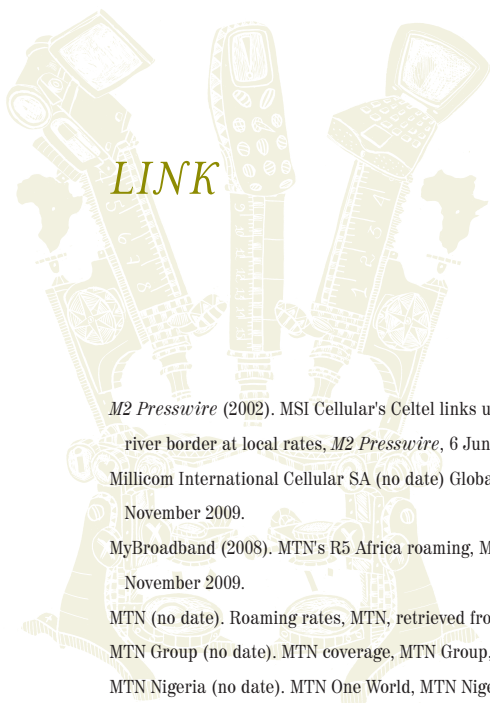
There are concerns that other actions might further distort the poorly understood market dynamics. Further detailed study of the economics of IMR markets is required to ensure a level of understanding that is sufficient to evaluate policy options. □

<sup>30</sup> See the decisions of the EC in the mergers of Telia/Telenor, Telia/Sonera, Vodafone/Mannesmann and Vodafone/Eirecell.

## REFERENCES

- Aihe, O (2007). ECOWAS, WATRA see roaming as next big business for GSM operators, Centre for International ICT Policies Central and West Africa (CIPACO), 30 July 2007, retrieved from <http://www.cipaco.org/spip.php?article1395&lang=en> August 2009.
- ANAC (2009). Compêndio das estatísticas dos mercados de services públicos das comunicações electrónicas e postais em cabo verde, 1º semestre de 2009, Agência Nacional de Comunicações (ANAC), Cape Verde, [retrieved from http://www.anac.cv/images/dadosest1sem2009.pdf](http://www.anac.cv/images/dadosest1sem2009.pdf) November 2009.
- Arab News* (2008). STC launches UIR service in 30 states, *Arab News*, 28 July 2008, retrieved from <http://www.arabnews.com/?page=6&section=0&article=112185> November 2009.
- AT&T (no date) International roaming rates and coverage, retrieved from <http://www.wireless.att.com/learn/international/roaming/international-roaming.jsp> August 2009.
- Bakker, H (no date). International mobile roaming: regulatory policies in the EU, Presentation, retrieved from <http://www.tra.gov.eg/presentations/International%20Mobile%20Roaming%20in%20the%20EU.ppt> November 2009.
- Bharti (2010). Bharti enters into exclusive discussions with Zain for the acquisition of Zain Africa BV. 15 February 2010, retrieved from [http://www.bharti.com/151.html?&tx\\_ttnews\[tt\\_news\]=336&tx\\_ttnews\[backPid\]=150&cHash=802e07e8b3](http://www.bharti.com/151.html?&tx_ttnews[tt_news]=336&tx_ttnews[backPid]=150&cHash=802e07e8b3)
- Cell C (no date). International roaming, Cell C, retrieved from <http://www.cellc.co.za/content/services/internationalroaming.asp#roaminginfo> November 2009.
- Concord Times* (2009). One Network service for Zain customers, *Concord Times*, 2 June 2009, retrieved from <http://allafrica.com/stories/200906030896.html> November 2009.
- Daily Trust* (2008). Celtel Nigeria offers customers data roaming in UK, USA, Kenya, Others, *Daily Trust*, 27 July 2008, retrieved from <http://allafrica.com/stories/200807280901.html> November 2009.
