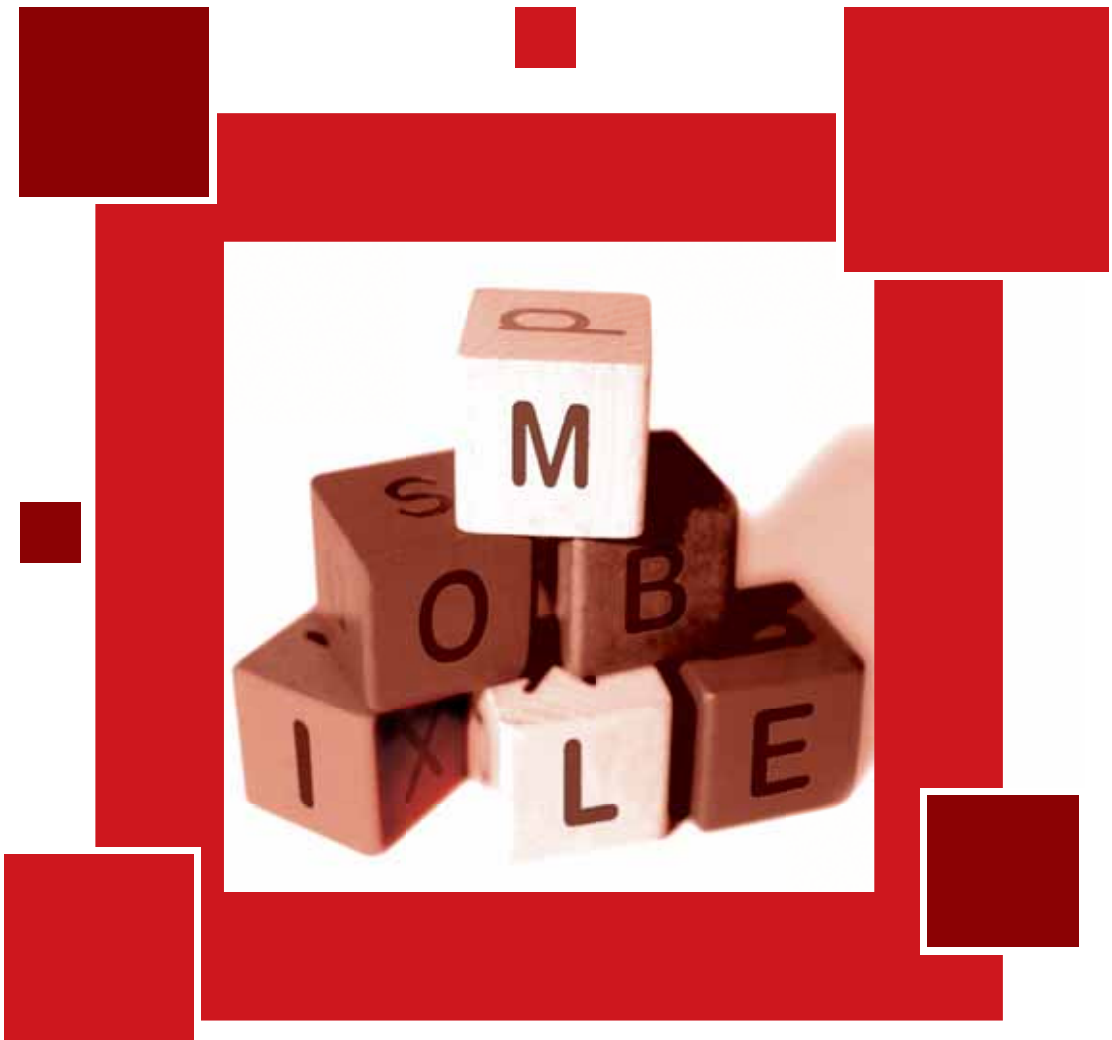




Regulation and the Digital Divide



How best-practice mobile regulation can drive investment and penetration in emerging markets



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Bridging the Digital Divide

The GSM Association (GSMA) represents the interests of over 680 mobile operators across 213 countries worldwide. Spearheading technical, commercial and public policy initiatives, the GSMA works to enhance the value of mobile services globally. With over 1.7 billion global customers and about 80% of the world's population covered by mobile networks, the GSM story is one of unprecedented growth. Yet we are also acutely aware that billions of people in the world still have no easy access to digital telecommunications.

GSM is the most effective technology to connect the unconnected and release the potential of the world's emerging markets. We strongly believe that the lowering of ownership barriers such as the cost of handsets, services and taxes, coupled with the introduction of compelling consumer propositions in developing markets, are measures that will provide a sustainable pathway to eliminating the digital divide.

To that end the GSMA has launched a series of programmes aimed at lowering the barriers that prevent access to mobile services. In February 2005 the GSMA announced its Emerging Market Handset (EMH) programme, designed to provide low cost handsets and hence increase accessibility within emerging economies. The enormous success of this programme has helped deliver a sub US\$30 handset, and has the potential to add more than 100 million new global connections per year. By substantially reducing the cost of handsets, the programme has lowered the entry level of communications for a significant proportion of the world's unconnected people.

We have also identified that lowering taxes on mobile communications can greatly enhance affordability and growth in emerging markets. Our Tax and the Digital Divide report demonstrated how governments have often taxed mobile communication like a luxury good and, consequently, priced it out of reach of those who could readily benefit from it. In 26 of the 50 developing countries in the study, taxes represent more than 20% of the total cost of owning and using a mobile phone. In 14 of the developing countries, the average mobile phone user pays more than US\$40 a year in taxes on handsets and mobile services. The report concluded that a government that lowered sales taxes on mobile services by just one percentage point would boost the number of mobile phone users in its country by more than 2% between 2006 and 2010.

The GSMA is committed to working with governments and regulators to increase the availability of mobile services. To this end, this Regulation & the Digital Divide report examines how governments can sometimes impede access to, and take-up of, mobile phone usage in Sub-Saharan Africa by imposing stifling regulation. The continuing use of Universal Service Funding to support the deployment of fixed-line infrastructure in rural, unconnected areas is just one example of how misplaced regulation can hold back a market's growth. Despite the fact that the provision of a GSM connection costs about one tenth that of a fixed line, many regulatory authorities are missing out on the ability of mobile services to reach the poorest members of society.

This report is a result of the support and contribution of a number of individuals and organisations. We would particularly like to acknowledge Nokia, Ericsson, Vodacom, MTN and Celtel. We have assimilated the views from a wide range of authorities, from academia to operators, from government officials to industry investors. While the emphases may have differed, the underlying message was always the same – encouraging development and investment in mobile communications is key to continued growth in our sector and in bringing the economic and social benefits of mobile phones to emerging markets.



Tom Phillips
Chief Government & Regulatory Affairs Officer
GSM Association



Section 1 Introduction and Executive Summary

Executive Summary

This report was commissioned by the GSMA and undertaken by PricewaterhouseCoopers (PwC) to examine the link between regulation and the digital divide. The emphasis has been on Sub-Saharan Africa because of the region's relatively low level of penetration and significant, unfulfilled demand.

Mobile has clearly emerged as the main solution to providing communications for the world's unconnected. Mobile has already brought significant benefits to economies and societies across much of the developing world, but much potential still exists in Africa, where fixed-line communication alternatives are extremely limited. This report investigates how a move towards best-practice regulation would promote an increase in mobile investment and help to realise this potential.

Specifically, the analysis explores the impact of regulatory policy and government intervention on the level of risk associated with operator investment decisions. In light of this, we examine how reduced regulatory risk could improve investment levels and reduce the cost of mobile ownership. We then consider the impact this could have on penetration levels, and the corresponding knock-on effect for GDP.

Key findings:

- Mobile telephony acts as a major catalyst of economic and social development and is already playing a central role in bridging the digital divide. In the region, over the last five years, approximately eight times as many mobile connections have been made relative to other technologies (fixed and fixed wireless).
- Mobile already makes a profound economic contribution to Sub-Saharan Africa, through its positive impact on employment, increased business efficiency, tax revenues and GDP.
- There are many examples where the current situation differs substantially from regulatory best practice, in particular in terms of:
 - a lack of appropriate sector legislation and clearly defined regime
 - a lack of clear regulatory policy in particular in relation to licensing and long term allocation of spectrum
 - a lack of independent dispute resolution and independence of regulators from political intervention
- In many respects, the challenges facing regulators in the region are more complex than in developed countries, and there is a significant danger of "copying and pasting" policies without conducting appropriate impact analysis. However, across the region regulators often do not have adequate capacity in terms of economic and legal skills.
- As a result, in many countries in Sub-Saharan Africa mobile operators are exposed to significant levels of regulatory risk, which raises the cost of capital or required return demanded by investors and leads to a sub-optimal level of investment.
- Based on our analysis of operators' investment policies, a best practice regulatory environment could have increased mobile investment to date by approximately 25%. This equates to US\$4.6bn.
- This additional investment could have led to an increase in mobile subscribers of up to 20%, representing the connection of 17m extra subscribers.
- Best-practice regulation, would also reduce operators' capital costs leading to a lower total cost of ownership (TCO) faced by consumers. TCO could be reduced by around 10%. Given the significant elasticity of demand for mobile services, this would result in up to 8.25 million additional subscribers.

Section 1 Introduction and Executive Summary

- Together the impact of increased investment and the lower cost of ownership could increase subscribers by 25 million, representing an increase of 30% above the current level of 83 million.
- In addition, there is significant potential for governments to contribute to a reduction of the total cost of ownership of mobiles through their policies in terms of taxes, duties and the provision of infrastructure. This would further stimulate the development of the sector.

Key Recommendations

Consumers and society benefit when a regulatory framework exists in which the mobile sector can thrive and continue to make a vital contribution to the development of economies and societies. The long-term winners will be those countries whose governments set in place sound regulation, based upon the key recommendations below:

Government policy

- Establish a Telecommunications Act that enshrines the principles of fair competition, regulatory independence and reflects long term policy goals, linked to national, social and economic development targets.
- Create an effective National Regulatory Authority, which is independent from both undue political and financial pressures and is staffed by appropriately trained professionals.
- Create and maintain a national, strategic telecoms plan.
- Implement policies that minimise direct, mobile-specific taxation and, as a result, maximise the potential for investment by the private sector.

Regulators

- Develop appropriate resources and skills, in particular with regards to economics, to assess the impact and appropriateness of regulatory policies.
- Develop and communicate a clear set of regulatory policy objectives and targets.
- Implement consistent and transparent regulatory policy, and conduct regular consultation with stakeholders.
- Focus on reducing risk and commit to a stable and predictable environment.

In order to maximise the significant benefits to economies and societies, governments, regulators, and mobile operators should develop a long-term partnership based on consultation, collaboration and sustainability.



Section 1 Introduction and Executive Summary

Connecting The Unconnected

As Chairman of the Independent Commission for Worldwide Telecommunications Development ("The Maitland Commission") between 1983-85, Sir Donald Maitland and his colleagues were instrumental in recognizing the fundamental importance of communications infrastructures as an essential element in a country's economic and social development.

"In a majority of developing countries, the telecommunications system is inadequate to sustain essential services," noted the Introduction to the Commission's final report 'The Missing Link.' "In large tracts of territory there is no system at all. Neither in the name of common humanity nor on grounds of common interest is such a disparity acceptable."

The job of the Commission was to recommend ways in which the expansion of telecommunications worldwide could be stimulated. Twenty years on and close to one fifth of the world's population still has no telephone access. That's more than one billion people.

Sir Donald believes that mobile technology is critical to bridging this divide. "I hope that governments will continue to encourage investment in mobile communications, particularly in rural areas," he comments. "They can help in a number of ways, not least by providing a balanced regulatory environment and a stable investment climate."

"Some of the most intractable problems related to the growth of mobile – including the relationship with fixed line operators, pricing policies, even the siting of mobile masts – are not exclusive to the developing world. There needs to be genuine two-way dialogue, sharing the experiences of developed and developing nations. But, given the lack of fixed line telephony, the impact of mobile telephony on the economic and social structure of a developing country is far greater in poorer countries. This places a considerable responsibility on the shoulders of the mobile sector."

"Mobile telephony is providing the magic ingredient which may yet allow the final aspiration of the Maitland Commission report to be realised: that 'all mankind could be brought within easy reach of a telephone by the early part of the next century'."

To mark the 20th anniversary of publication of the Maitland Commission's Report, a collection of essays by 16 of the world's leading authorities on telecommunications, IT and development has been published entitled "Maitland+20 – Fixing the Missing Link". Details at www.theanimacentre.org/maitland.



Sir Donald Maitland



Background & Methodology



Section 2 Background and Methodology

2.1 Purpose of the Study

PwC has been commissioned by the GSMA to conduct a review of the impact of regulation on the development of the mobile sector in Sub-Saharan Africa. The purpose of the study is to examine the issues facing regulators and operators in the region and to examine the ways in which the reduction of regulatory risk can contribute to the provision of accessible and affordable services.

2.2 Approach

PwC has engaged with various stakeholders to canvass opinion and explore pertinent experiences. In particular, meetings were conducted with a large number of operators, as well as with regulators and other stakeholders including equipment providers. In total the views of operators and regulators in 28 African countries¹ have been solicited. The sample was based on the need to cover a wide range of markets in Sub-Saharan Africa, but also on the availability of information. Interviewees included several larger operators with subsidiaries in a number of different countries.

A PwC team attended the GSM Africa 2005 conference in Cape Town (December 2005), and took the opportunity to meet personally with senior representatives of a large number of operators and regulators. We also contacted regulators in many of the countries for which we had obtained the views of operators. We have not carried out an “efficiency study” of individual regulators but have focused on general experiences. In some sections of this report we have included quotes from operators about the impact of regulation. These illustrate the kind of responses we had to questions about the regulatory environment but they are not referenced to particular operators due to the political sensitivity of some of the issues.

The main justification for the focus on Sub-Saharan Africa was that North African economies differ from Sub-Saharan countries in a number of aspects, due to their proximity to Europe and the Middle East, and their generally higher standards of living. However for these reasons North African countries do offer an interesting comparison, and in some sections we have drawn on these examples. Even within our sample there are significant differences between countries. Sub-Saharan countries are typically composed of a small proportion of very affluent people living in urban areas, and a larger section of the population with very low incomes, the very poorest living in rural areas. However in some countries the urban population is much larger or generally better off, and geographic differences between countries make a vast difference to the nature of the communications challenge.

Based on these interviews, we have sought to identify the key lessons for how best-practice regulation can reduce risk and therefore lead to an increase in infrastructure investment. This would translate into network rollout, equipment upgrades, access provision and capacity increases. To gauge the potential impact of improvement, we have examined the investment policies of operators and explored the sensitivity of these policies to the regulatory environment. This has enabled us to derive indicative estimates of the economic impact of improving the regulatory environment.

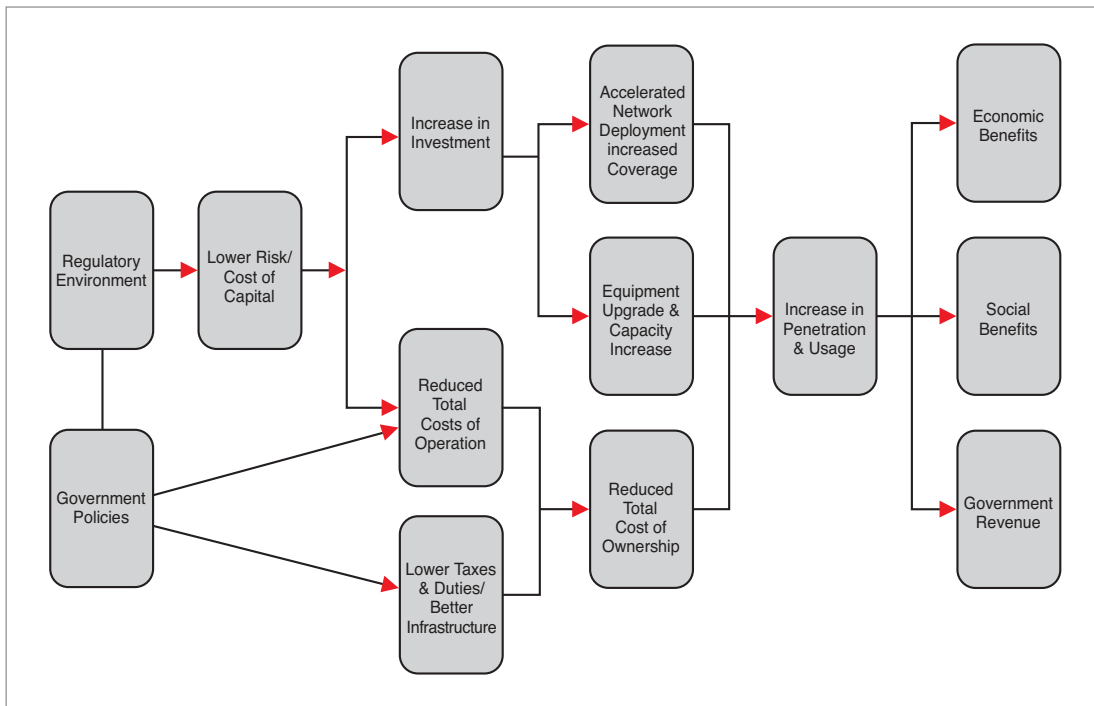
¹ Botswana, Burkina Faso, Burundi, Cameroon, Chad, Dem Rep Congo, Gabon, Ethiopia, Kenya, Lesotho, Malawi, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rep Congo, Rwanda, Senegal, Sierra Leone, Somalia, South Africa, Sudan, Swaziland, Tanzania, Uganda, Zambia, and Morocco.

Section 2 Background and Methodology

Figure 1 illustrates the mechanisms through which government and regulator actions impact on investment and penetration, and eventually GDP, social welfare and tax revenues.

We have also sought to highlight the challenges that regulators face in the region, in particular those that may not arise in developed countries. Based on this analysis we have identified key recommendations both for the design of the regulatory regime and with respect to specific policies.

Figure 1: Impact of Regulation and Government



Source: PwC analysis



Mobile equipment manufacturer Nokia cites Sub-Saharan Africa as a market with massive potential in terms of subscriber growth.

“The potential for growth is HUGE, in capital letters,” comments Petteri Terho, Director of Strategy and Business Development for New Growth Markets at the vendor’s Networks division. “The information society and the communications built in this part of the world will be predominantly mobile. Mobility is definitely the way forward there. Mobile will help bridge the digital divide and GSM will be the technology to bridge this.”

Despite the positive outlook, Terho is keen to stress that policy makers and regulators in developing nations will play a critical role in ensuring such potential is achieved. “The role of the regulators and governments in these countries is to build the enabling environment. The government and regulators play a huge role and the focus should be on sustainability from a long-term perspective rather than a quick fix. The growth will not happen if the environment is not right.

“We have seen from other areas of the world that as soon as there are transparent interconnection regimes, and taxes and duties are brought down, there is a lot more room for economic growth. All these excess factors always hinder growth. The faster they remove the inhibitors to growth, the faster they get the benefits. We need to focus on the total cost of ownership.”

Terho is convinced that if such barriers are removed, mobile services will bring major benefits to the Sub-Saharan region. “It is going to take time but the demand is there. Africa is predominantly an oral culture, people are used to talking. What else could be a better tool than a mobile phone when computers require literacy, power and electricity? Mobile brings money, it brings jobs, and it enriches people’s lives.”



Petteri Terho
Director of Strategy and Business Development
New Growth Markets
Nokia Networks Division



The Merits of Mobile



Section 3 The Merits of Mobile

3.1 The Development of Mobile Services

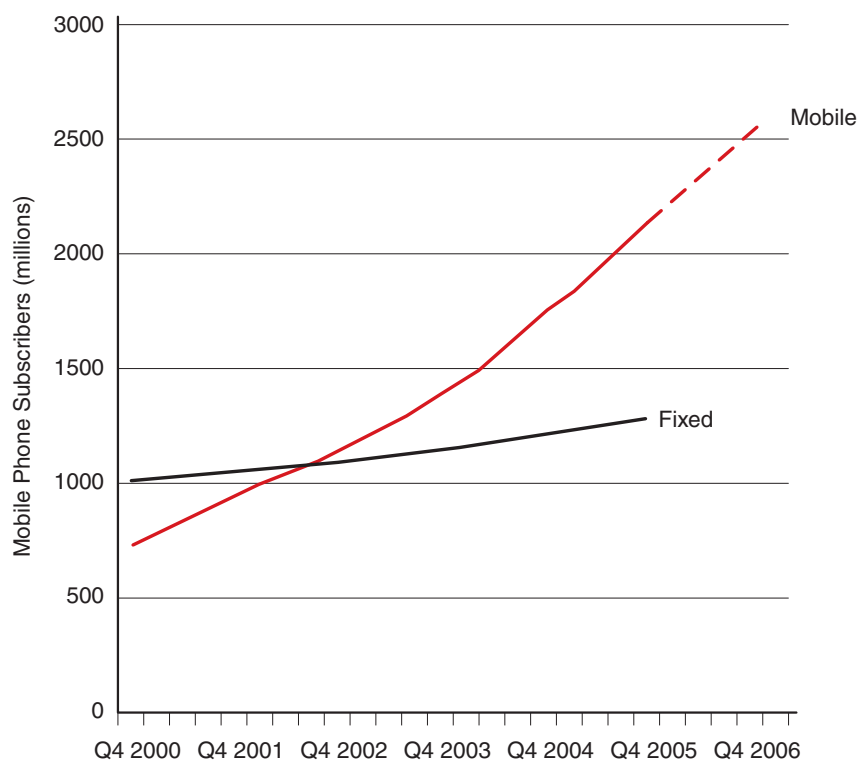
This section provides some detail on the development of mobile services in Sub-Saharan Africa over the past few years and discusses the impact this has had on the respective economies.

