Towards an African e-Index 2007
Telecommunications Sector Performance in 16 African countries:
a supply-side analysis of policy outcomes

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Research ICT Africa! (RIA!) fills a strategic gap in the development of a sustainable information society and network knowledge economy by building the ICT policy and regulatory research capacity needed to inform effective ICT governance in Africa. The network was launched with seed funding from the IDRC and seeks to extend its activities through national, regional and continental partnerships.

The establishment of the Research ICT Africa! network emanates from the growing demand for data and analysis necessary for appropriate but visionary policy required to catapult the continent into the information age. Through network development RIA! seeks to build an African knowledge base in support of ICT policy and regulatory design processes, and monitor and review policy and regulatory developments on the continent.

The research arising from a public interest agenda is made available in the public domain and individuals and entities from the public and private sectors and civil society are encouraged to use it for teaching, further research or to enable them to participate more effectively in national, regional and global ICT policy formulation and governance.

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Executive Summary

Introduction

The excitement about the extension of telecommunications networks and services in countries across the continent over the last few years, particularly in the area of mobile telephony, should be tempered by the fact that these have not been optimal. While gains have clearly been made this review of the telecommunications sector performance across 16 African countries suggests that national policy objectives of pervasive and affordable ICT services are often undermined by many countries’ own policies and practices, market structures and institutional arrangements. While Africa may have the highest growth rate in mobile telephony, this is off a very low base. Large numbers of people still do not have permanent access to basic telephony. The enhanced ICT services required for effective participation in the economy and society continue to elude the vast majority of the continent’s people. Retail and wholesale prices across the continent continue to inhibit the deployment of services and their usage by consumers. Institutional arrangements that constrain the autonomy of regulatory agencies fail to create certainty and stability. Together with the lack of capacity in regulatory agencies to regulate effectively, this has created, in most countries surveyed, telecommunications environments not conducive to the investment necessary for network extension and the competition needed to drive down prices and extend services.

While regional organisations such as CRASA, ARICEA and WATRA continue to address some of these issues and struggle to harmonise their regulatory frameworks and integrate their markets, market-led initiatives made gains in these areas. Termination of roaming charges in East Africa initially by Celtel, but subsequently by the three other operators in the region compelled to follow suit, enables mobile users travelling through these countries to make calls and send SMS at local rates and top up their airtime. This is likely to produce a range of positive multipliers, particularly with regard to trade in the region. This market respon-
siveness counters a range of constraining national and sectoral policies of countries in the region, that have contributed to high prices, such as retrogressive taxes on mobile equipment and services, ineffectually regulated prices and failure to constrain incumbent dominance.

This sector performance review of the telecommunications across 16 African countries is part of a multi-pronged research strategy undertaken by Research ICT Africa!, a continent-wide ICT policy and regulation research network. The purpose is to reveal the linkages between policy, legal and regulatory frameworks, the arising market structures and their impact on consumers and users of communications. This supply-side review of the sector draws on previous demand-side surveys conducted by the network that have identified different layers of indicators to assess policy outcomes at the individual and household level, at the enterprise level in relation to small and medium enterprises and at various levels of government. The results of the 16 African country household survey of individual and household access and usage will be available in 2008. By conducting alternatively supply- and demand-side research into ICT access and usage, the network has incrementally provided a rich picture of the alignment or misalignment of sector outcomes with national policy objectives on the continent.