- Etisalat (2008). Etisalat launches roaming alliance offer for its customers with Mobily in KSA and Etisalat Misr in Egypt, 13 July 2008, retrieved from <http://www.etisalat.ae/index.jsp?lang=en&type=content&currentid=6d88e15e0b56a010VgnVCM1000000a0a0a0a&contentid=84dade14fb02b110VgnVCM1000000c24a8c0RCRD&parentid=ed38800d1f52a010VgnVCM1000000a0a0a0a> August 2009.
- European Commission (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, European Commission, Brussels.
- GSM Association (no date). GSM Association Open Connectivity Programme, retrieved from [http://www.gsmworld.com/our-work/programmes-and-initiatives/open-connectivity-programme/roaming\\_hubbing.htm](http://www.gsmworld.com/our-work/programmes-and-initiatives/open-connectivity-programme/roaming_hubbing.htm) August 2009.
- GSM World (no date). GSM coverage maps, GSM World, retrieved from <http://www.gsmworld.com/roaming/gsminfo/index.shtml> November 2009.
- Highway News Agency* (2007). MTN investing more in mobile industry *Highway News Agency*, 23 November 2007, retrieved from <http://allafrica.com/stories/200711230688.html> November 2009.
- Informa (2008). *Global mobile roaming*, Informa, London.
- ITU (2009). *ITU world telecommunication/ICT indicators database 2009*, International Telecommunication Union, Geneva, retrieved from <http://www.itu.int/ITU-D/ict/publications/world/world.html> November 2009.
- ITU (2008). *Trends in telecommunication reform 2008: Six degrees of sharing*, International Telecommunication Union, Geneva, retrieved from <http://www.itu.int/publications/publications.aspx?lang=en&parent=D-REG-TTR.10-2008> November 2009.
- ITU (2006). *West African Common Market Project: Harmonization of Policies Governing the ICT Market in the UEMOA-ECOWAS Space*, International Telecommunication Union, Geneva.
- ITU (no date). ITU ICT Eye, retrieved from <http://www.itu.int/ITU-D/ict/eye/Default.aspx> November 2009.
- Karam, S (2008). Saudi Telecom to offer cheaper roaming fees, *Arabianbusiness.com*, 27 July 2008, retrieved from <http://www.arabianbusiness.com/525999-edit-roaming> August 2009.
- Kisambira E (2009). Zain to link other providers to its 'One Network' *Computerworld*, 25 March 2009, retrieved from <http://www.computerworld.co.ke/articles/2009/03/25/zain-link-other-providers-its-one-network> November 2009.
- Laremont, R (Editor) (2005). *Borders nationalism and the African state*, Lynne Rienner Publishers, Boulder.
- Leadership (2008). Zain, Celtel parent company, introduces roaming service on air Leadership, 9 April 2008, retrieved from <http://allafrica.com/stories/200804090421.html> November 2009.





- M2 Presswire* (2002). MSI Cellular's Celtel links up two Congos: Direct interconnect enables Celtel subscribers to call each other across the Congo river border at local rates, *M2 Presswire*, 6 June, 2002.
- Millicom International Cellular SA (no date) Global operations, Millicom, retrieved from <http://www.millicom.com/operations/operations.cfm> November 2009.
- MyBroadband (2008). MTN's R5 Africa roaming, MyBroadband, 4 August 2008, retrieved from <http://mybroadband.co.za/news/Cellular/4713.html> November 2009.
- MTN (no date). Roaming rates, MTN, retrieved from <http://www.mtn.co.za/Travel/TravellingFromSA/Pages/RoamingTarrifs.aspx> November 2009.
- MTN Group (no date). MTN coverage, MTN Group, retrieved from [www.mtn.com](http://www.mtn.com) November 2009.
- MTN Nigeria (no date). MTN One World, MTN Nigeria, retrieved from <http://www.mtnonline.com/products/oneworld.aspx> November 2009.