3.1.1 Users

Mobile phone subscription levels are rising rapidly all over the world. Since 2000 the number of subscribers has almost tripled, rising from around 720 million to over 2 billion.

Figure 2: Global Telephone Subscriptions 2000-2006

In 2002 the number of mobile phone subscribers across the globe overtook the number of fixed-line connections for the first time. The rapid growth of mobile penetration, compared to fixed lines, is largely



Source: Wireless Intelligence and ITU

attributable to the relatively low incremental cost of adding subscribers to cellular networks, and to the value users place on mobility. Mobile networks can be built more quickly than fixed networks, and mobile technology allows users a variety of ways to obtain access to the network. In particular low income consumers can opt for prepaid options, and do not have to qualify for subscription plans.²

²ITU. Mobile overtakes fixed: Implications for policy and regulation, 2003. Reproduced with the kind permission of ITU. http://www.itu.int/osg/spu/ni/mobileovertakes/Resources/Mobileovertakes_Paper.pdf

Section 3 The Merits of Mobile

Table 1: Fixed & Mobile Penetration Rates in Selected Countries of Sub-Saharan Africa

	Fixed Penetration 2004	Mobile Penetration 2004 (Q4)	Mobile Penetration 2005 (Q4)
Botswana	8.0%	33.3%	37.1%
Burkina Faso	0.6%	2.7%	3.7%
Burundi	0.3%	1.5%	2.1%
Cameroon	0.6%	9.4%	13.6%
Chad	0.2%	1.6%	2.3%
Congo (Republic)	0.4%	10.6%	12.7%
Gabon	2.9%	32.8%	39.7%
Kenya	0.9%	11.7%	16.9%
Lesotho	2.1%	10.3%	13.7%
Malawi	0.8%	0.9%	1.0%
Mauritius	28.7%	43.6%	48.0%
Mozambique	0.4%	4.3%	6.0%
Namibia	6.4%	16.4%	19.2%
Niger	0.2%	1.3%	1.8%
Nigeria	0.8%	7.1%	13.8%
Rwanda	0.3%	2.1%	3.4%
Senegal	2.4%	10.8%	15.8%
Sierra Leone	0.5%	1.6%	1.4%
Somalia	1.7%	0.4%	0.7%
South Africa	10.4%	45.4%	60.9%
Sudan	3.0%	3.4%	5.7%
Swaziland	4.4%	12.4%	19.8%
Tanzania	0.4%	4.7%	7.3%
Uganda	0.3%	4.3%	6.1%
Zambia	0.8%	4.4%	6.7%
WORLD	19%	25.9%	33.80%

Source: Wireless Intelligence and ITU

In most countries in Sub-Saharan Africa mobile penetration is much higher than fixed penetration.

Although mobile phone subscriber numbers are growing rapidly all over the world, the spread of mobile phones has been most rapid in those regions where usage was previously limited.

Table 2: Annual Growth in Mobile Subscriptions by World Region

	2001	2002	2003	2004	2005
World	31%	21%	22%	24%	23%
Americas	18%	12%	25%	37%	35%
Asia Pacific	45%	32%	26%	23%	21%
Europe	26%	14%	16%	21%	20%
Middle East	36%	30%	23%	27%	33%
USA/Canada	16%	10%	16%	19%	11%
North Africa	64%	32%	36%	49%	70%
Sub-Saharan Africa	59%	48%	47%	54%	49%

Source: Wireless Intelligence

In Sub-Saharan Africa subscription numbers have climbed to nearly eight times their levels at the end of 2000. There are now approximately 83m mobile subscribers in Sub-Saharan Africa. However in the majority of countries penetration was still below 10% in 2004,³ reflecting a large untapped market and huge potential for future growth.

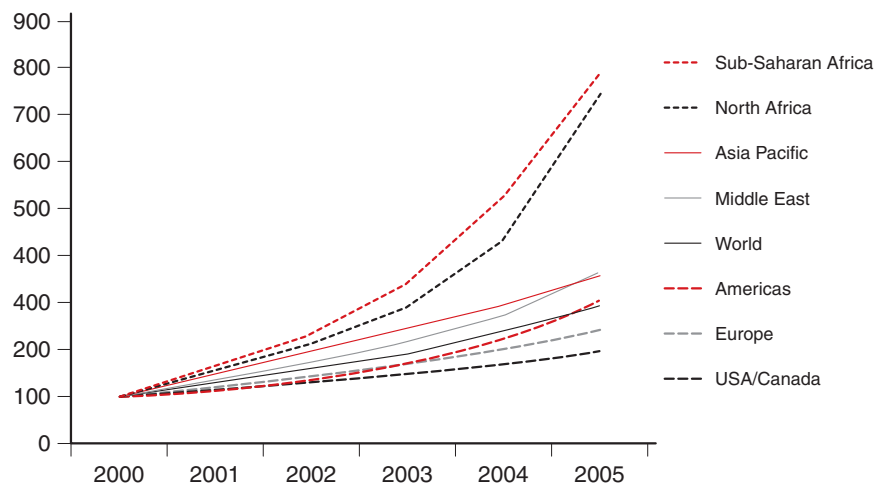
³Wireless Intelligence.



Section 3 The Merits of Mobile

Industry forecasts suggest that by the end of 2007, subscriber numbers in Sub-Saharan Africa will have climbed to over 130 million.⁴

Figure 3: Global Mobile Subscribers Indexed, Year 2000 = 100



Source: Wireless Intelligence

As well as reflecting the huge latent demand for communications services in Sub-Saharan Africa, the rapid increase in mobile penetration is evidence that mobile technology is well placed to fill the gap left by the existing poor fixed-line infrastructure.

Table 1 showed that in many countries penetration levels are still very low, and increasing penetration to cover lower income groups and rural areas still represents a great challenge for governments and operators. The regulatory environment has a very important role to play in enabling continued growth at the fastest possible rates by creating an environment that encourages investment and that leads to reductions in the total cost of ownership (TCO).

3.1.2 Coverage and Access

As a result of the substantial growth of the mobile sector, around 80% of the world's population already lives in an area with mobile network coverage.⁵ However geographic coverage in many countries in Sub-Saharan Africa is more limited, and is often focused on urban areas. An estimated 50% of Sub-Saharan Africa is covered by a mobile signal,⁶ and this provides significantly more coverage than the fixed line infrastructure. Network coverage is not always the most important constraint to mobile ownership, and access to services also depends on the affordability of services.

The increase in subscriber numbers shown above probably understates the growth in access to mobile phones. This is because in areas where incomes are low, sharing is common. Families may share a phone to spread the cost, or people may make occasional use of a friend's phone for emergencies. In Africa it is also common for entrepreneurial individuals to establish small businesses selling mobile call services to others. As a result, in addition to the 83m subscribers in Sub-Saharan Africa, there are likely to be several million more who benefit from shared access.

⁴Wireless Intelligence

⁵The Economist, Less is More – Mobile Phones and Development, July 9th 2005. (GSM coverage alone is probably slightly lower).

⁶ITU, Africa's Booming Mobile Markets: Can the Growth Curve Continue? 2004. Reproduced with the kind permission of ITU. <http://www.itu.int/AFRICA2004/media/mobile.html>

Section 3 The Merits of Mobile

Within Africa as a whole teledensity figures show an average of 3.1 fixed and 8.8 mobile subscribers per 100 inhabitants respectively for 2004,⁷ highlighting the relative importance of mobile on the continent. Penetration of mobile phones had risen to 15%⁸ by the end of 2005, but fixed lines have shown very little growth.

3.1.3 Investment

The private sector invested US\$210 billion in telecommunications infrastructure in the developing world from 1995 to 2002.⁹ In many African countries telecommunications investment accounts for a very significant proportion of total investment. Table 3 shows that in 2003 the telecoms sector accounted for more than a tenth of gross fixed capital formation in four out of the nine countries for which data was available from the ITU.

Much of this investment came from overseas in the form of foreign direct investment (FDI). In many African

Table 3: Telecoms Investment in a Selection of Sub-Saharan African Countries¹⁰

Country	Telecommunications Investment 2003 \$mn	% Gross Fixed Capital Formation
Benin	26.4	5.8
Burkina Faso	34.9	4.5
Kenya	188.6	10.5
Lesotho	7.1	3.3
Mali	17.7	3.0
Senegal	108.6	10.4
Swaziland	27.6	11.7
Togo	30.0	11.5
Uganda	68.0	4.9

Source: ITU

countries local capital is scarce and countries are reliant on attracting international investors to fund projects which involve the construction of significant infrastructure. The openness of a country to FDI is therefore an important determinant of investment and penetration growth.

3.2 The Growth of Mobile Services – Mobile vs. Fixed

In Africa the number of mobile phone subscribers overtook the number of fixed lines in 2001. Since then the proportion of mobile users has continued to grow, and in 2003 nearly three quarters of telephone subscribers in Sub-Saharan Africa used a mobile phone. In some countries almost all subscribers used mobile. For example in Uganda 92.7% of users had mobile phones, and in the Democratic Republic of the Congo this figure exceeded 98% in 2003.¹¹

While annual growth rates for mobile subscriptions have hovered consistently in the region of 50% for Sub-Saharan Africa,¹² growth of fixed-line penetration has been slow, and in some countries, for example South Africa, fixed line use has even declined.¹³ Nigeria has witnessed particularly high growth in mobile subscribers, with penetration doubling each year since 2000 while fixed line numbers have stagnated over these years and only seen minor growth over the past three or four years. In Africa as a whole approximately eight times as many new mobile subscribers were added compared to new fixed line additions (between 1999 and 2004).¹⁴

⁷ ITU World Telecommunications Indicators Database.

⁸ Wireless Intelligence.

⁹ World Bank, Financing Information and Communication Infrastructure Needs in the Developing World: Public and Private Roles, Draft Version, February 2005.

¹⁰ ITU, World Telecommunications Indicators, 2004/2005. Reproduced with the kind permission of ITU.

¹¹ ITU, African Telecommunication Indicators, 2004. Reproduced with the kind permission of ITU.

¹² Wireless Intelligence, 2005.

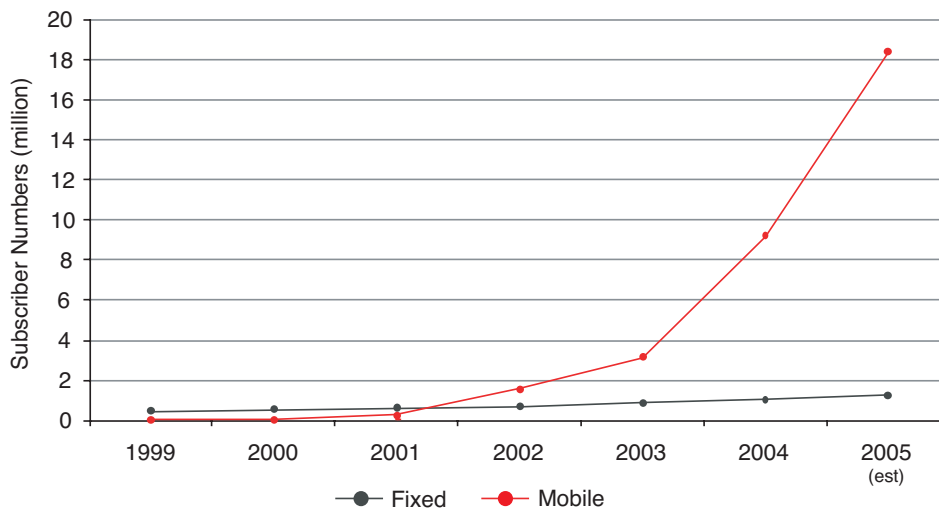
¹³ ITU, African Telecommunication Indicators, 2004. Reproduced with the kind permission of ITU.

¹⁴ Wireless Intelligence and ITU.



Section 3 The Merits of Mobile

Figure 4: Subscriber Numbers in Nigeria 1999-2005¹⁵



Source: Nigerian Communication Commission

The green-field aspect of a mobile business gives it a significant advantage over existing fixed operations. For example in some African countries bad debt levels can be extremely high for fixed incumbents. Mobile networks, which in Africa are predominately prepaid, are not exposed to this problem. Although there is no technical barrier to offering prepaid services over a fixed network, the costs of changing to such a system would be high. Because the technology is new, mobile networks also tend to be more reliable than fixed services.

In addition there are low initial costs to new mobile subscribers. Used handsets are available at low prices¹⁶ (and are often shared so that only a (free or very cheap) SIM card is needed to become a subscriber) whereas connection fees for fixed subscribers are often significant. Furthermore, SIM cards are available immediately and practically everywhere, whereas fixed line subscription tends to entail long waiting lists in Africa.

These factors indicate that of all of the recent technological developments, mobile technology is set to be the tool with the greatest impact on sustainable development. This is echoed by the following statement recently published in *The Economist*: "There is plenty of evidence to suggest that the mobile phone is the technology with the greatest impact on development."¹⁷

3.3 Impact on Economic Development

The growth of subscriber numbers is not only an aim in itself but contributes, directly and through spill-over effects, to the economic development of the countries concerned.

3.3.1 Impact on GDP

We estimate that for Africa as a whole, mobile revenues alone accounted for 2.2% of GDP in 2004 (an increase from 1.4% in 2002).¹⁸ By comparison, in Sub-Saharan Africa agricultural activities such as farming, hunting, forestry and fishing constitute around 15%-20% of the economy, and manufacturing, mining and manufacturing accounts for just over 10% of GDP.¹⁹ The distribution of activity is very similar for North African countries. However, mobile operations and technology play a more important role in the economy than the size of their revenues suggests.

¹⁵ Data from Nigerian Communication Commission website. http://www.ncc.gov.ng/index5_e.htm.

¹⁶ Prices for new mobile handsets are also falling rapidly. The GSMA Emerging Market Handset Programme provides handsets for \$30 each.

¹⁷ *The Economist*, 10 March 2005.

¹⁸ Calculated from Wireless Intelligence revenue data and World Bank GDP data.

¹⁹ United Nations Statistics Division (data download). <http://unstats.un.org/unsd/snaama/dnlist.asp>

Section 3 The Merits of Mobile

Without a functioning communications network hardly any region will generate significant levels of investment, through FDI or otherwise. Companies and industries that appear to be entirely unrelated to telecommunications will take into account the availability of communications networks when deciding where to locate new factories. In other words, communications networks form an essential part of infrastructure that is a prerequisite for the economic development of other sectors and of the economy as a whole. This was recognised in the 1985 Maitland Commission Report, which suggested that telecommunications were “an essential component in the process of development”.²⁰

As other mobile services, such as mobile banking and payments become more prevalent, the economic impact will further be amplified, particularly as credit and transactional facilities are extended to those who previously had no access to banking facilities. Similar arguments apply to mobile commerce and data services, as well as a range of other applications, including wireless internet access for rural schools and government healthcare initiatives enabled through mobile technologies.

A recent study attempted to quantify the effect of increased mobile penetration on GDP, and found that between 1996 and 2003 a developing country with ten more mobile phones per 100 people could expect to experience annual GDP growth that was 0.59% higher than an otherwise identical country.²¹ Since telecommunications play such an important role in the economy as a whole, other parts of government should also examine what they can do to support their growth.

3.3.2 Impact on Government Tax Revenues

Tax revenue from the mobile sector provides a significant stream of income for governments in Sub-Saharan Africa. In many of these countries a significant part of the economy is informal, presenting many obstacles to tax collection. Some activity in the mobile sector can also be informal, for example sales of mobile top-up cards by street hawkers, and the activities of other micro-entrepreneurs.²² However, this income is channelled into the formal sector through mobile operator revenues. This allows easier collection of taxes than from many other parts of the economy.

In some cases these factors have encouraged governments in developing countries to tax mobile communication at a disproportionately high level. As a result, taxes constitute a far higher proportion of the total costs of ownership of mobiles than is the case for other goods. Governments should realise that excessive tax puts future growth and development at risk. Under a reasonable taxation regime mobile ownership and use will continue to grow, bringing with it additional growth and therefore higher tax revenues in the future.²³ India has had positive experiences in this area: “India has reduced its handset import duties over the past three years, helping to boost penetration from less than 1 percent to more than 5 percent. The clear implication is that governments can use fiscal policy to enable more of their people to become connected.”²⁴ In this context it is also important for governments to ensure that double taxation (e.g. by federal, regional and local authorities) is avoided.

Finally it should be noted that due to the impact on GDP discussed in the previous section the mobile sector contributes indirectly to tax revenues from other sectors such as contractors, banking, and any other industries attracted by a well-functioning telecoms sector.

3.3.3 Impact on Employment

Mobile networks contribute to employment both directly and indirectly. In addition to staff employed by the operators to build infrastructure, many other employment opportunities are generated in the sale of mobile phones, top-up cards, and other services associated with mobile networks.

²⁰ Maitland Commission, *The Missing Link, Report of the Independent Commission for World Wide Telecommunications Development*, 1985, p8.

²¹ Waverman, Meschi and Fuss, *The Impact of Telecoms on Economic Growth in Developing Countries*, The Vodafone Policy Paper Series 2 (2005): pp. 10-23.

²² For example, in Nigeria ‘Umbrella Ladies’ offer public telephone-style services on the roadside.

²³ GSMA, *Tax and the Digital Divide*, 2005.

²⁴ New Horizons, *Tax Cuts Boost Mobile Growth and the Economy*, January 2006.



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A recent study carried out for the GSMA suggests that in Latin America more than twice as many jobs are created in support services catering to the mobile industry than are directly employed in the industry itself (and of those employed in the industry only a tenth were employed by the operators themselves).²⁵ Further to this, the expenditures of the mobile industry in the rest of the economy will induce job creation in other areas, and tax revenues collected by governments will fund the employment of other workers. In Latin America this effect was estimated to contribute to the creation of as many jobs as were created directly within the industry.

The indirect effects on employment may be much more important. There is significant anecdotal evidence to suggest that the use of mobile phones greatly facilitates the job-search process in countries where the flow of information in the economy is sluggish due to poor general infrastructure and communication networks. Where postal services are poor and there is no access to fixed-line telecommunications a mobile phone can be a vital way to find out about and apply for a job. A mobile phone also provides a point of contact for potential employers. This could be crucial for independent itinerant labourers such as painters or carpenters who otherwise could not be reached. While these effects are difficult to measure precisely, for many workers in developing countries they will make a significant difference to the ease of participating in the economic system. A survey carried out in South Africa found that 15.5% of those interviewed used mobile phones to assist with job search.²⁶

3.3.4 Impact on Productivity

Mobile phones can have an important impact on productivity. A survey of small businesses in South Africa found that 89% made use of mobile phones. Of these 62% reported increased profits. Some of the benefits mentioned included: increased availability to clients (47%), reduced travel (50%), and assistance in breakdowns/emergencies (21%).²⁷

A separate study of mobile phone use by micro-entrepreneurs in Rwanda found that small business owners who were solely reliant on a mobile connection used the phones to expand their business networks.²⁸ Evidence from Tanzania and Kenya has shown that mobile phones contribute to the expansion of the markets of small and medium-sized enterprises (SMEs).²⁹

The increase in information flows associated with mobile phone use brings many associated benefits. This includes the spread of information on prices and product availability. Accessibility of price signals ensures that scarce commodities are channelled to the right locations, namely where they are most scarce and prices are highest, thus contributing to a reduction of shortages of food and other essential supplies. For example, fishermen based on Mafia Island in Tanzania are reported to use mobile phones to gather information about prices before deciding where to land their catch.³⁰

3.4 Impact on Social Development

3.4.1 Bridging the Digital Divide and the role of Mobile Communications

The impact of mobile phones extends beyond measurable economic indicators. Much attention has been focused recently on the 'digital divide', which refers to the fact that in many parts of the world income differences are reflected in a gap between those with, and those without, access to computing and communications technology. This divide is regarded as responsible for further isolating the world's poor from the rest of the global community.

²⁵ Lewin, D. & Sweet, S. The Economic Impact of Mobile Services in Latin America, a report for the GSMA, GSM Latin America, and AHCIEI, p24.

²⁶ Samuel, J. Shah, N. and Hadingham, W. Mobile Communications in South Africa, Tanzania and Egypt: Results from Community and Business Surveys, The Vodafone Policy Paper Series, Number 2, March 2005.

²⁷ Samuel, J. Shah, N. and Hadingham, W. Mobile Communications in South Africa, Tanzania and Egypt: Results from Community and Business Surveys, The Vodafone Policy Paper Series, Number 2, March 2005.