This report starts by looking at African trends in investment and competition and argues that a new scramble for Africa has started. This time round the focus is not only on resources but on Africa as a profitable market. This has resulted in investment in the market by mobile operators at the expense of fixed-line investment and network extension. This move to wireless services is also based on the changing value chain within the telecoms market. With the global trend towards the integration of voice and data services, broadcasting and telecommunications, and fixed and mobile services, with a single integrated receiver and number that allows the subscriber to move seamlessly between networks, a range of new service and service bundling opportunities have emerged. However, the gap between countries enjoying access to these innovative new services and their availability on the continent is likely to become ever wider under the current policy and regulatory constraints that exist in most of the 16 African countries reviewed for this study. Despite the telecommunications reform frameworks in many countries aligning themselves with global strategies, which increasingly deploy market mechanisms to achieve policy goals of improved affordability and access to an increasingly wider range of services, in practice most markets are still structured around vertically integrated incumbents and as a result are not very competitive. This is reflected in the analyses by the authors of the country reports on which this survey is based and particularly in the Telecommunications Regulatory Environment survey. The survey attempts to measure perceptions of all stakeholders of the key regulatory processes in each country. It is remarkable that only two countries,
Nigeria and Côte d’Ivoire with some qualifications, score a positive result out of those that are surveyed.

The results of the regulatory perception survey point to the massive challenge that all regulatory agencies face in the establishment and resourcing of autonomous agencies needed to build effective competition in markets, and particularly now in moving from traditional to competition regulation in an increasing converging environment.

The report then provides a unique review of various pricing regimes across the continent, focusing primarily on retail fixed and mobile services. There appears to be no correlation between economies of scale and pricing, population density, GDP per capita or ARPU's. One can assume therefore that prices remain substantially above cost. This also highlights the complex task facing attempts by regulatory agencies to regulate prices with the asymmetries of information that exist between them and not only the traditional incumbent but new, and often far more resourced, foreign operators.

For the first time an initial review of leased lines pricing is provided. With few cases of competition in this area this information has been historically impossible to come by and this continues to be the case in most countries. From the few countries where sufficient information could be obtained to apply the OECD methodology to assess leased-line pricing, the prices were exponentially higher than OECD country medians or even poor OECD performers.

The higher growth potential and lower incremental investment costs of mobile compared to fixed infrastructure, and increased opportunities to compete with often inefficient incumbents, have attracted private-sector investors. As a result, mobile is the main means of voice communication in Africa today. It is estimated that there is still significant untapped mobile market potential in Africa, driven by slowly growing or stagnant fixed-line network roll-outs. Forecasters expect mobile penetration on the African continent to reach 20% by 2010, from around 9% today (fixed line 3%), illustrating the potentially continued strong growth in the mobile sector in developing countries. As mobile operators have become the new incumbents and state-owned fixed operators struggle to raise public or private investment in order to extend and modernise their networks, important questions for policy and regulation are raised. The high cost of services, together with the fact that most receivers are not GPRS or 3G compatible, means that while more and more people are indeed gaining access to voice services they continue to be marginalised from the enhanced ICT services regarded increasingly as basic services in the more connected economies.

1 ITU, 2004
Broadband access across sub-Saharan Africa is still nascent, with only South Africa showing any significant take-up of ADSL and mobile HSDPA services, but with ADSL offerings emerging in Nigeria and Côte d’Ivoire.

Internet penetration is uneven across the continent, though public access appears to be more pervasive in West and East Africa, most particularly Nigeria, Tanzania and Kenya. With the low home PC penetration rates across the continent, private access remains very limited, very expensive and way below the critical mass required for it to impact significantly on the economy and society. From the demand-side surveys conducted by RIA! we are aware that in the sub-Saharan Africa region the primary point of access to the Internet for many people is at work or school. This is certainly the case for Botswana, Namibia, South Africa, Zambia and Ethiopia.

One of the reasons for the high cost of Internet services on the continent is the exceptionally high cost of international bandwidth. This is largely as a result of the monopoly on international gateways held by the incumbent in many countries and their dependence on the SAT-3 cable. Membership of the consortium that operates the undersea cable endorses national exclusivity for their members and restricts even intra-club competition in the provision of bandwidth. Even where there is international gateway competition, competitors are still compelled in the absence of other options to link to SAT-3. These monopolistic practices have negatively impacted not only on the development of the ICT sector, but also, since it is a major input cost of business, on the national economies.