- MTN Uganda (2009). MTN Home & Away new tariffs, Press release, MTN Uganda, 2 January 2009, retrieved from <http://www.mtn.co.ug/News-Room/Current-News/MTN-Home-Away-new-tariffs.aspx> November 2009
- NTRA Egypt (no date). Mobile International Roaming among Arab Countries, National Telecommunications Regulatory Authority, Egypt, January, 2006, retrieved from <http://www.ntra.gov.eg/presentations/Mobile%20Roaming%20in%20Arab%20countries.ppt> November 2009.
- OECD (2008). African economic outlook 2009, Experts meeting: Innovation in information and communication technology in Africa, Innovation in ICT in Africa, Organisation for Economic Cooperation and Development, Paris, 15 December 2008, retrieved from [http://www.oecd.org/document/28/0,3343,en\\_2649\\_15162846\\_41713244\\_1\\_1\\_1\\_1.00.html](http://www.oecd.org/document/28/0,3343,en_2649_15162846_41713244_1_1_1_1.00.html) November 2009.
- Okojie, G (2008). GLO extends network to Benin Republic, *Leadership*, 11 June 2008, retrieved from <http://allafrica.com/stories/200806110454.html> November 2009.
- Orange (no date). Global footprint, France Telecom-Orange, retrieved from [http://www.orange.com/en/\\_EN/group/global\\_footprint/](http://www.orange.com/en/_EN/group/global_footprint/) November 2009.
- Orange (no date b). La couverture Orange, Orange, retrieved from <http://www.orange.ci/index.php?rub=roaming> November 2009.
- Orange Mali (no date c). Roaming, Orange Mali, retrieved from <http://www.orangemali.com/moITU-D/afrbile/roaming.php> November 2009.
- Orange Senegal (no date d). Roaming, Orange Senegal, retrieved from <http://www.orange.sn/djountouwayvatu.2.911.avb1605edac83d1d3> November 2009.
- Orascom Telecom (no date). Global presence, Orascom Telecom, retrieved from [http://www.otelecom.com/regional\\_Presence/default.aspx](http://www.otelecom.com/regional_Presence/default.aspx) November 2009.
- Portugal Telecom (no date). Customer area, Portugal Telecom (PT), retrieved from <http://www.telecom.pt/InternetResource/PTSite/UK/> November 2009.
- Rwandatel (no date). Rwandatel SA chooses the Belgacom, Rwandatel, retrieved from <http://www.rwandatel.rw/?Rwandatel-SA-Chooses-the-Belgacom> November 2009.
- Sanou, D R (2005). *GSM Mobile Networks in West Africa*, Mission report, August 2005, International Telecommunication Union, Dakar, retrieved from [www.itu.int/ITU-D/af/ docs/MissionreportDieRogerSanou.pdf](http://www.itu.int/ITU-D/af/ docs/MissionreportDieRogerSanou.pdf) August 2009.
- Sharp, A (2009). Egypt mobile firms offer discounts during Ramadan, *Reuters*, 20 August 2009, retrieved from <http://www.reuters.com/article/rbssIntegratedTelecommunicationsServices/idUSLJ51075420090820> November 2009.
- Sutherland, E (2001). International roaming charges: over-charging and competition law, *Telecommunications Policy* 25 (1) 5-20.
- Sutherland, E (2006). *Roaming in Africa*, 34th Telecoms Policy Research Conference (TPRC), Arlington, Virginia, retrieved from [http://web.si.umich.edu/tprc/papers/2006/522/3wan\\_TPRC\\_africa\\_roaming\\_paper.pdf](http://web.si.umich.edu/tprc/papers/2006/522/3wan_TPRC_africa_roaming_paper.pdf) November 2009.
- Sutherland, E (2009). Counting customers, subscribers and mobile phone numbers, *info* 11 (2) 6-23.
- The Monitor* (2008a). Region's phone companies unify airtime recharging, *The Monitor*, 12 September 2008, retrieved from <http://allafrica.com/stories/200809120041.html> November 2009
- The Monitor* (2008b). MTN roaming clients to pay less, *The Monitor*, 23 April 2008, retrieved from <http://allafrica.com/stories/200804221084.html> November 2009.