²⁸ Donner, J. The use of mobile phones by microentrepreneurs in Kigali, Rwanda:

Changes to social and business networks. Submitted to: Wireless Communication and Development: A Global Perspective Annenberg Research Network on International Communication Workshop 7-8 October 2005.

²⁹ Matambalya, F. and Wolf, S. The Role of ICT for the Performance of SMEs in East Africa, ZEF – Discussion Papers on Development Policy Bonn, December 2001.

³⁰ Coyle, D. Overview - Africa: The Impact of Mobile Phones, The Vodafone Policy Paper Series, Number 2, March 2005.

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Various initiatives have been undertaken to help bridge this divide, including the World Summit on the Information Society, endorsed by the UN.³¹ Experience has shown that regional centres equipped with computers providing internet connectivity have had a very limited impact. This is because of a lack of literacy, the distance of centres from large parts of the population, and technical problems, especially in relation to the maintenance of these centres. Mobile technology, on the other hand, has proved extremely effective in addressing the issue of the digital divide. Literacy is not required, the mobility of the device helps deliver versatile services (wherever there is coverage) and handsets are robust and easy to use. This explains why it has been suggested the spread of mobile technology would be the most effective way to address the digital divide.³²

In 2003, a paper published by the ITU stated that: “in countries where mobile communications constitute the primary form of access, increased exchange of information on trade or health services is contributing to development goals”.³³ The UN has also advocated the use of information and communication technology (ICT) in the achievement of the Millennium Development Goals. The UN Millennium Project stated that: “ICT is a powerful enabler of development goals because it dramatically improves communication and the exchange of knowledge and information, strengthening and creating new social and economic networks.”³⁴

3.4.2 Benefits brought to poor communities

There are many examples that suggest that providing mobile connectivity in poor communities can indeed deliver significant social benefits. The importance of mobile coverage to communities is starkly illustrated by a case mentioned to us by one operator. After building a mobile phone mast in the countryside of one African country, the operator returned to the site a couple of months later to find that a nearby village had relocated next to the mast where mobile phone reception was best. On later visits electricity and water supply had become available, and a road had been built to the site.

To the extent that mobile phones facilitate attempts to create successful small businesses and help poor individuals to find work, they will also help to reduce inequality within countries. Naturally this will depend on the extent to which services and coverage can be provided to poorer communities. Since many of these communities are located in rural areas away from big cities this presents a challenge to mobile operators and regulators. Careful management of incentives and universal service obligations will be critical in this respect.

The social impact of mobile networks is much higher in countries where no extensive fixed network exists (as is the case in most of Sub-Saharan Africa). In many cases, mobile communication is the only way of receiving information on the availability of medical treatment in regional centres. Prior to the introduction of mobile telephony, for many families regular communication between rural and urban relatives was impossible. In emergencies travel was the only way to convey important messages. In this context mobile services have a profound influence on people’s lives.

Even if ownership of a separate subscription is beyond the means of poorer relatives, many people are finding innovative ways of staying in touch. This may involve maintaining contact with another member of the community, who does own a mobile phone, or travelling to a nearby village or town where mobile payphone services are available. In this respect community service phones have made significant progress in extending access to the poor and rural users. A survey carried out for the UNDP in rural Tanzania found that even though only 5% of respondents owned a mobile phone, 49% had used one, and 95% knew about them.³⁵

Methods to ensure that wealthier friends and family members bear most of the costs of mobile communication are also common, for example the practice of “beeping” whereby the caller hangs up before the other party picks up. In this way, people send a signal that they wish to be contacted without incurring any cost. Certain operators in the region have taken note of this communication need and offer services whereby the call costs are borne by the party that can better afford them. This includes services such as the free “call-me” SMS,

³¹ <http://www.itu.int/wsis/basic/about.html>

³² The Economist, The Real Digital Divide, March 12 2005.

³³ ITU, Mobile overtakes fixed: Implications for policy and regulation, 2003. Reproduced with the kind permission of ITU.

³⁴ UN Millennium Project, Innovation: Applying Knowledge in Development, Taskforce on Science, Technology and Innovation, 2005.

³⁵ UNDP, ICT Socio-Economic Feasibility Study, March 2005. <http://www.undp.org/business/gsb/tanzania.html>



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third-party call-sponsor, and prepaid airtime transfer.

3.4.3 More Benefits and More Evidence

In developing countries, mobile networks provide many people with access to new activities outside their traditional sphere. The absence of fixed networks means that mobile connections often offer the only opportunity for internet access. The World Bank has pointed out the benefits of the internet for developing countries, including increasing trade between regions, developing rural agricultural markets, healthcare delivery, and HIV/Aids prevention.³⁶ A recent development has been the introduction of “m-Commerce” financial services, which phone users can use for purposes such as making cash deposits and withdrawals, transferring money between user accounts, and making retail purchases. Such systems have been applied most successfully in the Philippines, but services have also been launched in several countries in Southern Africa.³⁷

The value of communication to developing country users is illustrated by the willingness of low income users to pay for services. In interviews with stakeholders it was estimated that many users in Sub-Saharan African spent 8-10% of their income on communication services. For the lowest income groups, expenditure constitutes an even more significant share of income. *Souter et al* found that some users in Tanzania spend around 14% of their income on telephony.³⁸

Examples:

Nigerian Hospitals:

A study of ICT (Information and Communications Technology) use in Nigerian teaching hospitals found that 99% of doctors used mobile phones. This had a direct impact on the quality of medical services provided and the health of the patients within the hospitals.

Doctors used mobile phones for communications between wards—including referring patients on to other practitioners, contacting colleagues for consultation or second opinions, and arranging for equipment or materials to be brought to a particular ward.

Although mobile phones had a clear impact on the level of services, doctors were bearing the entire costs themselves including purchasing handsets and call charges.

Idowu, Ogunbodede, & Idowu, Information and Communication Technology in Nigeria The Health Sector Experience, Journal of Information Technology Impact Vol. 3, No. 2, 2003.

Ugandan Village:

The Village Phone Uganda project, sponsored by the Grameen Foundation and MTN Uganda, has been supporting the extension of cell-phone coverage in rural areas. The project offers micro-finance to allow female entrepreneurs to purchase a mobile phone. Phone services are then sold on to other members of the community.

Village phone operators are offered a starter kit, which consists of a mobile phone; a sim card; pre-paid phone time; business cards; a sign; and a car battery or solar panel to recharge the phone.

Clients use the phones to conduct business transactions, communicate with family members, check the prices of agricultural goods and to participate in radio call-ins.

USAID. Using Cellular Phones in Uganda for Rural Income Generation and More Dot-Comments Newsletter December 2005.

³⁶ Guislan, P, Ampah, M, Besançon, L, Niang, & C, Sérot, A. Connecting Sub-Saharan Africa, World Bank Working Paper no 51. 2005.

³⁷ InfoDev Industry Specialist Report. Micro-Payment Systems and their Application to Mobile Networks, Jan 2006.

³⁸ Souter, D. et al., The Economic Impact of Telecommunications on Rural Livelihoods and Poverty Reduction CTO for DFID, (2005).

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3.5 Barriers to Development

In view of the economic and social benefits of the development of the mobile sector it is important to identify the current obstacles to development.

The problem is not a lack of demand or willingness to pay. Handset prices are falling, and innovative mechanisms have been devised to bring much-needed services (communication and otherwise) to even the poorest individuals.

Nor is it a case of technological obstacles. Technological solutions exist to cover countries of any size, shape and terrain with high-quality communications. The cost of deploying and launching basic services is constantly decreasing due to economies of scale in technologies, in particular GSM. This evolution brings increased affordability in urban, as well as rural areas.

The main barriers to development result from a combination of several factors. These include significant investment requirements, considerable regulatory and other risk associated with these investments, low income levels, and areas for which service provision is extremely costly.

In the short to medium term, some of these factors such as geographic and income-related issues, will remain problematic. What can be addressed is the matter of regulation and the associated risk. A sustained effort by regulators and governments is needed to provide a climate of stability in which the communications sector can thrive.

The main role of governments will be the establishment of an appropriate regulatory regime, the provision of essential infrastructure (roads and electricity), and the abolition of short term penalty or luxury taxes levied on the mobile sector. The main role of regulators will be to implement best-practice regulations that are appropriate for, and tailored to, the countries concerned, and to do so with a maximum degree of predictability.

3.6 Concluding Comments on the Merits of Mobile

In summary, we found that:

- Mobile is far outstripping fixed-line technologies in providing access to communications services both within Africa and globally.
- Access to mobile phones represents a powerful enabler to advance economic and social development objectives in developing countries, especially where the existing fixed network is poor.
- Investment in the telecoms sector, especially foreign direct investment, accounts for a significant proportion of investment in many African countries, and stimulates investment in other sectors.
- Obstacles to the further development of the mobile sector are not of a technical nature, but are driven by regulatory obstacles, political uncertainty and low incomes.



Section 3 The Merits of Mobile

Mr Yoshio Utsumi was elected Secretary-General of the ITU on 20 October 1998 by the Minneapolis Plenipotentiary Conference. He was re-elected for a second term on 1 October 2002 at the Marrakesh Plenipotentiary Conference.

Whereas 80% of the world's population have mobile coverage, only 50% of the Sub-Saharan population have such potential access. What steps can regulatory authorities take to encourage investment in Sub-Saharan Africa?

There are a number of mechanisms to stimulate investment in rural areas. A number of countries have set up Universal Access Funds that are made up of license fees paid by telecom operators, to subsidise infrastructure deployment in areas where ROI (return on investment) can be poor in the early days. In order to effectively use such a fund however, governments need to look at the type of universal access policy that is required, e.g. has the traditional definition of universal service related to fixed lines given way to mobile lines? The needs and priorities of rural areas have to be carefully considered before developing investment strategies. In this respect, public/private partnerships can also play an important role in rolling out networks. The building of infrastructure, like masts, etc. can be a costly exercise, and for this reason, collaboration and joint projects are optimal. Furthermore, if this infrastructure could be shared between players, the overall investment costs could be reduced further, thereby encouraging companies to enter the market.

10 years ago international calling rates were maintained at artificially high levels to subsidise local fixed networks. Today, the interconnection and access fees paid by mobile operators to their fixed counterparts seem to be playing a similar role. Why do you think this is and what steps should be taken to increase the affordability of mobile communications?

An ongoing problem in mobile pricing is indeed fixed-mobile interconnection rates. In a Calling Party Pays environment, for instance, as a result of the monopoly on termination to a specific set of addresses held by each operator, interconnection is subject to bilateral negotiation rather than competition. Generally, incumbent operators who control a larger number of addresses are likely to impose unfavourable terms on or deny interconnection altogether to new entrants with fewer addresses.

The provision of one GSM line costs about one tenth that of a fixed line. Connecting the unconnected will therefore be done via mobile. Should developing nation governments therefore be encouraged to support mobile and, if so, what specific policies should governments consider?

Mobile communications are already playing an important part in bridging the digital divide. The cost of rolling out mobile networks is significantly lower than the cost of rolling out fixed networks. Therefore, governments in these countries should be turning more and more to mobile communications for the purposes of extending access. In this respect, specific programmes for mobile-sharing among communities, as well as universal service funds geared specifically at mobile network deployment—or at least favouring technological neutrality—should be seriously considered.

Given the positive economic and social benefits of mobile communication, how do you think regulation can best support and accelerate this trend?

An effective regulatory framework can provide incentives for investment, for mobile-sharing among communities, and for the appropriate creation and use of universal service funds. Furthermore, effective regulation can lead to liberalisation and fair competition which can drive costs down and lift barriers to entry.

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There is a movement that believes communications is now a basic human right and, as such, should be managed in the same way as ensuring people have other basic needs. What is your view?

Communication is a basic right and access to communications can improve economic growth, empower communities and individuals, as well as enhancing quality of life and well-being. The link between mobile communications and economic growth has been noted in Sub-Saharan Africa in particular where wireless is often the only form of electronic communication available. Mobile communications can deliver basic needs, such as information on health services, to rural and remote communications. In general, mobile technology can bring about economic benefits that in turn can spur incremental changes in a number of important areas, from community-building to entrepreneurship.



Mr Yoshio Utsumi
Secretary-General
ITU



Section 3 The Merits of Mobile

Views from the U.S. Department of State

Ambassador David A. Gross has served as the U.S. Coordinator for International Communications and Information Policy in the U.S. Department of State since August 2001. He was nominated by President George W. Bush and confirmed by the Senate. Ambassador Gross was also a member of the UN Information and Communications Technologies Task Force, and is a strong advocate of the economic and social benefits of mobile technology.

What is your opinion on the development to date of the mobile sector in Sub-Saharan Africa?

It's a fascinating region. Sub-Saharan Africa is at once very challenging – because of the low teledensity rates – but it has also showed some of the greatest progress over the last two to three years. The region has a lot of potential but remarkable progress has also been made.

What steps should be taken to encourage development of the region's mobile industry?

The challenges are to create an enabling environment that draws in direct investment. It is now widely recognised that telephony is a private sector enterprise, not a governmental enterprise. The challenge at its core from a governmental and regulatory perspective is what can and should be done to create an environment to encourage investment, both domestic and foreign. The market, even in very rural areas, can be much more robust than people ever thought to be the case. The key here is private sector leadership and the entrepreneurial spirit that sparks private sector development.

Driving down the cost of telephony also becomes extremely important. The great work that has been done by the GSMA, encouraging the manufacturer of low cost mobile handsets, has meant we are now seeing some fantastic benefits.

Do you believe that mobile operators in the region are treated the same way as fixed operators by regulators and governments?

I think it is fair to say that there is not a level playing field. Although such a factor is not necessarily unique to Sub-Saharan Africa, there is a belief that there are some economic advantages for the incumbent wireline players. We work with countries in the region to explain why it is in their economic, social and political best interests to liberalise communications. It is an issue where we are starting to see some real progress.

What can be done to help overcome the issue of high interconnection fees for mobile operators in the region?

This is a particularly complicated issue; however, we believe that the key to finding practical solutions to interconnect issues is to have a truly independent regulator that can adjudicate the issues effectively, or at least be in a position to act if the parties involved cannot do so voluntarily. It is worth remembering though, that this is no longer just a fight between wireline and wireless carriers, but also between wireless carriers. You need an independent regulator that has adequate enforcement authority and you need to have clear rules of the game.

How much progress has been made in this area?

It's uneven throughout the region, but there has been some very good progress made in many countries including Botswana, Nigeria and Uganda. There are many more examples of nations that have made very significant progress, and we realize they operate in traditionally challenging environments. While it may be relatively easy for countries to pass the right laws, the key is making a commitment to that liberalisation and rule of law at the highest political level. This is something that needs to be done for the best interests of countries as a whole.

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Is mobile technology critical to bridging the 'digital divide?'

We have an interesting take on this. We no longer talk about the “digital divide”, as we believe it a negative viewpoint focusing on a problem rather than a solution. Instead we talk of “digital opportunities”. What is unique about mobile is that it has proven itself capable of narrowing gaps in ways that have never before been done. So we speak of digital opportunities rather than any digital divide. Wireless is a key solution to providing digital opportunities.

Any final thoughts on increasing the growth and affordability of mobile communications in the Sub-Saharan Africa region?

One of the things that countries can do very quickly that will be very helpful to people – aside from making sure interconnection is done well and there is adequate spectrum – is lowering or eliminating tariffs on the import of equipment such as handsets and base stations and taxes generally. If you want to encourage something you don't tax it. We believe the best strategy for expanding government resources is to expand the economy, and this can best be accomplished by lowering barriers – legal, tax and regulatory – and allowing the market and private sector to grow. In Sub-Saharan Africa, where economics are driving development, this is especially true.



Ambassador David A. Gross
U.S. Coordinator for International Communications and Information Policy
U.S. Department of State



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Nkateko 'Snakes' Nyoka is Group Executive, Legal and Regulatory Affairs, at MTN. MTN operates GSM networks in ten African countries that collectively service the needs of more than 22 million subscribers. He is based in South Africa.

Do you believe that regulatory authorities could do more to encourage development and investment in the mobile industry? If so, how?

Governments and regulatory authorities can do more to encourage development and investment in the mobile industry through an understanding that the success of mobile penetration in the poorest parts of Sub-Saharan Africa is dependent on the inbound ARPU, and that over-regulation of inbound calls could render low-end users unprofitable, resulting in higher outbound prices and therefore compromising the public policy objective of universal access.

Do you think that interconnection fees imposed on mobile operators are fair and justified?

Interconnection fees are not imposed on mobile operators by the regulator in South Africa, but are negotiated between operators on the basis of interconnection guidelines published by the regulator. The recent revisions to the COA/CAM regulations envisages a much more active role for the regulator in the determination of interconnection fees; and advocates a cost-based approach to interconnect charges. What the cost-based approach to interconnection ignores is that all mobile operators in South Africa have recycled revenues generated from inbound calls to fund network expansion and that the business case for the aggressive network roll-outs has been a function of high inbound ARPUs.

Do you believe that mobile operators are treated the same way as fixed operators by regulators and governments?

There is generally confusion in South Africa in the regulatory treatment of the competitive mobile telephony market and fixed line monopoly environment. This was apparent during the recent deliberations on the Electronic Communications Bill in Parliament where cost-based interconnection and facilities leasing were sought to be introduced for both the fixed line monopoly environment and the competitive mobile telecommunications market, without any economic analysis pointing to evidence of market failure. In my view regulatory intervention is only essential to regulate markets or market segments that lack effective competition.

What steps could be taken to increase the affordability of mobile communications?

Governments should work with the telecommunications industry to identify barriers to access to mobile communications and find ways of reducing the total cost of owning and using a mobile phone. This could include producing cheaper handsets, and governments agreeing not to levy high taxes on handsets; liberalising international gateways; and permitting all telecommunications licensees in any given country to self provide and not force mobile operators to lease lines from state-owned fixed line monopoly operators.

Has the mobile industry brought social and economic benefits to Sub-Saharan Africa?

The mobile industry has definitely brought social and economic benefits to Sub-Saharan Africa. South Africa today has an estimated 25 million mobile users as opposed to 4 million fixed subscribers. Not only has mobile telephony enabled a Mozambican immigrant worker in South Africa to make a call to a village in rural Mozambique, but the efficiency of small and medium sized enterprises has increased exponentially given the ease with which small entrepreneurs can now be reached through mobile communications.



Nkateko Nyoka
Group Executive
Legal and Regulatory Affairs
MTN



Regulatory Risk and Sector Growth



Section 4 Regulatory Risk and Sector Growth

4.1 The Link Between Regulatory Risk and Investment

This section examines the link between regulation and the growth and development of the communications sector. There are two major mechanisms by which the level of regulatory risk impacts on the growth of the telecoms sector:

- (i) Regulatory risk increases hurdle rates and thereby reduces investment
- (ii) Regulatory risk increases the total cost of ownership and thereby reduces take-up and penetration.

These two mechanisms are discussed in more detail in sections 4.1.1 to 4.1.3.

4.1.1 The Economics of Investment: Risk and Reward

Functioning competitive markets rely on the prospect of profits to attract investors. The potential to earn superior profits drives investment and operational efficiency. It also encourages innovation and improvements in service quality. Low-risk business environments attract many suppliers (and investors) and as a result competition leads to lower profits. However, in countries where political or sector risk is high, investors will be reluctant to make investments unless expected returns are higher. Higher levels of expected returns compensate for the fact that returns might fluctuate significantly.

This link is straightforward and in general most stakeholders, including consumer groups and regulators, recognise that prices will be higher for goods and services that require a greater degree of risk-taking. However, profit levels may not always be viewed in the context of the risks that were involved in undertaking investments. It is therefore appropriate to briefly review the relationship between risk and reward and to highlight how this can be influenced by regulatory policy.

When comparing investment opportunities investors take into account many different factors which impact on risk and the expected return of an investment. Higher-risk investment opportunities will only be considered if they are expected to result in higher returns. This extra return for a given level of risk is referred to as a "risk premium".

Finance theory identifies two key types of risk: systemic risk and specific risk.

- Systemic risk is associated with the general performance of the economy (for example fluctuations in the economic cycle). This risk cannot be diversified by holding a portfolio of investments (in that economy). Technically this is reflected in a company's "beta", a statistical measure of company performance compared to the market average. Companies that are more sensitive than average to the performance of the economy have a higher beta and tend to have a higher "cost of capital", as the certainty of delivering a particular expected return is lower. This beta determines the additional return investors require for investing in equities in the individual sectors over and above the risk free rate. Investment opportunities can typically be financed by a combination of debt and equity. The required return to both types of investor, including interest payable to creditors and compensation for equity investors taking on systemic risk, is known as the "weighted average cost of capital".
- Specific risk relates to those risks that arise in a particular sector. They are risks that affect specific aspects of a company's business plan i.e. the particular line items of a company's revenues and costs. This includes items like technology risk, uncertainty over consumer reaction to new products, market share performance, the length of time over which the company will generate returns, and the level of capital and operating costs.

Regulatory policy influences most, if not all, of these factors. Licensing policy will influence costs, the number of competitors, and the timeframe for recouping investment. The regulator may or may not be successful in achieving a level playing field. Spectrum policy, interconnection policy and USO obligations will directly influence the costs of the company and regulation can also affect pricing discretion. This is discussed in more detail in Section 5.