Several other cable initiatives have developed, primarily focusing on the unserved East African seaboard in response to this situation over the years. The most promising at one stage appeared to be the EASSY cable, an initiative that brought together a range of incumbent, private and for the first time non-profit interests. Fearing another club consortium in which they would have no say, African governments, led by South Africa, intervened in the consortium effectively scuttling it in that form. Without resolution on the EASSY cable, governments have instead turned their effort to creating a massive multi terrabit US$2 billion Nepad cable network that would circumnavigate the entire continent and connect land-locked countries.

While any intervention that would lower the high cost of international bandwidth on the continent must be welcomed, the ramifications for competitiveness and the efficient allocation of resources by the market need to be considered. Rather than acknowledging the poor bandwidth situation on the continent being the outcome of past policies of protectionism, governments have explained their need to invest in the network due to the lack of interest by the private sector in infrastructure investment in Africa or alternatively the negative perception of the SAT-3 club...
consortium. The decision at the recent Meeting of African Ministers in Rwanda that no cables that were not predominantly locally owned would be permitted to land in future on the continent also does not bode well for inducing lower prices through competitive supply of services. How these new regional and continental networks complement or contradict current national market strategies adopted across the continent is unclear. The relationship of such a multiple state-owned network, as the proposed NEPAD cable, to the uneven and unrooted regulation of the sector that characterises the continent, is also not clear. Until this is clarified it will remain unclear how prices will be determined to ensure they meet the public interest objectives that state intervention has apparently championed.
Background

Across the African continent information communication technologies (ICT) continue to be hailed as the drivers of economic growth and development. But despite the success of mobile communications in the last decade, there is limited and uneven evidence of its contribution to growth and development, with one of the reasons being that the necessary reform of telecommunications markets essential to the development and incorporation of ICTs into the economy has had mixed outcomes. The reason for this, in some countries, is that despite rhetorical and sometimes even legal commitments to securing the development of the sector through private sector participation, the introduction of competition has been limited and many markets have not been fundamentally restructured to realise the positive outcomes associated with competitive markets for consumers and users. At the extreme end, Africa has some countries that have not embraced any reform in the telecommunications sector, where limited services are provided through a state monopoly, such as Ethiopia. The outcome of this is reflected in Ethiopia’s very poor showing on the comparative penetration indicators below. Of course the role of markets to deliver on developmental goals in addition to economic growth has been tempered by an acceptance that, especially in developing countries, markets are highly imperfect and therefore unlikely to allocate resources optimally. Across the globe, even in mature markets, governments or their specialised agencies are regulating markets to ensure competitiveness and delivery. While the private sector continues to be recognised as the key driver of economic growth, effective regulation is acknowledged as necessary, not only to ensure fair competition and economic efficiency, but also to respond to market failure and to address issues of equity and inclusion. In most African countries this vital element of the reform model is lacking, denying countries the effective regulation that has enabled the opening up of markets in other parts of the world.

The linkages between new technologies and policies, markets and regulation, on the one hand, and penetration on the other, have been the focus of theoretical debates for more than two decades. However, endeavours to empirically assess these relationships have been more recent. In mature economies such as those within the OECD, and within agencies such as the ITU, supply-side measurements have been done for some time but these do not supply all the evidence required to understand such relationships. Increasingly, and particularly since the placing of the digital divide on the global agenda and particularly the millennium goals following the G8 meeting in Okinawa in 2000, greater efforts have been focused not only on developing more appropriate indicators for measuring the supply side, but also on more comprehensively surveying of the demand side. That a research gap existed between the national or har-
monised regional policy objectives for the telecommunications sector and policy outcomes became apparent in various research centres across the globe at the turn of the millennium. LIRNE.NET, a collaborative network comprising the Danish Technical University, Technical University of Delft, the Witwatersrand University LINK Centre, the London School of Economics and LIRNEasia was one such centre. It developed research that sought to assess the impact policy and regulatory frameworks were having on sector development – the Sector Performance Review. This methodology has been adapted and developed and informs the review of telecommunications policy and regulation undertaken in 16 African countries during 2006.