- The New Vision* (2008). MTN to introduce seamless network, *The New Vision*, 24 November 2008, retrieved from <http://allafrica.com/stories/200811250053.html> November 2009.
- The New Vision* (2009). Zain subscribers reach 63 million after introduction of One Network, *The New Vision*, 9 March 2009, retrieved from <http://allafrica.com/stories/200903110077.html> November 2009.
- The Saudi Gazette* (2008). Vodafone Egypt cuts roaming rates for Saudi Arabia, UAE, *Zawya* website, 9 August 2008, retrieved from

- <http://www.zawya.com/story.cfm/sidZAWYA20080809043522/Vodafone%20Egypt%20cuts%20roaming%20rates%20for%20Saudi%20Arabia,%20UAE> August 2009.
- T-Mobile (no date). International services, International roaming, retrieved from [http://www.t-mobile.com/International/RoamingOverview.aspx?tp=Inl\\_Tab\\_RoamWorldwide](http://www.t-mobile.com/International/RoamingOverview.aspx?tp=Inl_Tab_RoamWorldwide) August 2009.
- Touval, S (1999). *The boundary politics of independent Africa*, IUniverse.
- Ukodie, A (2009). Glo's One Network brings ease of use, low rates across two borders, *Daily Independent*, 4 May 2009, retrieved from <http://allafrica.com/stories/200905050362.html> November 2009.
- Verizon (no date). Verizon wireless, Global phone rates and coverage, retrieved from [http://b2b.vzw.com/international/Global\\_Phone/plans\\_coverage.html](http://b2b.vzw.com/international/Global_Phone/plans_coverage.html) August 2009.
- Vodacom (no date). Travel, Vodacom, retrieved from <http://www.vodacom.co.za/services/travel/data.jsp> November 2009.
- Vodafone (no date). Our global footprint, Vodafone, retrieved from [http://www.vodafone.com/start/about\\_vodafone/where\\_we\\_are.html](http://www.vodafone.com/start/about_vodafone/where_we_are.html) November 2009.
- Zain (2007a). MTC Group adopts a new name unifying its different brands, Press release, 8 September 2007, retrieved from <http://www.zain.com/muse/obj/lang.default/portal.view/content/Media%20centre/Press%20releases/Zain%20Launch> November 2009
- Zain (2007b). World's first borderless mobile network expands into Central Africa, Press release, 6 June 2007, retrieved from <http://www.zain.com/muse/obj/lang.default/portal.view/content/Media%20centre/Press%20releases/One%20Network%20expanded> November 2009.
- Zain (2006). Celtel launches One Network, world's first borderless mobile phone network, Press release, 27 September 2006, retrieved from <http://www.zain.com/muse/obj/lang.default/portal.view/content/Media%20centre/Press%20releases/One%20Network> November 2009.
- Zain (2005). Celtel launches East Africa calling tariffs, Press release, 8 September 2005, retrieved from <http://www.ke.zain.com/en/about-us/news/press-release9/index.html> November 2009.
- Zain (no date). A wonderful world: Africa, Zain, retrieved from <http://www.zain.com/muse/obj/portal.splash> November 2009.
- Zain (no date a). Zain Vision, retrieved from <http://www.zain.com/muse/obj/lang.default/portal.view/content/About%20us/Overview/Vision> November 2009.
- Zain (no date b). Africa abolishes roaming as Zain's One Network expands, Press release, no date, retrieved from <http://www.zain.com/muse/obj/lang.default/portal.view/content/Media%20centre/Press%20releases/One%20Network%2012%20countries> November 2009.
- Zain (no date c). Zain personal plans: Pamoja, Vuka, retrieved from <http://www.ke.zain.com/en/personal-plans/plan-pamoja/index.html> November 2009.
- Zain (no date d). Zain phone services, Zain Kenya and Zain Tanzania websites, retrieved from <http://www.ke.zain.com/en/phone-services/Zain-access/index.html>  
<http://www.ke.zain.com/en/phone-services/one-office/index.html>  
<http://www.tz.zain.com/en/phone-services/one-office/index.html> November 2009.

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