Section 4 Regulatory Risk and Sector Growth

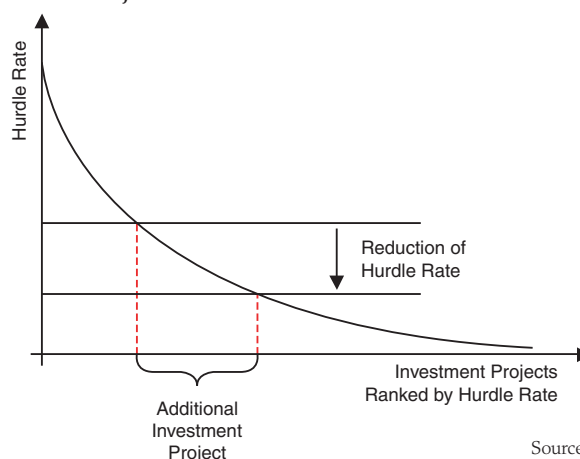
Some specific risk relates to factors that are outside the control of the regulator and, possibly, the government as a whole. Political unrest, for instance, could result in a significant curtailment of the opportunity to recoup investments. This “country risk” is an additional downside risk that investors will need to bear. When faced with significant downside risk investors therefore apply a risk premium to compensate. The application of a risk premium to the weighted average cost of capital described above results in what is known as a ‘hurdle rate’.³⁹

Higher risk leads to higher return requirements. This is another way of saying that pay-back periods are relatively shorter. As a result, companies may choose equipment based on short-term profit maximisation needs (say 2-4 years) instead of choosing technology that is optimal, based on the time span of asset lives (say 10-12 years).

4.1.2 The Economics of Investment: Investment Levels and Hurdle Rates

For any particular company there will be a range of investment opportunities available (such as providing coverage to a new area), each with its own particular expected return. The company’s hurdle rate represents a minimum threshold below which investments will not be deemed viable. This is illustrated in Figure 5. A reduction in the hurdle rate brought about by a more stable regulatory environment would increase the number of viable investment opportunities and bring additional sector growth and consumer benefits.

Figure 5: Risk and Investment Projects



Source: PwC Analysis

Uncertainty also affects the timing of investment. Finance theory⁴⁰ shows that faced with uncertainty, investment may be delayed where ‘waiting and seeing’ will lead to greater clarity and reduce the risk associated with an investment. This is true even where first-mover advantages exist in the market (strategic advantages from being the first player in a given market). In order that new products and services are delivered to the market in a timely fashion, it is important to recognise the relationship between uncertainty and the timing of investments.

4.1.3 Regulatory Risk, Costs of Operation and the Total Cost of Ownership

Regulatory risk not only impacts on the level and timing of investments but also on the total costs of running a mobile operation. The costs of a mobile operator must ultimately be covered by its revenues, so any reduction in costs will eventually feed into lower prices for consumers. This in turn will prompt further increases in penetration and usage. In this section we examine the determinants of the total cost of ownership (TCO) for users, and how they would be affected by better regulation and lower operating costs.

The total cost of ownership of a mobile phone is composed of all the expenses that a consumer incurs in

³⁹ This is from the perspective of the international investor. Local investors will include this element of risk in their weighed average cost of capital.

⁴⁰ Specifically, the theory of “real options”. See for example: http://www.ofcom.org.uk/consult/condocs/cost_capital2/statement/?a=87101



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owning and using a mobile phone, including the costs of the handset, of connection, line rental (if any) and call charges including VAT. Operators set retail prices for calls with a view to recovering their costs, including operating costs and the costs of network and non-network assets (i.e. depreciation and the cost of capital). The latter tends to be a very significant part of total costs due to the capital-intensive nature of the telecoms industry.

Given that the required return on investment depends on hurdle rates, which are driven by risk, including regulatory risk, it is obvious that regulatory risk increases the cost of capital, this will be passed on in the total cost of ownership. This link deserves more regulatory attention than it has received in many countries so far. If regulation is unpredictable and therefore increases risk this is bad news not only for operators, but also for consumers, who ultimately bear the associated costs.

A number of other elements of TCO deserve the attention of regulators and governments, including the following:

- Taxes (direct and indirect)
- Duties (customs and excise duties, etc. and time consuming processes, often involving several different authorities)
- Site acquisition costs
- Costs of building and maintaining roads leading to base stations
- Higher costs of sub-optimal technology driven by short repayment periods
- Costs of power generation to operate the network
- Costs of security measures taken by operators

Given that demand elasticities tend to be high in developing countries like those in Sub-Saharan Africa, significant reductions in TCO will lead to significant increases in take-up and hence penetration.

If governments and regulators want to ensure that their communications sectors thrive and grow they should prioritise the reduction in the above costs. In particular governments should be wary of overtaxing a sector that accelerates economic and social development and should instead focus on the wider benefits of providing essential infrastructure. Regulators should take care to eliminate all unnecessary risk which will drive up investors' hurdle rates and therefore TCO and the prices consumers have to pay.

4.1.4 The Influence of Regulation on Risk

Regulators perform an extremely important part in the creation of an environment in which the communications sector can develop and grow. The ultimate beneficiaries of their actions are consumers, who make use of extended and better communications services. A regulator's role includes safeguarding a 'level playing field' and encouraging of fair competition. The regulatory framework and regulator conduct should also avoid creating any unnecessary risk, for the reasons set out above.

Regulatory Framework

Regulatory risk can result from regulations, or the lack thereof, in a number of areas:

- Licence fees
- Licence renewal
- Spectrum allocation
- Interconnection
- USO funding
- Numbering plans
- Dispute resolution processes.

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The key issues surrounding these areas of regulation are discussed in more detail in Section 5 (Regulation in Practice).

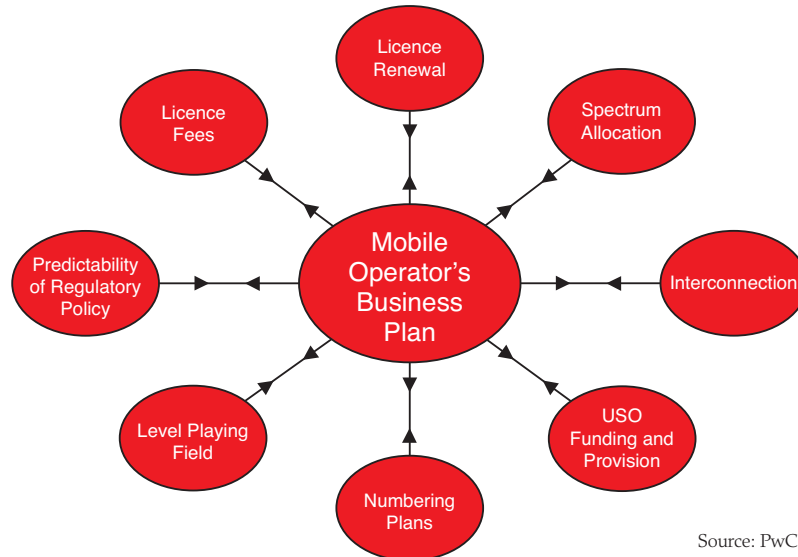
Regulatory Conduct

Once an appropriate regulatory framework is in place, regulatory risk will largely depend on regulatory conduct. Limiting the amount of regulatory risk generated by day-to-day regulatory actions implies:

- Avoiding unexpected changes
- Building up a reputation for consistency (in effect, a reputation for implementing unexpected changes may be worse than the changes themselves)
- Avoiding “ex-post opportunism”
- Providing clarity with respect to regulations going forward.

The interdependency of regulation and the mobile operators’ risk and operating environment is shown in Figure 6.

Figure 6: Regulatory Issues Impacting on Risk and Operating Environment



Source: PwC Analysis

4.2 High-Level Assessment of Evidence

The relationship between regulatory performance and market performance is difficult to quantify given that a significant number of factors will influence the development of the market. However, it is possible to examine at a relatively high level how penetration levels compare across different regimes.

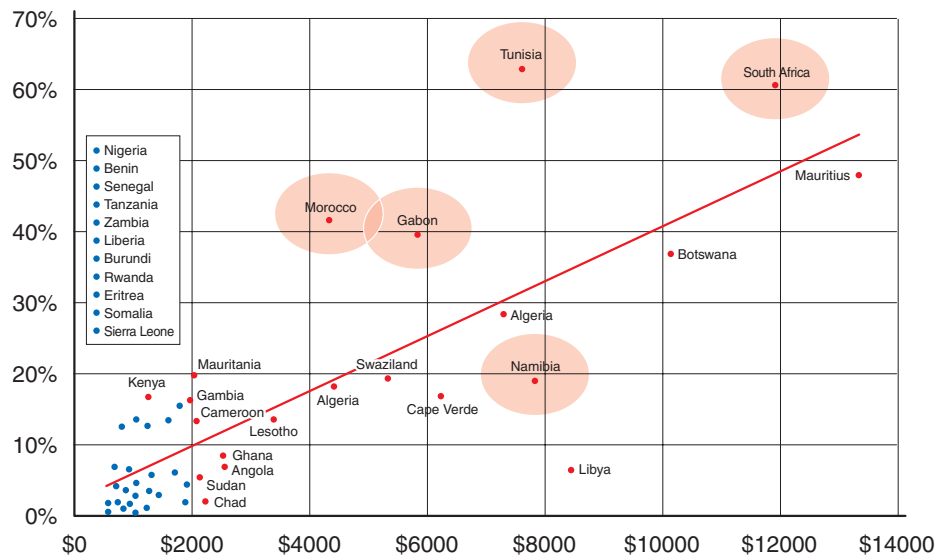
Penetration will be affected by a number of factors, the strongest of which is the relative wealth of the population. This is illustrated in the scatter plot in Figure 7. Although it is not possible to pin down the specific contribution of the regulatory environment to the level of penetration, there are several cases where the position of a country relative to the trend line is consistent with what we have learnt about the degree of regulatory uncertainty.⁴¹

⁴¹ Income distribution also has an impact on the proportion of the population that is able to afford a mobile phone. In order to capture this effect we estimated a regression on penetration with GDP per capita (PPP) and the Gini coefficient (a measure of inequality) as explanatory variables. The Gini coefficient was found to be significant, but the picture in terms of performance was very similar, with only two countries, Mali and Lesotho, moving from below to above the trend-line.



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Figure 7: Penetration (Q4) and Per Capita GDP (PPP) 2005⁴²



Source: Wireless Intelligence, AIA World Factbooks, and PwC Analysis

South Africa is above the trend line in Figure 7. Our research indicates that up to now South Africa has, to a large degree, corresponded to a 'best practice' regulatory environment. The regime is said to have been stable with little regulatory intervention. It was also predictable, with future developments laid out in the Telecommunications Act, and the timetable broadly followed, if not always on time. Licence fees were reasonable and powers to amend regulations were limited. The regime in South Africa is now going through considerable changes, and the impact of these will be seen in future penetration rates.

Namibia, on the other hand, suffers from a marked lack of regulatory clarity and certainty. Competition has yet to be introduced into the mobile or fixed market so, despite its relatively high income, penetration is low (below the trend line).

Of the North African countries included in Figure 7 Morocco is one of the most obvious success stories. Despite having income levels almost half those in Namibia, penetration levels are more than twice as high. Operators see this country as having a stable and predictable regulatory environment and the regulator is considered to make extensive use of industry consultation to ensure effective decision-making. The high levels of penetration may also be due to the licensing strategy adopted: the second mobile licence included build-out requirements into local areas.⁴³

In Tunisia penetration has rocketed from less than 10% in 2002, when the mobile market was liberalised, to 63%. The second mobile licence was issued for a 15 year period, and included the right to operate an international gateway, and a duopoly in mobile service provision for a four-year period.⁴⁴ Gabon has also received favourable feedback from operators regarding the coherence of regulation.

⁴² Source: Wireless Intelligence. Estimates for 2005 from CIA World Factbooks.

⁴³ ITU. Mobile overtakes fixed: Implications for policy and regulation, 2003. Reproduced with the kind permission of ITU. http://www.itu.int/osg/spu/ni/mobileovertakes/Resources/Mobileovertakes_Paper.pdf

⁴⁴ Hot Telecom Tunisia Country Profile, October 2004.

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Table 4: Subscriber Growth Rates, Sub-Saharan Africa⁴⁵

	2001	2002	2003	2004	2005
Angola	247%	62%	160%	102%	51%
Botswana	59%	32%	19%	21%	12%
Burkina Faso	285%	74%	60%	62%	43%
Burundi	37%	27%	92%	62%	41%
Congo (Kinshasa)	357%	253%	104%	61%	36%
Côte d'Ivoire	52%	43%	27%	31%	35%
Gambia	216%	320%	95%	29%	27%
Kenya	556%	104%	66%	71%	47%
Mauritius	56%	36%	28%	21%	11%
Namibia	56%	30%	59%	29%	18%
Nigeria	2211%	153%	98%	183%	99%
Senegal	140%	60%	26%	39%	49%
Sierra Leone	183%	93%	68%	-22%	-11%
Somalia	77%	10%	-60%	48%	63%
South Africa	31%	30%	32%	28%	35%
Tanzania	116%	89%	44%	74%	58%
Uganda	107%	50%	52%	60%	46%
Sub-Saharan Africa	59%	48%	47%	54%	49%

Source: Wireless Intelligence

It is also revealing to compare growth rates of mobile subscriber numbers.

One of the most striking examples is that of Sierra Leone. Although penetration growth was high in 2001, over the last two years subscriber numbers have actually fallen (the only other country to have experienced negative penetration growth is Somalia, a country with no government and in the throes of an ongoing civil war). Sierra Leone has no separate regulatory authority and no telecoms law. The government's approach to the sector has been somewhat unpredictable. For example, in 2004 the Ministry of Finance decided to impose an onerous tax on airtime.⁴⁶

Table 5 below gives an indication of how far countries in Sub-Saharan Africa have gone in the direction of reforming their telecommunications markets.

Table 5: Telecoms Reform Status in Sub-Saharan Africa⁴⁷

	No Separate regulatory authority	Incumbent operator fully state owned	Monopoly in mobile service provision	Monopoly for international telephony
Angola		✓		
Benin		✓		✓
Botswana		✓		
Burkina Faso		✓		✓
Burundi		✓		
Cameroon		✓		✓
Cape Verde			✓	✓
Central African Rep.	✓			✓
Chad		✓		✓
Comoros		✓	✓	✓

⁴⁵ Wireless Intelligence.

⁴⁶ Sierra Leone is also politically very unstable but it is reasonable to assume that the decline in penetration is partly due to the regulatory climate. However the beginning of the decline actually coincides with the official end of the civil war and the re-establishment of government authority.

⁴⁷ Guislan, P, Ampah, M, Besançon, L, Niang, & C, Sérot, A. Connecting Sub-Saharan Africa, World Bank Working Paper no 51. 2005.



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Table 5: Continued.

	No Separate regulatory authority	Incumbent operator fully state owned	Monopoly in mobile service provision	Monopoly for international telephony
Congo		✓		
Côte d'Ivoire				✓
Democratic Republic of Congo		✓		
Equatorial Guinea	✓		✓	✓
Eritrea	✓	✓	✓	✓
Ethiopia		✓	✓	✓
Gabon		✓		
Gambia	✓	✓		✓
Ghana				
Guinea	✓			
Guinea-Bissau			✓	✓
Kenya		✓		✓
Lesotho				✓
Liberia	✓	✓		
Madagascar				
Malawi		✓		
Mali		✓		
Mauritania				
Mauritius				✓
Mayotte				
Mozambique		✓		
Namibia		✓	✓	✓
Niger				✓
Nigeria		✓		
Réunion				
Rwanda		✓	✓	✓
S. Tomé & Príncipe	✓		✓	✓
Senegal				✓
Seychelles				
Sierra Leone	✓	✓		
South Africa				
Somalia	✓			
Sudan			✓	✓
Swaziland	✓	✓	✓	✓
Tanzania				
Togo		✓		
Uganda				
Zambia		✓		✓
Zimbabwe		✓		

Source: World Bank

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Table 6 summarises this data to show that countries with a well-performing mobile sector are ahead of the others in terms of the progress of the liberalisation process. For the purpose of this analysis “good performer” relates to those countries with penetration higher than predicted by the trend shown in Figure 7⁴⁸ and poor performers are countries below the trend-line. It is clear from Table 6 that in general the better performers have progressed further in the reform and liberalisation process. All of the good performers had liberalised their mobile sectors, compared to only 69% of the poor performers. Nearly all (92%) of these countries had also set up a separate regulator, compared to 69% of the others. International telephony had been liberalised more often by the good performers.

Table 6: Reform and Mobile Performance – Countries of Sub-Saharan Africa⁴⁹

	Separate Regulator	Mobile Liberalised	International Telephony Liberalised
Good Performers	92%	100%	54%
Poor Performers	69%	69%	38%

Source: World Bank and PwC Analysis

Sector liberalisation, in conjunction with best practice regulation, brings pay-offs in terms of higher rates of penetration and accessibility.

4.3 Concluding Comments on Regulatory Risk and Sector Growth

In summary:

- Where there is significant risk generated by regulatory actions investors will demand a premium to compensate.
- If regulatory risk were reduced there would be more investment, for example in the expansion of network coverage into rural areas.
- Reducing risk would allow operators to optimise their investments over a longer time period. This would allow the use of better technology.
- Reduced risk would lower the cost of capital. Reductions in the total costs of mobile operators would eventually be passed on to consumers in lower total costs of ownership.
- Regulation affects all the key aspects of an operator’s business plan and is therefore a fundamental consideration in investment decisions.

At a high level there is evidence that countries with better regulation perform better in terms of mobile penetration than others. This is true even once income levels and income distribution are taken into account.

⁴⁸ A linear regression of penetration levels on per capita income (adjusted for purchasing power).

⁴⁹ Based on reform data from World Bank shown in Table 5; Wireless Internet, and CIA World Factbooks.



Section 4 Regulatory Risk and Sector Growth

The Cost of Regulation: An Investment Perspective

Jay Naidoo is the Chairman of the Development Bank of Southern Africa, a development financing institution dedicated to the expansion of economic infrastructure in the region. It plays a key role in fostering private sector investment in large-scale infrastructure projects.

Jay Naidoo is also a founding partner of the J&J Group, a diversified investment company based in South Africa with growing interests in the ICT and financial services sectors. Mr Naidoo is a prominent political activist, who played a pivotal role in shaping the new South Africa. His previous high profile roles include General Secretary of COSATU (Congress of South African Trade Unions). He has also served as the Minister in President Mandela's office responsible for the Reconstruction and Development Programme (RDP), and in 1996 he was made responsible for the Ministry of Telecommunications, Post, and Broadcasting. In his tenure he was instrumental in concluding one of SA's first large privatisations, with the sale of 30% of Telkom SA and the creation of a forum of African Ministers to co-ordinate policy and governance.

Whereas 80% of the world's population have access to mobile coverage, only 50% of the Sub-Saharan population have such potential access. What steps can regulatory authorities take to encourage investment in rural areas?

The mobile telecommunications sector in Africa remains at an early stage of development. Continent-wide, mobile penetration in Africa was just 11.5% in June 2005, compared with 20.7% in Asia and 36.6% in Latin America⁵⁰.

Improving mobile telephony coverage and penetration, particularly in rural areas, requires a multi-pronged approach, including:

- Public sector assistance with CAPEX for telecommunication infrastructure, via grant funding (e.g. using Universal Service Fund-type support mechanisms)
- Public sector facilitation of provision of "platform" infrastructure for telecoms – such as electricity provision (generation and distribution)
- Public-Private Partnerships (PPP's), bringing new investors into the continent, to engage in market-driven sector development – both in infrastructure investment and in service provision.

Regulatory measures are equally important, in that they can give certainty and predictability to the investment climate, both pre-requisites for the growth of the telecom sector. Measures include:

- Establishment of a regulatory body for telecoms that is independent from government policy making processes and can guarantee a level playing field for a multiplicity of operators in a competitive landscape
- Spatially (geographically) defined Universal Service Obligations (USO) as a condition for operating licences, helping to deliver rural telecoms to under-served areas
- Measures to prevent or limit anti-competitive behaviour by dominant infrastructure owners and service providers.

Ten years ago international calling rates were maintained at artificially high levels, to subsidise local fixed networks. Today, the interconnect and access fees paid by mobile operators to their fixed counterparts seem to be playing a similar role. Why do you think this is and what steps should be taken to increase the affordability of mobile communications?

Speculative explanations for such practices include:

- Attempts to reduce the profit of those from the mobile telephony sector in order to address such a competitive threat to fixed line operators

⁵⁰ John Everington, "African Mobile Forecasts" in, the Acacia Atlas 2005 - Mapping African ICT Growth. IDRC. October 2005. p 22.

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- Compensating for cost pressures on fixed line telephony. Most fixed line operators usually have a significant or controlling stake in a mobile operator
- As a result, it is imperative that cross-subsidies are discouraged. Operators should keep their fixed and mobile network accounts separate
- Equity in interconnect fees between mobile network owners and non-network service operators and between the mobile network and fixed-line operators. This may require fees to be capped.