This study builds on the first 2004 RIA! ICT Sector Performance in Africa: A Review of Seven African Countries. The initial research arose out of the need, not only to fill some of the data gaps that existed on the continent in relation to ICT indicators, but more specifically to assess the regulatory impact and policy outcomes of telecommunications reform against actual sector performance. What it demonstrated was that across the continent, even where there was overall sector growth, the primary national policy objective of delivering affordable telecommunications access was not being met. Despite the relatively high cost of mobile services, they were more responsive to the pent-up demand for voice telephony, especially following the introduction of flexible pre-paid services. However, it was clear that large numbers of people on the continent remained unconnected and that while mobile was addressing the gap between those who had voice services and those who did not, relatively few Africans were able to affordably access the Internet and other enhanced services necessary for effective participation as a citizen and consumer.

To understand how Africans are using ICT services, the supply-side analysis was followed by a demand-side survey of ICT access and usage by over 70,000 individuals in nearly 15,000 households across ten African countries during 2004. The data was collected from rural, urban and metropolitan areas providing the first disaggregated ICT data in the public domain. The disaggregated data included gender, age, education and limited household income data. The survey was supplemented by focus group studies in five representative countries out of the original ten. A rich picture emerged of ICT access and usage and the reasons for people’s marginalisation from services (see www.researchICTafrica.net). While large numbers of the people continue to be excluded from access to services, others are excluded by the cost of services and, as services become more complex, by the absence of the necessary skills. While expanding mobile services improved access to voice services, the surveys revealed a multiple communication strategy where individuals used different services, fixed and mobile, public and private, according to available resources. For example, people with mobile phones often make use of public pay phones, if they are available, because low denomina-
tion calls can be made rather than a bulk purchase of airtime. The Internet was of limited use in this communications strategy mainly due to perceptions of its unreliability due to poor network quality, or limited bandwidth and high costs, or the people communicated with did not use the Internet.

With an understanding of individual and household access and usage, the next obvious gap in understanding the ICT market was around business usage. By the time the household survey was being completed, the WSIS Geneva Plan of Action item on Measuring the Information Society led by the ITU and UNCTAD had got under way and identified an internationally agreed set of universal indicators via a set of surveys. The first was the individual and household survey, the second was an enterprise survey. RIA! decided, due to limited resources and because of the significance of SMEs in economic growth strategies for developing countries in particular, that an access and usage survey of ICTs by SMEs only, rather than all enterprise segments, would be undertaken. Due to the absence of national SME registers in most countries, a non-representative sample of SMEs from a range of sectors was surveyed during 2005, demonstrating widespread use of mobile phones in particular and raising a range of significant policy questions around supportive SME policies and the importance of banking and business cellphone applications.

As the public sector in many African countries constitutes the single largest user of ICTs, the obvious next step was to assess ICT access and usage by the public sector. The intention here was not to review government delivery using ICTs or to conduct e-readiness surveys but to understand the scale and scope of ICT usage and the costs charged to government. However, as indicated in the OECD Working Party on Indicators for the Information Society in its assessment of measurement challenges for e-government, relatively few OECD countries have attempted to measure e-government via a survey of government organisations. The difficulties of comparability across very different forms of government with regard to definitions, scope, intensity of activities and other heterogeneous aspects of governments make multi-country studies unlikely to be meaningful.

In recognition of the statistical difficulties, other more experienced entities such as the OECD, have adopted a demand-side approach to e-government measurement through their household and business surveys. Recognising this development, RIA! will add a limited government usage component to its 2007 household and 2008 enterprise surveys.

In the interim, it was felt such a significant portion of the ICT market should be gauged at least from a supply side point of view. However, the absence of information on state ICT assets and service usage and reluctance to part with it has made determining the extent of government
usage almost impossible. In the country reports informing the comparative analysis, government ICT usage is variously quantified and assessed.

The purpose of this layered indicator research is to empirically reveal the linkages between policy, legal and regulatory frameworks, the arising market structures and consumers and users, and indeed those marginalised from communication services, in order to better understand how telecommunications and ICTs more generally can contribute to economic growth and development, employment creation, poverty alleviation and social inclusion.
Methodology

The methodology for this ICT sector performance review draws on the now quite common theoretical approach to understanding market performance in terms of the impact of market structure on players’ conduct.

FIGURE 1: SPR COMPONENTS

The sector performance review involves the collection and analysis of national economic indicators and supply-side data from existing national census data, ITU Indicator Reports, annual reports of operators and regulators and other sources of information that may exist. National data such as GDP per capita and historical sector developments such as time to market for new services powerfully impact on take-up, and the recording of significant national data will be important in analysing each country case study. These are used to contextualise sector delivery against the primary national policy objectives of the sector including access to services, affordability of services, competitiveness and any significant indicators specific to the country. The outcomes of the policy and regulatory framework are determined by the following sector indicators:

Retail services: Accessibility and cost of fixed, mobile and Internet services – both public and private;

Wholesale services: Interconnection, facilities leasing (including international bandwidth) and leased lines.

These outcomes are tracked against the institutional arrangements and market design of the sector arising from the policy and legal frameworks and the policy and regulatory developments or absence thereof in different countries in order to identify enabling and constraining aspects.
African trends

At the continental level, the ICT sector is characterised by increasingly high levels of uneven integration in the global economy, with some areas providing valuable nodal points to an international communications backbone while others remain marginalised from participation in the network economy. The diagram below gives some idea of the number of countries in sub-Saharan Africa that do not have access to the international backbone. The dotted line represents the proposed EASSY cable covering East Africa – these points are not currently operational.

FIGURE 2: PROPOSED AND CURRENT UNDERSEA CABLES

The degree to which national and even smaller units such as metropolitan networks connect to the global network, and the cost at which this occurs, are key determinants of global competitiveness and, in an increasingly globalised world, also determinants of a country’s ability to deliver on its own developmental objectives.

The creation of policy and institutional frameworks that enable the deployment of new cost-effective, sometimes rapidly-deployable technologies, and encourage investment in the relatively large, long-term investments associated with critical network extension in developing countries, are a necessary condition of successful global inclusion. This section looks at several trends within the African continent that should inform national strategies.
Investment Trends

Data on investment in the African continent is scarce. The global ICT sector has recovered from the after-effects of the bursting of the dot.com bubble in 2000/2001. That period resulted in a dramatic decline in investment, particularly in the telecommunications sector, and followed a spike in telecommunication companies’ defaults in 2001 and 2002. The effects of the decline did not impact as dramatically on Africa because investment in Africa, as a percentage of global investment, is minuscule. In Africa the trend is towards increased investment, particularly in the mobile sector, though data is limited. The data which does exist is for selected countries only. ICT spending figures from the OECD show that South Africa, for example, had a compound annual growth in ICT spending of around 17% between 2000 and 2005.

Overall, there is a significant interest in network investment across the region, particularly following the realisation of the implications of broadband networks for social and economic development. Recent initiatives by Ethiopia, Kenya, Rwanda, Tanzania and Uganda in extending national backbone and putting a broadband plan in place points to the public commitment to invest in the telecommunication sector to achieve wider economic and social benefits associated with high speed broadband access.

FIGURE 3: SPENDING GROWTH

Investment in mobile in Africa has shown a spike over the last few years, as mobile companies have been looking for acquisitions in regions across the globe still with greenfield opportunities. Some examples of the levels of investment on the continent are:
Vodafone’s purchase of Venfin for R16 billion translates to US$924 per subscriber per year against an average ARPU (Vodacom) of US$178; MTC’s purchase of Celtel International for US$3.4 billion translates to $680 per subscriber; MTN’s purchase of Investcom for US$5.5 billion translates into roughly US$1000 per subscriber against a current average ARPU of US$219.

Mobile operators, particularly South African companies with large domestic profits, are expanding as rapidly as they can to capture as much of the markets as possible. Value-laden acquisitions are becoming increasingly scarce, as Telkom South Africa’s continued fruitless search for new acquisitions bears witness. Vodacom South Africa was freed from its contractual agreement not to expand into countries where Vodafone is operating, but has yet to conclude a major acquisition outside of greenfield investments.