The provision of one GSM line costs about one tenth that of a fixed line. Connecting the unconnected will be done via mobile technology. In light of this, should developing nation governments be encouraged to support mobile and, if so, what specific policies should Governments consider?

Yes they should, as long as one caveat is kept in mind - mobile telephony can be unreliable in situations where power supply is variable. Support for mobile technology by developing nation governments depends to a significant extent on the very much lower cost of connection for mobile compared to fixed lines. The cost of providing new fixed lines is particularly high in underserved rural areas and it is there that mobile is a particularly attractive option. Therefore Governments should be encouraging such investment through supply side incentives. The development of lower cost handsets is also crucial to increasing penetration. In rural areas and under-served areas, using community multipurpose telecentres based on an entrepreneurial model is also a more commercially sustainable model for growth. Government policy and the regulatory initiatives are important for creating an attractive environment for this to happen.

Given the positive economic and social benefits of mobile communications, how do you think regulation can best support and accelerate these developments?

Regulation should be directed towards four targets:

- Directing service provision into underserved areas and communities through USOs and similar licence conditions
- Equity in interconnect fees
- Ensuring an enabling environment for PPPs
- Legislating against anti-competitive behaviour to limit extraction of excessive monopoly rents by service providers.



Section 4 Regulatory Risk and Sector Growth

How would you rank in importance the areas being considered in this study?

The ranking of priorities in terms of areas considered in the study ought to be:

- 1) Promotion of competition
- 2) The regulatory environment, especially in terms of: Interconnect fees, Universal Service Obligations, and prevention of uncompetitive behaviour
- 3) Public-Private Partnerships in both infrastructure creation and in operator service provision.

There is a movement that believes communications is now a basic human right and as such should be managed in the same way as ensuring people have other basic needs. What is your view?

It is not as far fetched an idea as one might think. Human rights are often viewed in two broad dimensions: a) political and civil rights, and then b) social, economic and cultural rights.

Human rights to basic communication services can be viewed as cutting across both domains. If a society is so advanced and e-connected that the exercise of civic and political rights is dependent on basic access to communication services, communication services could be said to be a pre-condition for the fulfilment of civil and political human rights. I don't think the world at large is quite at this stage yet, so I would say that communication services are a matter of facilitation of social and economic participation.

In terms of social and economic rights, communication services cannot be said to fall into the category of an absolute requirement for human survival, in terms of physiological needs, such as food, shelter and security. But it can be associated with the right to education in the 21st century, and thus linked to human rights to essential services such as health and education, which notably have strong externalities and benefits beyond private individual benefits.

It is important to bear in mind that economic and social rights are aspirational and context sensitive. Fulfilment of economic and social rights is not instantaneous; there is a gradualism involved, in that economic and social rights are fulfilled progressively over time in relation to the economic and organisational capacity of society and its institutions.

This raises the question of what is the capacity of society, at national, regional and global level. I think what is clear is that the world has moved into a new age, an information and knowledge age. An enlightened world in my view should begin to see communication as a basic infrastructure that is necessary for the meaningful exercise of all human rights in a truly brave new world, one that is concerned with human development and advancement.

A key question to be addressed is what can be said to be a basic communication service, in what context, and at what point in time. How can we differentiate different levels of service, and ensure that we do not destroy incentives for efficiency, innovation and technology development?



Jay Naidoo
Chairman of the Development
Bank of Southern Africa

Section 4 Regulatory Risk and Sector Growth

Vodacom Group Proprietary Ltd is a pan-African cellular communications company providing GSM service to customers in the Democratic Republic of the Congo, Lesotho, Mozambique, South Africa and Tanzania. The company is the largest operator in Africa, with over 15.7 million subscribers in South Africa alone.

Whereas 80% of the world's population have access to mobile coverage, only 50% of the Sub-Saharan population have such potential access. What steps can regulatory authorities take to encourage investment in rural areas?

The development of a sustainable universal strategy or model in consultation with all stakeholders is a basic requirement. It is essential that such a strategy comprises the following:

- A comprehensive market review should be undertaken, that would include: an assessment of what services are being offered; the demand by consumers; market size and its characteristics; and the level of penetration and current market growth
- An assessment of the current financial obligations and the estimation of any additional obligations
- Detailed financial and technical viability assessment of the services to be provided
- Careful consideration of all the alternatives, e.g. virtual telephony, community phone shops, and prepaid products, etc.
- Technology-neutral licensing i.e. operators can choose and mix technologies that are cost effective for the particular area
- Positive regulation, i.e. reducing market barriers to entry, eliminating discrimination, allowing local community involvement, etc.
- Analysis of incentives to attract investment.

Regulators should ensure that an environment is created where operators willing to invest in rural areas are able to earn a reasonable return on their investment. The viability of rural investments should be enhanced through targeted subsidies (either supplier side or demand side subsidies).

Consumer surplus (i.e. the willingness of consumers to pay more for the ability to phone relatives in rural areas) should be considered when assessing market-pricing practices. Operators often cross-subsidise service provisioning in rural areas through revenues earned on other commercial services.

Ten years ago international calling rates were maintained at artificially high levels to subsidise local fixed networks. Today, the interconnect and access fees paid by mobile operators to their fixed counterparts seem to be playing a similar role. Why do you think this is and what steps should be taken to increase the affordability of mobile communications?

Interconnection and access fees payable to fixed counterparts are but two of the cost elements taken into account by mobile operators to develop prices for the services they offer. Numerous other elements are also considered in the development of mobile prices.

Furthermore, the general perception that mobile communication services is unaffordable to the broader community is incorrect. If one considers the high growth of mobile communications in Africa, this general statement cannot hold true.

Before the affordability of mobile communications can be assessed, a detailed study of the market and competition in each jurisdiction should be undertaken.

The affordability of mobile communications should be achieved through the development of a healthy competitor environment and a sustainable universal service model.



Section 4 Regulatory Risk and Sector Growth

It has been proven in independent studies that a healthy competitor environment has a far more effective and sustainable impact on pricing (and, subsequently, affordability) than regulation. Further benefits include improvement in quality of services and customer service levels.

Economic concepts that deal with the provisioning of communication services to marginal and rural communities, e.g. network externalities, should be adopted as part of regulatory practice.

Should developing nation governments be encouraged to further support mobile and, if so, what specific policies should governments consider?

Governments should be encouraged to support technologies that increase the “connectivity” of the nation. Mobile operators utilising GSM and 3GSM have taken the lead in providing services in areas and to communities that were previously unconnected.

They should formulate policies that:

- Provide certainty on who is licensed to do what, for what period
- Provide for compliance with the rule of law, i.e. fair procedure
- Ensure that the total sum of fees, obligations and commitments are reasonable
- Provide guarantees that license rights will not be unduly changed during its license period
- Ensure sufficient access to limited resources such as spectrum and numbers
- Give mobile operators equal rights to effectively compete, e.g. international gateway, the right to self provide transmission
- Decrease or suspend for a period of time, taxes and duties payable, e.g. tax holiday, duties payable on mobile handsets, infrastructure import duties

In light of the economic and social benefits from mobile communications, how do you believe regulation can best support such development?

Regulators should ensure that they create an investor-conducive environment. Future regulation of the sector should be based on sound market and competition analysis. The following steps should be followed in determining whether regulation is required or not:

- Competition assessment
- Identification of possible remedies
- Assessment of the cost and benefits of various remedies
- Reassessment of the impact of applied remedies

Regulators should refrain from intervening in markets unless a proven market failure exists. Operators should be encouraged to develop and test new products and services. The regulator should appoint and retain a highly competent staff complement, able to practise regulation in an effective and timely manner. Regulators should take into consideration international best practice in order to develop best practice regulation within their local market. Proper administrative processes should be followed in the execution of their responsibility/duties.

How would you rank in importance the areas being considered in this study?

All the areas in this study are very important, as they all collectively and individually have the potential to adversely affect an investor-favourable and friendly environment. Together with other areas not indicated in the study, e.g. due administrative practice, they form the foundation on which investor confidence is built; a basic requirement to obtain sustainable investment.

Section 4 Regulatory Risk and Sector Growth

There is a movement that believes communications is now a basic human right and as such should be managed in the same way as ensuring people have other basic needs. What is your view?

We agree that enhancing the accessibility of communications to the broader community should be an objective. The manner in which this is done is of the utmost importance.

Addressing the basic needs of communications should be done in a cohesive manner, taking into account required investor returns, the collective obligations of the operators (e.g. licensing fees, US contributions, taxes payable, rural roll-out obligations, etc.) and government contribution to the industry, e.g. incentives.

The regulatory environment could stifle growth of mobile services in Sub-Saharan Africa unless regulators take appropriate measures to lower such costs and encourage longer-term investment.

That's the view of Thomas Sonesson, Ericsson's VP of Customer Solutions & Sales Support in Sub-Saharan Africa, who cites the Indian market as a region where interconnection rates have directly influenced industry growth. "Interconnection rates in India are approximately one tenth that of Sub-Saharan Africa and India has seen steeper growth," he says.

Sonesson believes the regulatory environment in Sub-Saharan Africa would benefit by driving down interconnect costs. "I would like to see regulators put more focus on lowering interconnection fees. They must act as a facilitator between the mobile industry and the fixed line industry in every country to get them down.... If interconnect fees were lowered it would have a significant impact on mobile growth."

Another issue Sonesson highlights is the positive effects on economic growth and sustainability related to penetration of mobile telephony services. "An unstable regulatory environment often leads to short-sighted purchasing decisions based on short-term capex thinking. This will not necessarily result in the best return on investment for operators, as the cost of ownership over time is not optimised. This in turn does not necessarily result in the best possible price for mobile services to subscribers, and may in fact result in lower subscriber penetration.

"It is only with predictable regulation that the operators can make investments with a long-term perspective and benefit from lower and optimised total cost of ownership over time. This will also enable lower user tariffs with maintained operator profitability. By having a longer perspective in developing the society and related business opportunities, it is not only the initial capital investment that is important but also the running operation costs resulting in lowest total cost of ownership."



Thomas Sonesson
VP Customer Solutions & Sales Support
Sub-Saharan Africa
Ericsson





Regulation in Practice



Section 5 Regulation in Practice

The creation of an environment that is conducive to mobile investment and penetration growth requires considerable commitment on the part of the government and the regulator. This may involve short-run financial sacrifice of government revenue, and requires great care in the design of the regulatory regime and policy. The benefits to the industry and the population will accrue only in the longer run. Good regulation will enable competition and encourage higher penetration; overburdening or intrusive regulation, as well as lack of clarity, will hinder this.

As discussed above, there is hardly a parameter in a telecom operator's business plan that does not depend on regulation in one way or another. This section discusses those aspects of the regime that operators report to have the most significant impact on their investment decisions, and explores how and why regulators should improve their performance in these areas.

We also reflect on the particular difficulties that regulators themselves face in designing appropriate policies given the particular circumstances that exist in developing countries.

5.1 Well-Defined Regulatory Regime and Policy

5.1.1 Regulatory Regime

It is essential to create a clearly-defined regulatory regime. In our view this should comprise, at a minimum, the following elements:

- A clear and up-to-date statement of sector policy
- A Telecoms Law
- A coherent set of regulations implementing the Telecoms Law
- A National Regulatory Authority (NRA) that has sufficient resources, is independent of the government in terms of its status, funding and nomination of key persons, and is granted sufficient powers to enforce regulations and laws
- A clear consultation and appeal process and an effective dispute resolution process.

In a number of countries in Sub-Saharan Africa these fundamental requirements are not met (see examples below and Table 5). Obstacles range from a lack of independence of the regulatory authority to ambiguities in the delineation of responsibility between various parts of government. Sometimes other ministries 'compete' with the NRA in regulating the sector. This lack of clarity is exacerbated where, instead of promoting the sector on the grounds that it plays a vital role in the development of their economies, governments merely attempt to maximise the revenues extracted from it.

Examples:

Namibia: "Three separate Ministries control the telecoms sector. This creates competition between government entities."

Uganda: "A dispute resolution tribunal is provided for in the law, but it has never been set up."

Sierra Leone: "There is no regulatory authority."

South Africa: "This is the only country that we operate in with a proper competition law, but this allows for forum shopping. Often the telecoms regulator will simply ignore complaints so people turn to the Competition Commission instead."

Section 5 Regulation in Practice

Much progress has been made over the past few years towards implementing clearly defined regulatory regimes, and many countries now have a separate, and technically independent, telecoms regulator. Some have also established appeals bodies, for example Kenya has a dedicated Communications Appeal Tribunal.

In addition, it is important that operators and regulators work together to develop appropriate policies. There are clear opportunities for partnership to achieve mutually beneficial outcomes. In some instances, regulators have expressed frustration that consultation processes are not always fully embraced, with operators too ready to resort to legal challenges.

5.1.2 Regulatory Policy

A clearly defined regulatory policy requires a clear statement of objectives, for instance with respect to competition, affordability, and greater access/coverage. However, these objectives may sometimes conflict. Regulatory policy statements should include a view of priorities, and how competing objectives will be balanced (this might depend on the stage of development of the infrastructure).

A clear statement of objectives and priorities provides a basis for the process of designing policies. Policy design has to take into account both the objectives of the country concerned and the environment of that country in terms of, for example, geography, the economy, and the development of the telecoms sector to date.

The complexity of regulating this fast-moving sector within the practical constraints that regulators will face should not be underestimated. The difficulty of an African regulator's task is typically exacerbated by limited resources, the relatively low levels of both fixed and mobile penetration, the large geographical area and low population density of many countries, and the perceived risks of investing in some areas of Africa.

In terms of policy design (as opposed to regime design) there are significant dangers associated with a 'copy-and-paste' approach where policies used in other jurisdictions (in particular developed countries) are followed without an assessment of the impact these will have on the market. Appropriate regulation will depend on the current issues in the respective market. Demand patterns, supply structures, the technologies used, the degree of competitiveness in the market, the size of the market and the purchasing power of the population will all affect the appropriate regulatory policies.

A policy that is appropriate in one country may be of limited use, or counter-productive, in another. Examples include:

- Universal service obligations: the amount of emphasis which needs to be placed on incentives to increase coverage is a function of the existing level of coverage.
- Mobile number portability: while this may be a desirable function for consumers in the long run, it may not be worth imposing the associated costs on mobile operators when the money would be better spent extending networks.
- Number of operators: there are trade-offs for regulators to consider here (see section 5.3) which may have a profoundly different impact on lower income countries.

In Africa the costs and benefits of regulatory policies may differ significantly from elsewhere, and regulators will face different trade-offs. Given this, regulators may need to have alternative priorities and may have to consider simpler legislation that will lessen the burden of implementation.

For example, in Europe the Universal Service Obligation (USO) is usually placed upon a single operator (typically the incumbent fixed operator) and includes provision of basic fixed telephony services to all potential users on request. In Africa this is clearly not feasible. Fixed telecommunications networks often cover only a relatively small proportion of the country and the cost of imposing the USO on an operator would be



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enormous. It has therefore become more standard to talk about universal access to telephony, rather than a USO obligation, combined with a suitable definition of reasonable access.⁵¹

Uganda has recently used a least-subsidy auction methodology to implement the universal access policy where different operators bid for the minimum subsidy they would be prepared to provide specified services to a particular area.⁵² In this way the regulator used a transparent, fair and market-based approach to allocate funding to different operators. This is a good example of where using policies appropriate for the African environment along with best practice methodologies successfully manages the specific trade-offs encountered.

Other areas in which the particular circumstances of many African regulators influence the trade-offs which must be considered include:

- **The behaviour of consumers:** In Africa the pattern of usage of mobile phones differs substantially. For example, many mobile phone users have few outgoing calls, principally receiving calls, “beeping” or “flashing” other users and sending text messages. Lower call prices could affect demand levels more significantly in Africa than in countries where the price sensitivity at the margin is lower. African markets also tend to be more segmented, with a relatively small number of users who are much more affluent than the general population. These users might require entirely different services to others.
- **Greater levels of risk and difficulty in attracting investment:** It may be appropriate for the regulator to share risk with operators by awarding licences as a percentage of future revenues rather than as an upfront licence fee – both the licence fee and the risk have an effect on marginal investment decisions in any market but the magnitude of each effect may differ substantially in Africa.

The various trade-offs encountered by regulators in Africa create challenges and obstacles to implementing effective regulation. Regulators may benefit from successful approaches that have been used in countries where the trade-offs faced are similar to those in their country.

All aspects of regulatory policy will influence willingness to invest including the following key areas:

Market structure

The market structure provides the basis for participation in the market. It is determined by key aspects of regulation such as the licensing framework, the number of licences, the role of competition versus regulation, the extent of infrastructure versus service-based competition, the status of the monopoly incumbent, and liberalisation timeframes.

Examples:

Mauritius: “The market is unsure how many licences the regulator plans to offer. It was even uncertain about whether a third licence would be issued.”

Liberia: “We pulled out because the government had issued an unknown number of licences. The allocation of spectrum was not clear. There was no regulator.”

Licence and Spectrum Management

In some countries, governments have threatened to withdraw licences from existing holders, or have revoked spectrum that has already been allocated. In some cases this has led to mobile operators putting all investment projects on hold.

⁵¹ Such as a given distance to the nearest telephone.

⁵² This methodology was initially developed in Chile and has been used in a number of Latin American countries.

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Examples:

Burundi: "The regulator decided it wanted the operators to give spectrum back. The government does not seem to have a clear policy. This is a major concern for mobile operators."

Republic of the Congo: "The licence had been awarded for a minimal fee based on a beauty contest in 1998 (during war time). In 2004 US\$15-20m was demanded by the government (by presidential order). We had to challenge this and the government ultimately cancelled the presidential order."

Democratic Republic of the Congo: "Operators have the right to provide international services in their licences but the Minister could turn around and give the rights to someone else. Operators are very worried that they have spent lots of money setting up the gateway and it could be taken away from them even though it is specified in the licence."

Interconnection Rates

While it is important to ensure that interconnection rates are set at an appropriate level, it is also important to avoid disproportionate fluctuations in those levels. Changes should be implemented gradually so that shocks are avoided. Where interconnection rates are set based on benchmarks it is important that the countries used in benchmarking are comparable in terms of geographic, economic and technological factors. Similarly where cost models are used it is important that the input parameters are appropriate. If these safety measures are neglected then interconnection rates may end up being "corrected" up and down in an unpredictable manner.

Imposition/Variation of Taxes and Fees

In some countries unexpected fees have been introduced to charge for numbering ranges. In other countries, tax levels which were agreed in advance have been increased significantly after the entrant had set up its operations. In one such instance, the mobile operator wrote off all the investment undertaken and ceased operations in the country.

Imposition/Variation of Universal Service Obligations

In certain countries operators are subject to a range of service obligations including contributions to universal service funds, network rollout targets and the provision of low cost or free services. However the total burden of these obligations on operators is not clear, as the different elements are often not properly quantified or integrated. In addition, contributions to universal service funds may be set at a percentage of turnover, which in certain jurisdictions may be adjusted at the discretion of policy makers. If such funds are created and used there needs to be government transparency and accountability to ensure they are used efficiently to meet stated policy objectives.

Price Regulation

To a large extent the role of price regulation is defined by market structure. In competitive markets (as in most mobile markets) price regulation is ostensibly restricted to monopolistic bottlenecks or areas of proven competitive market failure. There are, however, markets where confusion and uncertainty are introduced through inappropriate regulatory intervention – or even the risk thereof.

Globally there is a broad consensus on the need to regulate certain aspects of wholesale pricing such as interconnection. There are a range of arguments supporting different approaches to setting appropriate interconnect rates. What is key for regulation and important for investors is not so much which specific approach is adopted, but that it is based on sound economic principles, a proper market impact assessment (with the necessary industry consultation), and that it is applied consistently and fairly. Poorly devised interconnection rates can introduce undesirable market distortions. Where interconnection rates are set based



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on benchmarks it is important that the countries used in benchmarking are comparable in terms of geographic, economic and technological factors.

In addition to wholesale regulation, certain regulatory environments include provision for retail price regulation. This not only undermines the effective functioning of competitive market forces, but also adds significant complexity to the job of the regulator. By attempting to regulate both wholesale and retail prices, the regulator is in essence intervening at multiple points in the value chain. Not only is this difficult to do but it is unnecessarily intrusive as it effectively dictates margins and interferes in the business models of operators.

Facilities Access Regulation

In order to enhance competition, regulators in certain markets have introduced facilities-access regulations (facilities leasing). These regulations are aimed at resolving competition constraints around “essential facilities”. These are parts of the telecommunications network that cannot be technically or economically duplicated (for example the local loop of a fixed-line incumbent). However, where the obligation to provide access to such facilities is extended to all facilities this can undermine the incentive for infrastructure investment, particularly if such access must be granted at cost-based rates.

These examples highlight the importance of regulatory reputation and restraint. In some cases the regulator or government can create such a high level of risk and uncertainty that an operator completely withdraws from the market. In such circumstances even if a replacement operator could be found, it would be unlikely to be willing to incur the level of investment needed in many African countries in order to upgrade networks and to expand network coverage to rural areas. Unless a regulator develops a track record for reliability, the resulting uncertainty will deter entry and investment.