The rush for subscribers is also translating into massive capital expenditure into countries that have little or no telecommunications infrastructure.

The focus is, for the first time, outside of South Africa. For example, West Africa now attracts 51% of MTN’s total capital expenditure, compared to 32% for Southern Africa. Similarly, Vodacom has seen a 132.3% increase in its capital expenditure outside of South Africa. As the figure above illustrates, South Africa is, in comparison to markets such as Nigeria, a mature market and attracting significantly less capital expenditure.

COMPETITION
Globally, trends towards increased liberalisation over the last decade have been associated not only with declining state involvement in the ICT sector, particularly through privatisation of state-owned entities, but also by their market share dilution through the entry of new players. In OECD countries, the trend has seen a continued reduction in state involvement and increasing competition. Countries such as Australia and France, that had laws requiring the state to maintain majority ownership of their incumbent fixed-line operator, have now rescinded these laws and have made it clear that they are willing to reduce state ownership to below 50% and in certain cases have made commitments to privatise completely (OECD, 2005: 35). The trend has been increasingly to open up the telecommunications sector to competition, with the increased provision of ICT services by the private sector. This has entailed the opening up of both network and services-based competition. Africa has followed the international trend towards increased competition but mainly in the mobile space. Fixed-line competition remains problematic, with little interest in privatisations of

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3 Sutherland, 2006
4 MTN Annual Report, 2006
5 Telkom Annual Report, 2007
6 OECD Communications Outlook 2005
incumbents with diminished fixed lines or new entrant opportunities in the fixed-line market.

The fixed-line markets’ continued demise is given greater weight by the decision by mobile operators to invest in backhaul infrastructure, mainly because of the lack of any investment by the fixed-line incumbent. For example, this has meant further revenue loss by the incumbent Tanzanian Telecommunications Company Limited (TTCL) to the extent that its survival is now under question.

In the absence of interest in this market several countries have turned to securing public investment in network extension or even setting up new state owned entities. In Uganda the government has entered into a partnership with the Chinese government to provide a national backbone for the country on a 20 year payback scheme with a five year grace period. The monopoly operator in Ethiopia has also entered into a multi-million vendor financing agreement with the Chinese companies (Huawei and ZTE) to roll out the needed infrastructure. Without much reference to the applicable policy and legal framework for the communications sector in South Africa the Department of Public Enterprises has financed the establishment of a broadband operating company from the communications networks of the power company and the national transport company, that were to have been incorporated into the second network operator, Neotel, to affordably meet the broadband needs of the country in the face of high incumbent prices’.

FIGURE 4: TRENDS IN MOBILE COMPETITION

Source: ITU World Telecommunications Indicators 2006

REGULATORY TRENDS
Tariffs, customer service, consumer choice and curbing monopoly power are some of the primary issues driving sector regulation in developed economies. But, for developing economies, critical infrastructure shortages, low-income profiles, skills scarcity, inability to attract investment, generally poorly-run state operations and the lack of competitive market conditions remain critical issues requiring policy and regulatory intervention. The size and value of markets often limit competitive market entry, even where there are few policy constraints inhibiting the role of competitive market forces. With a few dominant players in many markets, often with cross-holdings by the state, effective regulation is needed most where institutional arrangements and incapacity have often most hindered it, resulting in poor enforcement of public service commitments, restricted access and high prices.

The regulatory maturity varied considerably across the countries that were surveyed, with Botswana, Kenya, Nigeria, South Africa, Tanzania and Uganda maintaining a staffed and relatively skilled regulator compared with the other countries. However, it was evident that relative regulatory maturity alone was not sufficient for improved access or reduced pricing, although the trend indicates the more legitimate the regulator, the better the network expansion.