5.2 Key Elements of Regulatory Good Practice

5.2.1 Regulatory Independence

Regulatory independence is imperative for the development of the telecoms sector. Too much interference from national governments is dangerous. Short-run ambitions may get in the way of governments carrying out successful regulatory policies. The results of too much government interference can include:

- Short-term populist agendas such as criticising tariff differences between prepaid and contract calls
- The imposition of excessive costs on the mobile sector, for example through taxation or sudden imposition of charges (e.g. for number ranges)
- Mishandling of the privatisation process for short-term political gain or revenue maximisation.

Telecommunications investment horizons extend well beyond the typical time-frame for political decision making. Regulatory independence provides a degree of immunity to short-term political priorities that undermine investor confidence.

Fully independent bodies should be tasked with regulating the sector, with a view to providing a climate in

Examples:

ICASA: "The most important element of a good environment for investment is independent and objective analysis of facts, where decisions are arrived at through reasoning. The regulatory regime should be fair and free from government control and commercial interference. The regulator should be more a consumer watch-dog and less a fairy godmother for operators. By being fair it is implied that the decisions are objective, proportionate, transparent and consistent. And last but not most important the decisions should be subject to judicial appeal and review."

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which telecoms can thrive and contribute to the development of the country. Independence includes both statutory independence and financial independence from governments. Key staff members should not be appointed by the government, otherwise interference will still be possible.

In addition to independence from government it is important that the regulator adopts an unbiased approach to different technologies. This may be a problem in some African countries since both the regulator and the fixed incumbent have often emerged from the original ministry responsible for telecommunications, and in some cases there remains a tendency to view the sector from a fixed technology mindset.

5.2.2 Appropriate Regulatory Skills and Capacity

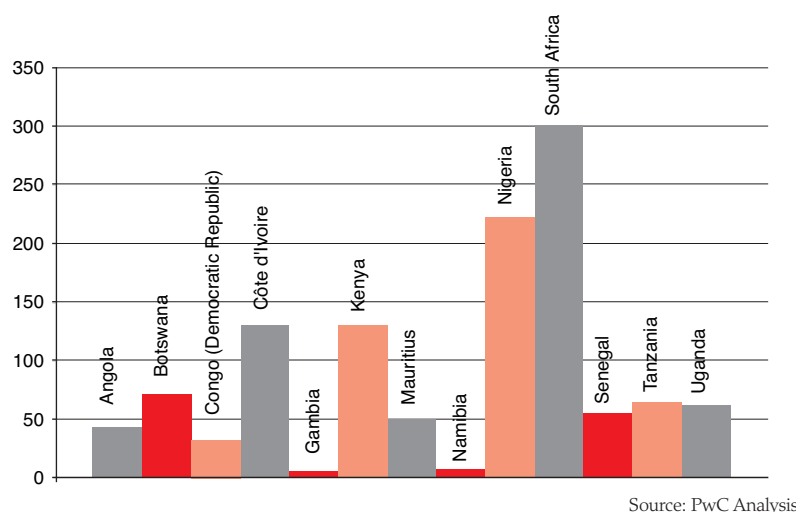
The telecoms industry is extremely complex both in terms of technology and the nature of the market. The analysis and regulation of the sector requires a combination of skills including economics, engineering and legal skills. The convergence of technologies, markets and services across telecommunications, IT and the Internet places an additional demand on skills.

The need for engineering skills is obvious and regulators in Sub-Saharan Africa do typically hire a number of engineers, often in leading positions (the head of the regulatory body often has an engineering background). Regulators also tend to be relatively well staffed in terms of legal expertise. However, economics expertise is often lacking and in a number of Sub-Saharan African countries the regulator does not employ any economists. This represents a fundamental weakness in these bodies, especially with respect to the assessment of alternative regulatory strategies.

In developed countries, economic analysis plays a central role in the regulation of the telecoms sector. In Sub-Saharan Africa the dearth of economists may be linked to the transition many countries are making from a socialist to a market-based economy. As long as competitive markets are still a relatively new phenomenon expertise in their analysis is also likely to be limited. Unfortunately in this context economics becomes all the more important, since careful consideration of the incentive structure is needed during the liberalisation process.

As Figure 8 below shows, there is considerable variation across regulators in terms of staff levels with some regulators reporting less than ten staff. Although it does provide some insight, the absolute number of staff does not reflect the competency of the regulator or extent to which skills and capacity meet market needs.

Figure 8: Regulator Staff Levels⁵³



⁵³ ITU Regulator Profiles 2005. Reproduced with the kind permission of ITU. <http://www.itu.int/ITU-D/treg/profiles/guide.asp?lang=en>



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A well-staffed regulatory body would facilitate a move towards a best-practice regime. Regulators with a balanced skill set will be able to apply best-practice tools and analysis, rather than following some sort of template for a best-practice regime. The costs of providing these skills are small in comparison to the potential impact of badly designed regulation on the telecoms sector and the economy as a whole.

International organisations and non-governmental organisations have recognised the importance of capacity building for regulators in developing countries. The International Telecoms Union (ITU) has a separate division dedicated to bridging the digital divide.⁵⁴ The World Bank has recognised Information and Communication Technology (ICT) as playing an essential role in poverty alleviation and has stated that ICT provides powerful tools to achieve the Millennium Development Goals. The World Bank is expanding its involvement in the development of regulatory frameworks, and has pointed out the need for more donor involvement to support capacity building efforts for autonomous regulatory agencies.⁵⁵ The Commonwealth Telecommunications Organisation (CTO) is also heavily involved in capacity building efforts.⁵⁶

5.2.3 Regulatory Powers

Even a fully independent regulator operating with well-designed regulatory policies will not be effective unless it has the power to enforce regulation. The regulatory regime must afford the authority specific powers. These powers should include the right to impose financial penalties, the right to require changes in conduct (e.g. pricing) and the power to revoke licences where appropriate. It is important that the institutional framework is clear on the process of enforcement of regulations and the right and ability of operators to appeal.

Examples:

Namibia: "The regulator only manages frequency and is not empowered."

Democratic Republic of the Congo: "The regulator is not very empowered. For example one operator was involved in a large law suit for infringing on the exclusivity gateway rights of a competitor. The regulator tried to intervene but the competitor ignored it and carried on with the case."

5.2.4 Due Process

Regulation cannot be effective if it is designed without full consideration of its implications for industry players and the market. Changing technological and market trends must also be considered. Effective and appropriate regulation will require a due process which includes the following:

- Market Analysis (to ensure regulations are appropriate and designed to achieve objectives)
- Consultation with all interested stakeholders (to ensure that the right issues are addressed, that industry expertise within operators is taken on board, and that regulation responds to the concerns of the various players in the industry)
- Statements of Policy (to ensure that operators do not waste valuable resources due to lack of clarity about the direction of policy)
- Timely responses to correspondence (to ensure issues are dealt with efficiently)

Examples:

Kenya: "Insufficient consultation is one of the major problems with the regulatory regime."

⁵⁴ <http://www.itu.int/ITU-D/index.asp>

⁵⁵ Guislan, P, Ampah, M, Besançon, L, Niang, & C, Sérot, A. Connecting Sub-Saharan Africa, World Bank Working Paper no 51. 2005 p28

⁵⁶ <http://www.cto.int/index.php>

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5.2.5 Regulatory Reputation

It is important to emphasise the role of the reputation of the regulator. The greater the degree of consistency in regulation the less risk will be perceived by investors. A consistent regulatory policy and conduct will reduce uncertainty overall. The regulatory environment has a material influence on the level of returns required to attract investors (the hurdle rate). A lower hurdle rate implies that, for a given business venture or project, investors are able to invest more and charge less in order to deliver levels of profitability required to attract investment. This drives more infrastructure investment and higher penetration.

Regulation matters to all aspects of a mobile business, so investment decisions will be closely tied to any uncertainty associated with it. Regulatory powers tend to include the regulation of interconnection tariffs and the imposition of fees for licences and additional spectrum. A significant amount of unnecessary uncertainty can be created where regulators either renegotiate previous agreements or induce large fluctuations in key parameters (for example by rapidly changing interconnection rates). The reputation of the regulator is crucial to establishing a low-risk investment climate for operators.

Poorly formulated or implemented regulations can have a devastating effect on market stability and far-reaching implications for market development. For example the declaration of existing contracts null and void with the introduction of number portability in Hong Kong led to fierce and destructive price wars, which has contributed to the financial distress of five of the six mobile operators.

A key element of regulatory reputation is the need to avoid “ex-post opportunism”, i.e. regulatory action that does not take account of the fact that investors have already made investments for which they require an appropriate return. In some cases the actual return generated may appear generous. It may be tempting for regulators to ignore the fact that this return was required to compensate for the risk of the project failing or being less successful.

Significant unnecessary uncertainty is created when regulators fail to provide predictability by failing to clearly define rules such as the institutional framework, the market structure or the processes to be followed in enforcing or changing them. In many jurisdictions regulators unilaterally impose rule changes such as revisiting and renegotiating previous agreements with operators, or make tariff determinations without following due process.

It should be recognised that often there will be a natural conflict and tension between the regulator and operators, as the parties have separate and different mandates. Operators need to pursue their commercial interests, balancing the needs of customers and investors as well as delivering on any universal service obligations. Regulators need to regulate the respective sectors in the public interest, including policy implementation, promotion of effective competition, licensing and spectrum management, compliance monitoring, and consumer protection. Notwithstanding this anticipated natural tension, operators and regulators should interact on the basis of mutual respect and professional integrity as an acrimonious relationship will not best serve the long term interests of consumers, government or market participants.

A credible regulator with a good reputation will be better able to fulfil its mandate and impose appropriate regulatory remedies where required. Operators should be willing to engage constructively with such a regulator to find solutions to appropriately identified market problems, rather than rejecting the external imposition of intrusive regulatory measures.



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5.3 Key Regulatory Objectives

5.3.1 Promoting Competition

Regulation should be designed to be pro-competition not pro-competitor. A regulator's task is not to prevent some market players from failing or others from succeeding. If a fair competitive environment is created consumers will ultimately benefit from lower prices and better service. So long as they compete on a level playing field with other players those operators which offer superior services and technologies and are more efficient will achieve higher profitability and growth. Competition will mean that entry and exit decisions are taken in the context of comparative efficiency.

It is widely accepted and acknowledged that effective competition is the best mechanism for the allocation of resources, achieving operational and technology efficiency, fostering innovation, and creating the greatest incentive for giving customers what they need. It should thus be recognised that regulation is not a substitute for competition. Notwithstanding this, regulation does have a crucial role to play – firstly, in resolving true monopolistic bottlenecks and secondly, in addressing areas of proven competitive market failure. Both of these realms of regulatory intervention are based on well-founded economic principles and supported by well-defined mechanisms applied by leading international telecommunications regulators.

The introduction of competition has delivered substantial benefits to many Sub-Saharan countries, including increasing telephone penetration, infrastructure investment, product and service innovation, and services to the poor. Recent and ongoing market liberalisation in many countries, coupled with technology convergence will serve to intensify competition within the sector.

The regulator's task is therefore to create and maintain a "level playing field". Where there is market failure regulations have to be designed to resolve this and to ensure efficient outcomes. In promoting competition it is important that regulators recognise that certain policies cause impediments to fair competition and can lead to an inefficient allocation of resources, in particular:

- Promoting the wrong type of entry
- Failing to determine the optimal number of operators
- Favouring competitors (e.g. entrants or fixed operators)

Right type of entry

It is in the nature of network industries that some customers are served at a higher cost than others and some high-cost customers are also low-revenue customers (for example subscribers in remote rural areas who are expensive to provide services for and who also have limited income available to pay for calls). In general entry is good where it contributes to the general level of competition and innovation. However, entrants that simply try to "cherry-pick" profitable consumers in high-density areas or business districts do not contribute to further network roll-out and universal access. In fact, they hinder other operators from contributing to these objectives by "cream-skimming" the revenues from profitable customers so that these funds can no longer be used by country-wide operators to promote rural network build-out.

Opportunistic cherry-picking entrants undermine the ability of other operators to "value price", whereby prices for less sensitive products and services are set to make a greater contribution to fixed and common costs (most often premium services and higher-end contract subscribers). This prevents them from setting lower prices for more price sensitive users and services thereby increasing penetration.

An example of this type of entry can be seen in the Democratic Republic of the Congo. This is a huge country in need of wide area network coverage. However, four out of six mobile operators confine their services to the

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capital. This is not the type of entry that is likely to achieve policy objectives focused around increasing access to telecommunications services.

A related issue is encouraging entry in service provision which may undermine incentives to invest in the upstream network. Again where the policy focus should be on encouraging more infrastructure competition and driving more network roll out these distortions will be particularly counter-productive. Mandated access to network infrastructure allows new entrants to free-ride on sunk investments undermining investment incentives going forward. It should be clear that incentives to improve efficiency will also be reduced if mandated access forces these gains to be shared with downstream rivals. A key concern of the South African operators is that the new Communications Bill will lead to exactly these sort of problems.

Examples:

South Africa: "Regulation is focused on increasing service competition although full network coverage is not in place and incentives are needed to increase the infrastructure."

Optimal number of operators

As far as market entry goes conventional wisdom suggests that "more is better". More entry will increase competition and result in a better deal for the consumer. The optimal number of entrants, it is argued, should simply be left to the market. This will lead to entry for as long as it is profitable, and margins will be driven down to a minimum as a result.

However it is necessary to take the nature of the industry into account, and the telecoms industry has certain features which change the way that entry affects efficiency. These features include: the relationship between the amount of spectrum available per operator and unit costs; the impact of volumes per operator on unit costs; and the impact of network duplication on cost structures and on the environment.

These factors stem from the underlying economics of the telecommunication industry and guide the delicate balance that policy-makers and regulators need to strike between the level of infrastructure-based and services-based competition in order to manage scarce resources (such as spectrum), avoid duplication of infrastructure, and attract investors. Too much infrastructure-based competition may result in a loss of economies of scale and excessive infrastructure duplication; while too much services-based competition seeking regulated access to network facilities will drive away infrastructure investment.

A balanced view of entry needs to take into account both its benefits and its costs. Some of these are listed in Table 7:

Because of these factors there is an optimal number of operators, which will vary from country to country. As market entry occurs, operators price more competitively, margins decrease and the efficiency of operations increases so that unit costs (and prices) decrease. However, taking into account some of the disadvantages of

Table 7: Advantages and Disadvantages of Further Entry

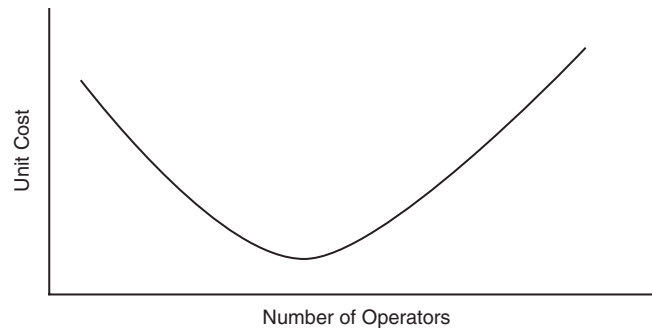
Advantages	Disadvantages
<ul style="list-style-type: none">• Lower margins• Efficiency improvements• Faster product development• Customer choice	<ul style="list-style-type: none">• Less spectrum per operator (smaller cells and larger number of base stations per operator)• Lower volumes (higher unit costs)• Network duplication (economic and environmental impact).



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further entry (including the fact that less spectrum per operator means smaller cell sizes and therefore higher unit costs), it becomes clear that there is a point where the positive effects of competition will be outweighed by cost increases resulting from network duplication and spectrum scarcity. This is illustrated in the following diagram.

Figure 9: Unit Costs and Number of Operators



Source: PwC Analysis

In technical terms more competition delivers greater “allocative efficiency” because it forces firms to set price closer to cost. However, the extent to which additional entry stimulates this will diminish and in some markets a new entrant may have little or no effect on the competitive outcome. On the other hand, additional entrants cause both incremental and average costs to rise as spectrum is increasingly rationed and volumes are shared out amongst a greater number of players. This loss of “productive efficiency”, which could involve higher prices and insufficient funds to support network roll-out, could quickly overturn the gains in allocative efficiency. In simple mobile access network terms, at some point the additional costs of, for example, four or five sets of radio masts, antennae, radio and switching equipment exceed the benefits of additional competition.

Competition is not an end in itself but a means to achieve objectives such as low-cost provision of quality services to consumers. Regulatory success cannot be measured simply with reference to the number of licences awarded or of entrants attracted to a market; one must take into account the quality and prices of products made available to consumers, as well as the potential destabilising effect on the market of the failure of non-viable operators.

The relationship between spectrum allocation and incremental costs is very significant, while later entrants to the market have an increasingly immaterial impact on price pressure. Hence in our view it is highly likely that in countries that issue more than three or four mobile licences, higher prices will result. It is also important to understand that in this context there are insufficient mechanisms for the market to deliver the optimal structure through consolidation. In low income countries where demand may be particularly price sensitive this will represent a significant missed opportunity.

Examples:

South Africa: “The regulator is seeking to maximise both the level of infrastructure and services-based competition, through a vast array of market liberalisation initiatives, coupled to regulated access provisions, without adequate analysis to determine the optimal balance or set of initiatives to ensure sustainability and investor confidence in addition to the necessary objectives of product/service innovation and affordable pricing to customers.”

Kenya: “In terms of investment, market entry is more dangerous than technological risk. The level of risk varies across countries depending on the openness of the market to competition.”

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Regulators should also avoid unduly limiting entry where there would be clear benefits to competition and for consumers. There are still countries where the telecoms market has not been liberalised at all (see Table 6). In other countries, regulators have shown reluctance in liberalising parts of the market, in particular with respect to the provision of international services. Interestingly, in this area no additional spectrum needs to be granted to operators to enable them to operate an international gateway (IG) and artificial restrictions allowing monopolisation of the operation of IG services are likely to be welfare reducing.

Unbiased policies promoting efficient entry

Entry should not be prevented or complicated by artificial restrictions or unnecessary barriers to entry. There should, for instance, be sufficient information for companies considering entry to make an informed decision; there should also be a clear and streamlined process for licence applications, and a coherent numbering plan and frequency management.

On the other hand, governments and regulators should beware of unduly assisting entrants that may turn out to be inefficient. In the absence of entry assistance, companies will only enter the market if they are sufficiently efficient in their operations to compete with established operators. If additional incentives are given in the form of tax breaks, lower licence fees compared to incumbents, etc., then entry will become feasible for higher-cost and less efficient operators. This will result in the tax-payer subsidising inefficient operators.

The same logic applies when considering the degree of balance between different technologies in particular between mobile and fixed operators.

Examples:

Democratic Republic of the Congo: "The operators have agreed to pay a contribution to fund the authority but all contributions go straight to the Treasury. Some ends up with the regulator and some goes to the fixed incumbent. In effect the mobile operators are subsidising the competition."

Botswana: "The government is not going to tax the new entrant as an incentive but the existing operators would have to reduce their bottom line to pay less."

Burundi: "Mobile operators are not allowed to interconnect directly. They have to go through the fixed incumbent and pay 1.5 cents per minute transit."

5.3.2 Promoting Access

The provision of universal access is still close to the top of the agenda of many governments and regulators. Where the provision of such services is unprofitable but socially desirable, an appropriate incentive structure should be implemented to encourage the extension of coverage into rural areas.

The obvious mechanism to achieve this is the introduction of a universal service fund. Generally, contributions to this fund are based on operators' revenues (typically 1%-1.5%). This fund should then be used efficiently in the provision of rural coverage or access. Funds can be allocated through a competitive bidding process (reverse auction) in which operators are given the option of bidding for contracts under which they would be obliged to cover certain unprofitable areas. The obligations included in these contracts should be designed to provide the services most needed by the communities in question (these could range from mobile coverage to community shared phones or internet access) allowing bidders flexibility over the technology they use.

Many countries in Sub-Saharan Africa face the problem that universal service funds have been established, and operators are contributing sizeable amounts to these funds, but there is no clarity on what exactly these funds are used for, if anything.



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A good antidote to this problem is where regulators have been creative in pushing universal access. In South Africa, for instance, licence fees had to be paid “in kind” where payment included the following elements:

- Free SIM cards
- Provision of free SMS messages with the free SIM cards
- Provision of “call centres” (shared community phones)
- Call subsidies (applicable to calls from free SIM cards or community phones)
- Internet access for schools

These measures were targeted towards disadvantaged and hitherto unconnected people, thus directly expanding access and driving up mobile penetration.

Operators were willing to pay relatively high licence fees “in kind” because they knew that these measures would result in additional traffic (from and to subsidised SIM cards and community phones, and from discounts, due to price elasticity effects). However regulators must be careful not to place an excessive burden on operators.

The above mechanism also ensured that the funds remained in the telecommunications sector and were not diverted to other sectors. This approach has been adopted in other countries, for example in Morocco the second mobile license was issued with conditions relating to build-out into rural areas.

Examples:

Nigeria: “Spectrum fees do not provide the right incentives. Fees increase with the number of base stations.”

Kenya: “High license fees hinder development and limit the number of users, especially in rural areas where incomes are low.”

Regulators should also consider promoting alternative business models when promoting the extension of network access. This might include encouraging shared networks for building out rural coverage.

The issue of spectrum policy is set to play a major role in the development of the mobile sector in Sub-Saharan Africa. As a Director at Warwick Business School’s Centre for Management under Regulation and an expert on the economics of spectrum management, Martin Cave is well placed to provide comment on the topic.

“Given the absence of fixed infrastructure, the only game in parts of town in these regions is wireless. Regulators should therefore enable as much spectrum as possible to be utilised for the purposes of providing mobile networks. A liberal spectrum policy will help move things along. Regulators need to facilitate this action.”

Cave says there is a risk of regulatory asymmetries between fixed and mobile operators in the region. “It is something worth worrying about. Regulators and governments could do more to encourage the development of wireless technologies, both voice and broadband. They need to devote quite a lot of attention to spectrum management and the concern is that many of them may not have the competencies to do so.”

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To this end, Cave is co-authoring the spectrum management module of a Regulation Handbook for the ITU and World Bank, available early 2006. "Our web-based resource is designed to give regulators in developing countries advice on implementing spectrum policies," he says.



Martin Cave
Director
Warwick Business School

5.4 Concluding Comments on Regulation in Practice

In summary, regulatory actions can have an enormous impact on all aspects of an operator's business plan. In view of this the following aspects of regulation are particularly important:

- **Well-defined regime and policy:** In some countries there was a lack of clarity as to which parts of government were able to influence telecoms regulation, or the regulator had not been properly established. In others there was no clear statement of policy objectives and policy was not well mapped out (for example the number of licences to be issued). This was detrimental to the development of the sector.
- **Key elements of good practice:** To establish an environment that is conducive to investment regulators should be independent, have appropriate skills and capacity, be empowered, follow due process and consult with stakeholders, and develop a reputation for fair and predictable behaviour.
- **Key regulatory objectives:** Regulators need to make clear the underlying objectives of their actions. Ultimately regulators should focus on protecting consumers. This means promoting competition, rather than supporting particular competitors. Efficient operators and technologies competing on a level playing field will survive and prosper. Regulators also need to carefully consider the best ways to increase access and coverage. Where universal access funds are established care must be taken that resources do not leak away from the sector and in some cases it may be more appropriate to build commitments into licence agreements.





The Impact of Moving
Towards Best Practice



Section 6 The Impact of Moving Towards Best Practice

In Section 4 we have set out various ways in which regulation impacts on the development of the mobile sector (and the communications sector in general). Section 5 explored various areas of regulatory practice which are material in this context. Section 6 builds on this discussion by providing indicative estimates of the impact of a move towards best practice regulation on investment and penetration. The implications for GDP and tax revenues are then discussed.

6.1 Analysis of Regulatory Risk

We have gathered information (on a confidential basis) from operators on their investment policies including past investments, investment plans going forward, and the sensitivity of those plans to different regulatory environments.

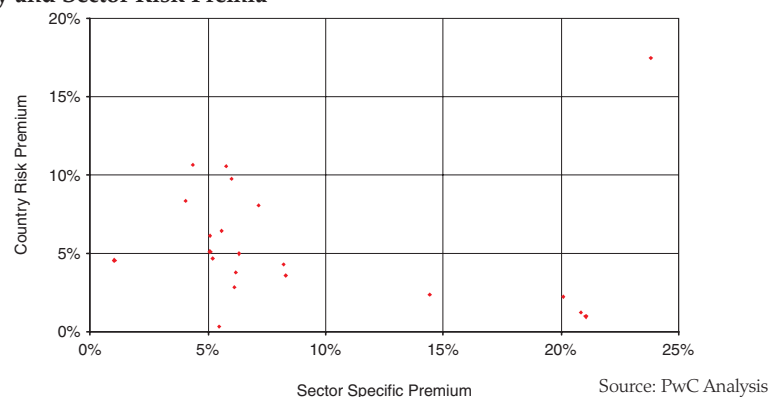
On the basis of this information we have derived risk premia for a number of countries in Sub-Saharan Africa. This information revealed evidence of significant but widely varying risk premia attached to investments in the Sub-Saharan region.

Operators were able to provide us with information on their hurdle rates they use to appraise investments in their particular countries. In some cases, operators base investment decisions on “pay-back” periods, whereby investments are only made provided that capital expenditure is “paid back” in terms of revenue increases within a given period. In these cases, using information on operating costs allows us to work out the implied hurdle rates associated with the pay-back period quoted by these operators. We also used this approach to cross check responses from other operators in relation to their hurdle rates.

The risk faced by operators in a particular country is composed of country risk as well as industry specific or regulatory risk. Therefore, we compared the risk premia we derived to third party sources on the risk premia sought by international investors to compensate for country risk. This information was available to us from our in-house country risk model.* This model uses bond information to compare yields on dollar denominated government bonds issued by countries with the yields on US Treasury bonds to extract a market assessment of individual country risk⁵⁷. Adjusting the operator hurdle rates for country risk gives us a clearer picture of the sector-specific risk implicit in individual operators’ hurdle rates.

Figure 10 provides a scatter plot of a sample of countries in Sub-Saharan Africa where each country’s coordinates illustrate the split of the total risk into country risk and sector specific risk components. The sum of x and y coordinates reflects the total risk associated with investments in the telecoms sector in the respective country.

Figure 10: Country and Sector Risk Premia



* See Annex 1

⁵⁷ Where sovereign bond information is unavailable, the PwC model calculates an implied premium by looking at credit ratings of the country in question. This relies on country credit ratings from Moody’s, S&P, EIU and Euromoney. The PwC model regresses observed premia for countries where direct bond market information is available against their corresponding credit rating. This derives a predictive statistical model of country risk.

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The names of countries are not displayed in Figure 10 because this would allow hurdle rates of individual companies to be imputed. However, the conclusions we draw from this analysis do not depend on the country names. The main conclusions are:

- First, there is no clear positive correlation between country specific and sector-specific risk. For example, some countries display a low country risk premium but investment in telecoms is associated with a considerable level of risk
- Second, for the majority of our sample a greater proportion of the operator's hurdle rate was associated with sector specific risks.

6.2 Impact on Investment

The operators also revealed that there was scope for a significant reduction in these risk premia if the regulatory environment could be improved. Several operators told us that regulation represented the main element of sector-specific risk in their country. Much of this risk was associated with a lack of a well defined regime and policy (for example, no independent and/or suitably empowered regulator). In other cases, regulatory risk resulted from uncertainty surrounding pending changes in regulation.

Although surprising at first sight, the statement that a large part of the risk is associated with regulation (or lack thereof) seems to be a reasonable one. Regulatory policy affects retail revenue (through retail price regulation), interconnect revenue (through interconnect regulation); it affects costs (e.g. interconnection out-payments, spectrum availability, spectrum and licence pricing) and planning horizons (through licence duration and renewal processes). Regulation further affects costs and revenues indirectly through its influence on the intensity and fairness of competition. In this context the operators' assessments do not appear unreasonable.

6.2.1 The Upside Potential

Operators also provided information on the impact that lower hurdle rates would have on investment. Our analysis suggests that a move to regulatory best practice would lead to considerably higher levels of investment and that, historically, investment might have been around 25% higher in such circumstances.

In order to quantify this effect mobile operators have provided us with information on their respective levels of total investments to date in various countries. The information provided shows that, up to 2005, these operators had invested around US\$11bn in telecoms equipment, networks, etc. The combined number of subscribers of these operators in the countries to which this information relates amounted to around 60% of the total subscribers in Sub-Saharan Africa. We have no reason to assume that these operators invested more, or less, per subscriber than other operators. On this basis, total investment in the mobile industry in Sub-Saharan Africa up to 2005 can be estimated as approximately US\$18bn to date.⁵⁸

Hence a 25% increase in historical investments would have amounted to an additional US\$4.6bn of investment. The implications are obvious: Sub-Saharan Africa has foregone considerable investment in telecoms, possibly to the tune of around US\$5bn, plus all the associated benefits which this additional investment would have brought, including an acceleration of penetration, employment, tax revenues, GDP growth and social development.

6.2.2 The Downside Potential

Many operators that we interviewed also told us that if the regulatory environment deteriorated they would simply stop investing or even pull out of the country altogether.

⁵⁸ This result appears conservative in the light of the recent World Bank report which estimated that total investment in telecoms in Sub-Saharan Africa between 1995 and 2002 alone amounted to approximately US \$22bn. (World Bank, Financing Information and Communication Infrastructure Needs in the Developing World: Public and Private Roles, Draft Version, February 2005.)



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One operator mentioned that regulators and governments stated that they were not too concerned by the prospect of operators withdrawing from their country, arguing that investment could come from other sources. However, it should be emphasised that regulatory uncertainty affects the propensity to invest from all possible sources. In some countries the liberalisation process has been hindered by the difficulty of finding willing investors. In Namibia, a private investor was found but later decided to sell its stake back to the Namibian government.

Examples:

Liberia and Guinea: "We pulled out of two countries due to unreasonable government behaviour."

Nigeria: "We have been seeking investment inflows for several years. International firms carrying out due diligence want to see evidence of good policies. In four years only one transaction has been concluded due to regulatory uncertainty."

6.3 Impact on Penetration

There is a strong link between regulation and the development of the mobile communications sector, firstly through the impact on investment levels, and secondly through the impact of regulation on the total cost of ownership for consumers. These effects are examined in the following subsections.

6.3.1 Impact of Increases in Investment

A 25% increase in the level of investment would have a significant influence on mobile penetration and usage. Some investment would be directed towards new network roll-out into areas where there is no existing coverage and some investment would be used to increase network capacity in urban areas. Operators would split additional investment between network roll-out, equipment upgrades and capacity increases with a view to maximising incremental subscription and usage increases.

Investment directed towards new network rollout would increase the number of base station sites, and expand the area with mobile network coverage. The extent of this increase in geographical coverage would be affected by the higher labour and transport costs which are associated with infrastructure development in rural areas. However, there are some economies of scale in the network, and rural base stations have much wider range than urban ones (since this is limited by the range of radio signals and the terrain, rather than by capacity and spectrum constraints).

As a result, there would be a more than proportionate increase in network area coverage. However the population in rural areas is much more dispersed than in the areas which already have mobile coverage. Rural areas also tend to contain low-income consumers who will be less able to afford mobile services than those in the rest of the country.

There would also be an indirect effect in other areas. As network coverage increased, and penetration increased into new and more remote areas, the value of mobile phones to the population in areas which already had coverage would increase. This is known as a "network externality". The possibility of calling friends and relatives further afield would entice new users onto the network even within existing areas of network coverage. Extending coverage would also mean that mobile owners who travelled to rural areas would be able to enjoy the benefits of mobile access more of the time. In terms of investment directed at increasing capacity, mobile networks in Sub-Saharan Africa are often highly congested and higher levels of investment could significantly increase quality of service by reducing blocking rates and increasing the quality and clarity of calls. Higher levels of investment in a lower risk environment would also be associated with the deployment of more efficient and longer lasting equipment. These affects would be likely to increase both usage and penetration in

Section 6 The Impact of Moving Towards Best Practice

areas of existing coverage.

Taking all of these factors into account we estimate that penetration would increase between 10%-20%. Assuming an increase of 15% this represents an addition of 12.5m subscribers to the existing 83m subscribers in Sub-Saharan Africa.

6.3.2 Impact of Reductions in Total Cost of Ownership

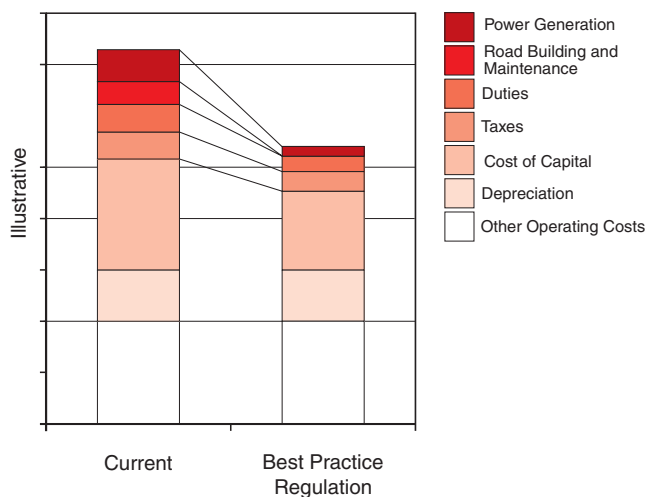
As shown in section 4.1.3 regulation impacts on the total cost of ownership (TCO) because regulatory risk drives up operator's capital costs which, among other costs, need to be recovered through retail prices.

The impact on the TCO will depend on a range of factors but is likely to be significant because the mobile telephony industry is capital intensive. Analysis of operator responses to the sensitivity of hurdle rates to the regulatory environment shows that reductions in TCO of up to 10% could result from a move to best practice regulation.

The effect of reduced TCO on penetration will depend on the price elasticity of demand. *Waverman et al*⁵⁹ find that the own-price elasticity of demand for mobile phones in developing countries is significantly above 1. This means that when price decreases, demand increases more than proportionately.

Operators and stakeholders that we spoke to pointed to a range of ways in which government and regulatory policy directly influenced the TCO. In their view it is not unlikely that best practice regulation, in conjunction with government measures such as fair taxation and lower levels of duty could reduce the TCO by around 20%, especially if these measures are coupled with the provision of essential infrastructure. Our analysis suggests that the influence of regulation could account for approximately half of this effect.

Figure 11: Composition of the Total Cost of Ownership



Source: PwC Analysis

With demand elasticities in excess of one such a reduction in TCO could lead to penetration increases of 20% or more (e.g. an increase from 10% penetration to 12%). Therefore a reasonable estimate of the effects of a reduction in TCO driven by best practice regulatory and government policy would be a 10-20% increase in subscription and usage levels. This could result in up to 16.5m additional subscribers.⁶⁰

⁵⁹ Waverman et al find that the own-price elasticity of demand for mobile phones in developing countries is significantly above 1. This means that when price decreases, demand increases more than proportionately. (Waverman, Meschi and Fuss. The Impact of Telecoms on Economic Growth in Developing Countries. The Vodafone Policy Paper Series 2 (2005): 10-23.)

⁶⁰ There is an additional positive effect on subscriber numbers and usage which is driven by increased investments: increased investments would lead to volume increases and hence to unit cost decreases given the presence of economies of scale. This would contribute to a further reduction in TCO due to competitive pressures. We have not attempted to quantify this additional effect.



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The precise outcome would depend on a range of factors, however it is safe to conclude that a robust and fair regulatory regime would reduce the TCO, as would appropriate government intervention in the areas of taxes, duties, and infrastructure.

6.4 Impact on GDP

Mobile and fixed telecommunications networks contribute enormously to the economic and social development of countries all over the world. They reduce the costs of interaction, expand market boundaries, and expand information flows. Some of the examples in sections 3.3 and 3.4 show how small businesses in African countries have been able to make use of mobile technology in order to improve the productivity of their operations. Where telecoms networks succeed in enabling this type of development, expansion of mobile penetration will have a measurable impact on GDP.

Several studies have examined the impact of investment into telecommunications networks on GDP growth. In 2001 *Roeller and Waverman* suggested that in the OECD fixed line telephony had contributed a third to output growth between 1970 and 1990.⁶¹ In developed economies fixed telephone coverage expanded gradually until coverage was more or less complete and mobile coverage followed rapidly much more recently. In many developing countries fixed-line penetration is still very low but mobile penetration is growing fast. It has been suggested that mobile communications will play the same important role in developing countries as fixed did in developed ones.

In 2005 in a paper for the London Business School, *Waverman, Meschi and Fuss*⁶² carried out an analysis to determine the impact of mobile penetration on GDP growth. The study found that between 1996 and 2003 a developing country with ten more mobile phones per 100 people could expect to experience annual GDP growth that was 0.59% higher than an otherwise identical country.

This may appear modest at first, however, higher GDP growth, even a small amount, over time leads to significant differences in per capita income levels. In addition, the actual economic benefit from future increases in mobile penetration may be more complicated than this figure suggests. One reason is that since many African countries have large informal sectors, GDP data will not necessarily capture all of the growth associated with mobile penetration. Another reason is that the impact of penetration on GDP growth is not instantaneous, and grows over a long period. Over time usage patterns change, and businesses learn to take better advantage of mobile technology having a more positive effect on GDP than that calculated using historic data. Furthermore, as the network grows to cover more companies and individuals there are more people to contact and we expect this to have a further positive effect on GDP.

6.5 Impact on Government Revenues

Even in developed countries the mobile sector is an important source of government revenue. In 2004 a GSMA report estimated that the mobile services industry annually contributed €83.9 billion to the European Union prior to its expansion. In developing countries, where a large portion of economics activity is informal, tax revenue from the mobile sector could be comparatively even more important.

Contributions to government revenues are generated in the mobile sector via income tax, value added tax, social security contributions, and corporate tax, as well as licence fees. It is important that the taxation system within a country is not unduly severe, in the sense that it discourages investment in mobile services. In a fair tax regime governments will benefit as the sector grows and channels revenue into government funds. A previous study for the GSMA found that even if handset taxes were cut, every new mobile user would generate an additional US\$25 in tax revenue for governments per year.⁶³

⁶¹ Roeller, L.H. and Waverman L. Telecommunications Infrastructure and Economic Development: A Simultaneous Approach." *American Economic Review*, 2001, 91(4).

⁶² Waverman, Meschi and Fuss. The Impact of Telecoms on Economic Growth in Developing Countries. The Vodafone Policy Paper Series 2 (2005): 10-23.

⁶³ GSMA, Tax and the Digital Divide, 2005.

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Increased penetration that is generated by expanding rural coverage may consist mainly of lower income customers, who are likely to spend less and generate less government revenue directly. However the expansion of the network is very likely to result in more calls being made by existing users, for example relatives in urban areas. In addition to this government revenues will benefit indirectly from the impact on the rest of the economy, and in rural areas where communication is currently most difficult, this impact will be very important.

6.6 Concluding Comments on the Impact of Moving Towards Best Practice

In summary, a move towards best practice could bring about substantial increases in investment and lower operating costs for operators. This would have knock-on effects for penetration and the economy as a whole:

- Financial information received from operators revealed a significant risk premium associated with mobile operations in Sub-Saharan Africa. Adjusting for country risk showed that a substantial proportion of the risk premium was associated with sector specific risk.
- If best practice regimes had been in place through Sub-Saharan Africa, total investment might have been 25% higher. This represents US\$4.6bn additional investment.
- If all of the additional investment had been channelled into wider geographical coverage we estimate that 12.5m additional subscribers might have been added in Sub-Saharan Africa.
- Reduced regulatory risk and better governance would reduce costs for operators. This would ultimately be passed on to consumers in the form of a lower total cost of ownership. We estimate that better regulation might lead to a reduction in TCO of up to 10%.
- Given the high sensitivity of consumers to prices in developing countries⁶⁴ these effects could increase penetration by a further 10%. Industry sources estimate that government policies could double this effect.
- Increased penetration would feed through into faster GDP growth. In 2005 *Waverman et al* found that between 1996 and 2003 a developing country with ten more mobile phones per 100 people could expect to experience annual GDP growth that was 0.59% higher than an otherwise identical country.⁶⁵
- Higher penetration would also translate into increased government revenue from the mobile sector in the form of taxation. Government would also benefit indirectly from the impact on the rest of the economy.

⁶⁴ Waverman et al find that the own-price elasticity of demand for mobile phones in developing countries is significantly above 1. This means that when price decreases, demand increases more than proportionately. (Waverman, Meschi and Fuss. The Impact of Telecoms on Economic Growth in Developing Countries. The Vodafone Policy Paper Series 2 (2005): 10-23.)

⁶⁵ Waverman, Meschi and Fuss. The Impact of Telecoms on Economic Growth in Developing Countries. The Vodafone Policy Paper Series 2 (2005): 10-23.



Section 6 The Impact of Moving Towards Best Practice

Omari Issa is Chief Operating Officer of Celtel International, a pan-African operator with over 9 million customers and the largest footprint of any operator across the continent. In May 2005 Celtel was acquired by MTC Kuwait for US\$3.4 billion in one of the biggest ever-corporate deals involving a company operating in Sub-Saharan Africa.

Do you believe there is a clear relationship between investment in the mobile sector and the regulatory environment?

I would say that the investment that has gone into the mobile sector has forced governments to address the issue of regulation. It is not that regulation has been a catalyst for investment. In fact, I think that investments have actually overtaken developments in regulation. In many cases I think regulators are really struggling to cope with the current environment. For instance, in many countries regulators are regulating mobile in the same way they used to regulate fixed. They haven't really come to the realisation that the sector is changing. The market forces are changing. They are trying to change things regardless of what the customer wants. Operators are normally way ahead of the regulatory environment in terms of coverage, tariffs and everything else.

Do you believe that local regulatory authorities could do more to encourage development and investment in Sub-Saharan Africa's mobile industry?

Yes, the regulatory environment itself has to be conducive to investment by promoting and ensuring a level playing field. But beyond regulation there are other factors that can encourage development of the mobile industry. Governments need to look at the long-term benefits as opposed to short-term financial gains. A good example of the benefits of taking a long-term approach is the situation in Gabon. Five years ago Gabon decided to issue two operator licences. Instead of requiring operators to bid for the licence, the Government set the licence fee in the region of a nominal US\$160,000. But the Government required the operators to have certain geographical coverage within a specified period. Four years later there was a penetration rate in Gabon of 32-33%, the highest penetration rate in Sub-Saharan Africa. The operators had been allowed to invest in the network rather than pay huge license fees. The Government took a deliberate policy in the beginning, which enabled services to be extended to very remote parts of Gabon.

Do you think that interconnection fees imposed on mobile operators are fair and justified?

It's only in the last 18-24 months that we are seeing regulators adopting a more justified methodology to assess the appropriate rates. Previously they have been set anywhere from 8 cents to 25-30 cents with no particular methodology. Now that this issue is high-profile, we are seeing regulators conducting very in-depth studies on the costs of providing services. There is still plenty of room for improvement but we are seeing the industry moving in the right direction. I am hopeful that by the end of 2006, beginning of 2007, this will be an issue that will go into the archives.

Do you believe that mobile operators are treated the same way as fixed operators by regulators and governments?

There is still a bias towards fixed operators. There is a combination of factors for this. Firstly, the government still has a significant stake in many of the fixed line operators. Secondly, many of the individuals working within regulators have a background in the fixed line industry.

Has the mobile industry brought economic and social benefits to Sub-Saharan Africa?

Yes, and the growth has really happened in the last three years at a rate of 50-70% per year. We've gone from talking thousands, to millions. Having said that, we are still talking average penetration rates of well below 10%, around 7%. That's why governments and regulators have to look to the long-term benefits as opposed to just the short-term financial gains. The benefits to governments are enormous: Sales tax, value added tax, corporate tax.

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Is mobile technology critical to bridging the 'digital divide'?

Absolutely, especially as average fixed line penetration is around 2%. People are moving away from fixed. There are still many other things that need to be done to facilitate that though. Some countries are looking to cover up their fiscal deficit by milking the mobile operators. At some point the mobile operators will not be able to absorb these additional taxes and will pass them onto the consumer, reducing customer usage. They therefore risk making the divide wider!

How else can developing nation governments support mobile?

One important issue is taxes, and I would refer you to the GSM Association's taxation study for further details. Also, in many of these countries we spend anywhere from 7-15% on our capital expenditure just to provide electricity for our base stations. We have to provide the prime power and a standby generator because electricity is not readily available. If electricity was more readily available we could roll out much faster and the tariffs would be lower. Secondly, a big proportion of areas beyond the capital cities are not easily accessible, so we are having to buy 4-wheel drive vehicles and maintain our own roads so we can access these places. All these things add up to high costs. When you add all these things – electricity, accessibility, frequency fees, handset costs and so on – you are making affordability quite an issue. This is where governments can play quite a role.



Omari Issa
Chief Operating Officer
Celtel International



Section 6 The Impact of Moving Towards Best Practice

Mostafa Terrab is a Program Manager for *infoDev*. *infoDev* is an innovative global partnership of international development agencies focused on how information and communication technologies can help to combat poverty and promote opportunity, empowerment and economic growth in developing countries. This partnership is coordinated and served by an expert Secretariat housed at the World Bank, one of *infoDev*'s principal donors and founders.

Within Sub-Saharan Africa, is there a clear relationship between investment in the mobile sector and the regulatory environment?

There is no doubt that there is a strong correlation between a good regulatory environment and growth in the mobile sector. If you are using investment as the criteria then it is clear the correlation is there. Transparent licensing processes are a clear consideration for investors, but regulatory predictability is also important. In fact, there is great correlation between predictability of the regulatory environment and investment in mobile communications. Investors are very keen on ensuring some degree of regulatory predictability.

Do you believe that local regulatory authorities could do more to encourage development and investment in the region's mobile industry?

Firstly, I would distinguish policy from regulation. It is critical that the policy environment is healthy and promotes competition, and the government is responsible for that. It is very important that the policy function enables a "hands-off" regulatory process and promotes the development of a good and strong regulator that is not swayed by short-term political considerations.

Policy and regulatory functions should be clearly distinguished. However, this may not be feasible in all legal and administrative environments, but even in such environments there has to be a clear functional separation between policy and regulation. One can maintain separation at least at a functional level, so that investors feel comfortable that they have some mechanism that will enforce a level playing field. This is becoming a positive trend as demonstrated by investments in mobile. The fact that large foreign mobile operators have invested in the country and taken risks and been trailblazers has gotten the attention of policy makers.

Of course, there's plenty of improvement possible as it is not an easy task due to the institutional environments that can differ between countries. There has to be a lot of effort put into the design of specific policies and regulatory regimes that will work in each environment.

Do you believe that mobile operators are treated the same way as fixed operators by regulators and governments?

In general, regulators have struggled to create a more level playing field for operators. For instance, the growth and phenomenon of mobile communications was not expected and that has created in some places a degree of panic, where survival of the incumbent operator has become a significant concern for policy makers and regulators have had to balance divergent interests.

What other steps could be taken to increase the growth and affordability of mobile communications in the region?

As mentioned, it is imperative that the regulatory function is at arms length from the policy function, as in many countries the government is still the owner of the incumbent operator. Technology neutrality is also important. Universal Service Policy is clearly one area that could be improved with respect to technology neutrality. The other is spectrum management. Spectrum in these countries was not managed to encourage wireless investment and the introduction of new approaches to spectrum management has been slow, but the situation is improving.

Section 6 The Impact of Moving Towards Best Practice

Is mobile technology critical to bridging the 'digital divide'?

Certainly the bulk of communications investment has been in mobile. It would be the technology of choice in many non-dense areas simply because of its economics. It is clear it has already played a large role in Africa both in terms of users and coverage. It has the potential to play an even larger role. It is simply a matter of providing a level playing field and leaving the technology decision to the operators themselves. It is clear that mobile and wireless technologies have already played, and are bound to play, a very large role in bridging the digital divide.

But a word of caution here: when we talk about fixed versus mobile we are really talking about access technologies; backbones are fixed networks, whether wireless or wireline. Let us keep in mind that the deployment of mobile access networks depends on the availability or deployment of fixed backbone networks. In Sub-Saharan Africa, we should talk about an "access divide" or an "infrastructure divide", not a "digital divide". Once the access divide is addressed there is no digital divide: experience has shown that when access to ICT is available there is no lack of capacity to use that access for economic and social advancement. In this sense, the notion of a digital divide is misleading.



Mostafa Terrab
Program Manager
infoDev





Recommendations & Conclusions



Section 7 Recommendations & Conclusions

7.1 Conclusions

Our analysis has attempted to identify the extent to which regulatory risk is impacting on the development of the mobile sector in Sub-Saharan Africa. In our view, reducing regulatory risk will significantly improve the investment environment. Operators will be encouraged to invest more and to expand coverage and capacity and this could greatly assist efforts to bridge the digital divide.

To inform this view, we have attempted to quantify the impact that a move to best practice regulation could have. Our analysis suggests that under a best practice regime, investment to date might have been around 25% higher. This would have led to increased network coverage providing access to mobile services for a portion of the population that previously had no telecommunication services. Investment would also have been directed towards increasing capacity in urban areas, investing in longer-lasting equipment, and improving quality of service. This is also likely to have had an effect on penetration in areas of existing coverage. We estimate that a 25% increase in investment could be associated with an increase in penetration in the region of 10 - 20%.

Higher capital costs incurred by operators and resulting from regulatory risk are ultimately borne by consumers in the form of a higher total cost of ownership (TCO). We estimate that the impact of a move to best practice regulation could account for a reduction in TCO of up to 10%. Given the high sensitivity to prices of consumers in developing countries⁶⁶ these effects could increase penetration by in excess of a further 10%. Operators have pointed to a number of ways in which regulators and governments can directly influence the total cost of ownership and thereby play an important role in enabling operators to offer affordable services to consumers. This would further stimulate the development of the sector.

Higher mobile penetration in countries where the existing communication network is weak would unlock significant economic potential and social benefits. *Waverman et al.* estimated that the effect of increasing penetration by ten people for every 100 would be 0.59% higher annual GDP growth.⁶⁷ As networks become established and mobile users become more sophisticated, the potential for growth is greater. There are many examples across Africa of small enterprises using mobile technology to transform their businesses. Furthermore, as we have seen, mobile access offers many intangible social benefits to users and can have a profound impact on people's lives.

We therefore conclude that it is well worth the effort to ensure that the regulatory regime effectively encourages mobile investment as this could significantly influence the extent to which mobile technology can bridge the digital divide.

The following section sets out our recommendations of how this may be best achieved in practice.

7.2 Recommendations

7.2.1 Follow Best Practice Design of the Regulatory Regime

The main elements which constitute a "best-practice" regulatory regime are relatively uncontroversial. Very broadly, these comprise the following:

- A clearly defined regime and policy
- A fully independent regulator
- A regulator composed of experienced staff with relevant expertise
- A regulator with sufficient powers to enforce regulations
- Regulatory due process

⁶⁶Waverman et al find that the own-price elasticity of demand for mobile phones in developing countries is significantly above 1. This means that when price decreases, demand increases more than proportionately. (Waverman, Meschi and Fuss. The Impact of Telecoms on Economic Growth in Developing Countries. The Vodafone Policy Paper Series 2 (2005): 10-23.)

⁶⁷Waverman, Meschi and Fuss. The Impact of Telecoms on Economic Growth in Developing Countries. The Vodafone Policy Paper Series 2 (2005): 10-23.

Section 7 Recommendations & Conclusions

- Transparent decision-making process
- Regulatory policy that encourages fair competition (including liberalised markets)
- Regulatory policy that encourages rural network build-out

In general the countries of Sub-Saharan Africa are moving towards, rather than away from, this model, although in some cases movement is slow.

7.2.2 Evaluate the Economic Impact of Specific Policies

There should be a careful assessment of the costs and benefits of the options available to a regulator in terms of their impact on the market and the achievement of regulatory objectives. This will avoid the risk of inappropriate policies resulting from the “copy and paste” of regulations from other countries.

Understanding the economic impact of regulatory policies will require a strong analytic capability, in particular economics expertise. It may be necessary for capacity-building initiatives to focus on this and in many circumstances the most sensible option may turn out to be a more “hands-off” approach to regulation, at least until regulators have the chance to develop more expertise. This might mean that certain small benefits from extra regulation are forgone, but this may be worthwhile if the potential costs of bad and unpredictable regulation are high.

7.2.3 Focus on Reducing Risk

Regulators must be conscious of the effect of their actions on investment risk. Once this relationship is understood the authority will be able to act in such a way as to maximise mobile coverage and penetration in their country by harnessing the competitive dynamics of the mobile market.

Since the level of risk is a key component to investment decisions, this is where regulators should focus their efforts. In other words, regulators should act in a way that minimises risk, by acting consistently and predictably when making regulatory decisions. For example sudden changes in licence fees may be more damaging than high fees alone because they create uncertainty as to whether there will be further changes in the future. Since risk is already higher for investments in rural areas, where infrastructure is poor and revenues are lower, regulatory risk will have an important influence on whether investment projects go ahead in those areas.

The key way in which regulatory risk is minimised is through adherence to consistent policies with full consultation and due process for operators. This allows the regulator to develop a reputation for clarity and consistency which investors can rely on. Even if individual policies do not always suit individual competitors/technologies often the process is as important as the outcome for investors. Departing from good practice to try and attract investment from one particular source, in the long term will only result in creating additional uncertainty and lower investment.

7.2.4 Commit to a Stable and Predictable Environment

Creating a stable and predictable regulatory environment will be a challenge requiring considerable commitment from most regulators. Governments may also have to change their overall policy towards the sector. This may involve short-run revenue sacrifice, but as penetration grows fair tax levels will lead to increasing fiscal returns.



Section 7 Recommendations & Conclusions

Given the potential economic and social benefits of having a strong communication sector, it is also worth governments considering how other ministries can support its growth, as they would for health or education. The most obvious way in which this could be done would be to improve the transport and energy infrastructure as far as possible. Since much investment into the telecommunications sector comes from overseas, the openness of the economy to FDI is also important.

Annex 1: PwC Country Risk Model

What is Country Risk?

Country risk reflects risks inherent to investing in different sovereign territories. It is close to zero for most developed and stable countries, but can be substantially higher in emerging markets. Broadly speaking, it can be attributed to variations in the degree of economic, political, financial and institutional stability in different countries.

Country Risk Adjustments

Many academics agree that country risk has a material impact on Net Present Value (NPV), but disagree about how it is best handled. The standard textbook approach assumes it has already been dealt with by making (downwards) adjustments to cashflows – for factors such as the risk of civil unrest, expropriation, exchange controls and so on – when the cashflows were initially assessed.

In reality, this is rarely the case. Most financial analysts are not country risk experts, and cashflows are usually assembled using straightforward public or management account information without further adjustment.

Financial textbooks are typically silent on this problem, even though the principle of arbitrage states that two opportunities of similar risk should have the same required rate of return, and an exposure to a higher risk macroeconomic, political or institutional environment should therefore be compensated by a premium on invested cash.

The PwC approach handles country risk (where it is clear that adjustments to cashflows have not been made), through adjustments to the discount rate. If such adjustments were not made, the value ascribed to potential overseas investments would be overstated.

Quantification of Country Risk

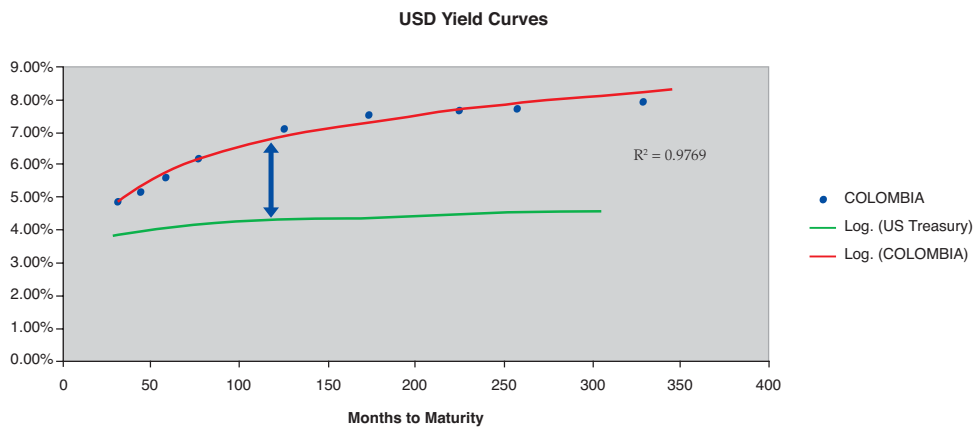
It is possible to quantify country risk premia by measuring the default yield spreads on US dollar-denominated sovereign Eurodollar bonds (issued by various countries) compared with the yields on US Treasury bonds of the equivalent maturity (US Treasury bonds are usually considered “risk-free”). Because both types of bond will pay both principal and interest in US dollars, the cashflow payoffs from both are identical; any premia on the yields on the sovereign bonds (compared with the US Treasuries) can therefore be attributed to the perceived default risk of the sovereign country relative to the US.

These premia are derived directly from market prices. They can therefore be seen as representing a consensus view of the level of country risk.

An in-house PwC model estimates default spreads for over 30 countries where bond information is available, by using logarithmic regressions to fit yield curves so that a statistical term structure model can be derived. By way of illustration, the graph below shows the US Treasury yield curve and a Colombia US dollar yield curve, based on observations in the Eurobond market. The gap between the two represents the default spread associated with Colombia, at different points in time. This varies with duration.



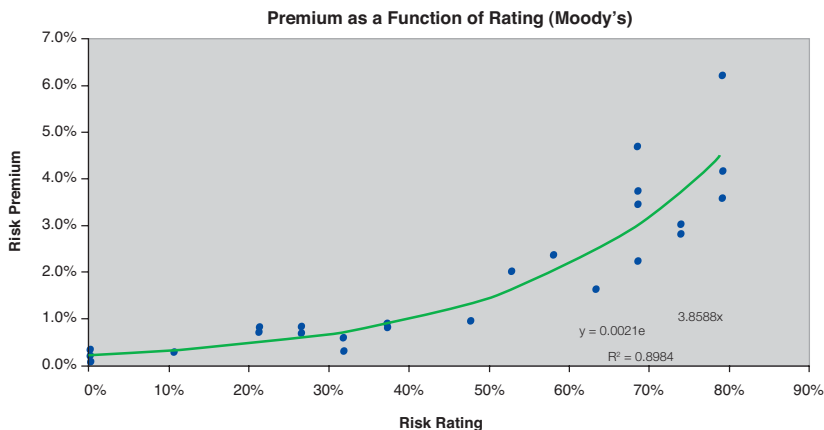
Annex 1: PwC Country Risk Model



From the modelled curves, it is possible to estimate a 10 year Country Risk Premium (CRP) of 2.4% for Colombia.

Where sovereign bond information is unavailable, the PwC model calculates an implied premium by looking at credit ratings of the country in question. This relies on country credit ratings from Moody's, S&P, EIU and Euromoney (section four below). The PwC model regresses observed premia for countries where direct bond market information is available against their corresponding credit rating. This derives a predictive statistical model of country risk.

The graph below shows the relationship between observed 10-year default spreads and credit ratings supplied by Moody's. The credit ratings are linearised into percentages to facilitate this process (see section four below).



We use four credit rating agencies to derive four separate predictive models. By a process of residual analysis, we are able to rank them in order of preference. For the fourth quarter in 2004 we continue to use an average of all four credit rating variables as the best predictor for yield spreads in our sample.

For countries where no credit rating is supplied by one or more of the rating agencies, the model uses those that are available. As a consequence, as long as a country has a credit rating supplied by one or more agencies from our sample, it is possible to estimate a country risk premium for that country.

Annex 1: PwC Country Risk Model

Credit Ratings

There are numerous organisations that rate the political, social, institutional and macroeconomic risks faced by particular countries. For example, EIU and Euromoney grade individual countries between 0% and 100%, - where 0% is zero risk and 100% is maximum risk – using a system of factors considered of importance. These include the risk of social unrest, the impact of crime and more economic factors such as debt service as a percentage of GDP.

Moody's and Standard and Poor's also provide credit ratings for sovereign states, reflecting the risk of default on government bonds. These ratings consist of twenty bands ranging from AAA (minimal risk of default) to D (default). For the purpose of our regression analysis, we have linearised these ratings into percentages – where 0% represents no risk of default and 100% represents maximum risk – in order to derive our predictive statistical models.

Sovereign credit ratings are largely determined by the markets' perception of country risk. The ratings are therefore intended to be forward-looking, assessing the prospects of different countries in relation to their future ability to repay debt.

Calculation Methodology

The country risk adjustment is usually made through the discount rate, as calculated by the Capital Asset Pricing Model (CAPM). The country risk adjustment is an addition to the risk-free rate in calculating both the cost of equity and the cost of debt. The formulae (in percentage terms) for discounting currency converted cashflows is as follows:

1. $Ke = [(1 + Rf) * (1 + CRP) - 1] + (\beta * EMRP)$
2. $Kd = [(1 + Rf) * (1 + CRP) - 1 + DM] * (1 - T)$
3. $WACC = [Ke * (1 - (d/(d+e)))] + [Kd * (d/(d+e))]$

Where :

Ke	= Cost of Equity
Rf	= Risk free rate (proxied by the nominal yield on a long dated base country government bond)
CRP	= Country risk premium for example Colombia with respect to the base country
β	= Beta
EMRP	= Equity market risk premium
Kd	= Cost of Debt
DM	= Corporate debt margin
T	= Marginal rate of corporate taxation

WACC = Weighted average cost of capital

d	= Proportion of debt in total value
e	= Proportion of equity in total value

If converted cashflows are to be discounted then accurate forecasts for future exchange rates should be used to convert the foreign currency into the base currency. In the absence of forecasts, purchasing power parity (the law of one price) can be invoked to adjust exchange rates in line with inflation differentials.

If foreign currency cashflows are to be discounted, then the WACC derived from the calculations above can again be multiplied by the inflation differential between the two countries.



Project Contributors



The GSM Association (GSMA) is the operator-led trade association representing the global mobile industry. Encompassing technical, commercial and public policy initiatives, the GSMA focuses on ensuring wireless services work globally, thereby enhancing the value of mobile services to individual customers and national economies while creating new business opportunities for operators and their suppliers.

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For further information, please contact:

Mark Smith
+44 207 759 2300
press@gsm.org
www.gsmworld.com



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For further information, please contact:

Alastair Macpherson, Partner +44 20 721 34463
alastair.macpherson@uk.pwc.com
Liam Colley, Director, +44 20 780 45316
liam.colley@uk.pwc.com
Michael Hardt, Assistant Director +44 20 780 43112
michael.hardt@uk.pwc.com
www.pwc.com

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GSMA London Office

1st Floor, Mid City Place, 71 High Holborn, London WC1V 6EA, United Kingdom

T +44 (0) 20 7759 2300

GSMA Dublin Office

Block 2, Deansgrange Business Park, Deansgrange, Co. Dublin, Ireland

T +353 (0) 1 289 1800

www.gsmworld.com