CONVERGED SERVICES
The global trend is for infrastructure providers to offer converged, network independent services. For example, within the OECD area, some 55% of ICT infrastructure providers provide triple play (voice, data and video). Nearly 90% of ICT infrastructure firms provide double play (voice and data)*. As voice revenues decline, so firms are moving towards alternative offerings to sustain growth. In the OECD, the trend is for cable firms to offer triple play, and for telecommunications firms to lag behind.

Cable and fibre providers are more likely to offer triple-play services than other ADSL providers. Nearly 66% of the 29 cable networks examined in the OECD offered triple-play services. In contrast, only 44% of the 50 surveyed telecommunications networks have triple-play offers. Of the eight fibre-optic providers, seven (88%) had multiple-play offers (OECD, 2006: 6).

The OECD sees the delivery of multiple play as a two-stage process. The first stage is offering multiple play over a particular infrastructure. In the OECD area, this started over fibre and cable and moved onto ADSL, but in Africa this is more likely to take place over wireless technology, given the existence of some competition in this sector as compared to fixed line. The second phase is for multiple play over any network – the so-called ‘Next Generation Network (NGN)’. In phase two, it does not matter what the underlying infrastructure is, as long as it is IP-enabled. While the move towards triple play has already occurred in the OECD

* OECD, 2006. *Multiple play: pricing and policy trends*
area, it is becoming increasingly common to offer quadruple play which consists of data, voice, video and mobile, all in one package. This has fundamentally changed the traditional communications value chain.

Since Africa does not have cable, the driver of triple play will have to come from somewhere else. At this stage, the only driver for converged services will be the mobile operators, particularly multi-national operators such as Vodafone. In its latest strategy release, Vodafone argues that emerging markets have strong growth potential. In relatively mature African markets, such as Egypt and South Africa, growth will have to come from data revenues and not just voice. At least, double play should become a key driver of growth. Other markets are likely to lag behind. Nonetheless, with increasing rollout of fibre network and broadband wireless technologies, Africa might achieve so called ‘1.5’ play combining fibre, mobile and fixed broadband wireless technologies. However, the extent to which fibre becomes a key convergence infrastructure depends on the speed at which proposed national backbone projects and regional submarine cables such as EASSy, Seacom or Nepad are rolled out and the enabling environments that will be put in place to advance the deployment of wireless technologies such as WiMax.

**Changing Value Chain**

The impact of converged services can best be illustrated by comparing the traditional vertically integrated value chain to the integrated value chain characteristic of converged services, which follows a much more horizontal framework. Traditionally, in the vertically integrated value chain, value was added to the fundamental transmission functions of the infrastructure through the layer of network services that makes possible the routing of calls and management of traffic. With the technological revolution of the 1980s, another value-added layer was incorporated into the chain, known quite literally as the Value Added Network Services (VANS), which provided applications to access or manage data and information services in addition to basic voice. In broadcasting, this included text services to complement and substitute the audio-visual information services. These limited TV text services have almost entirely given way to enhanced IP-based data services. With the rise of the Internet, content provision extended from electronic broadcasting content and simple data services to a wide range of customised content offered across traditionally distinct platforms.

Even with the introduction of competition in the services sector, the market continued to be structured around a vertically-integrated incumbent, often the exclusive provider of facilities to, and competing in, the liberalised market segments.

With the trend towards the integration of voice and data services, broadcasting and telecommunications, and fixed and mobile services, with a
single integrated receiver and number that allow the subscriber to move seamlessly between networks, a range of new service and service bundling opportunities has emerged.

Through dynamic developments in the unregulated IT services sector, combined with the liberalisation of communications infrastructure and services, a complex and integrated value chain has supplanted the classically linear value chain. The services still originate from the infrastructure but the infrastructure can be composed of multiple and distinct networks that seamlessly integrate to create a modern information backbone.

Most recently, the emergence of uniform Internet Protocol (IP) standards has fuelled the demand for IT and telecoms services. While digitisation allowed for the convergence of broadcasting and telecommunications services through reduction of data into bits that could be carried across any platform, it is through new IP-based networks that seamless communication across integrated networks can be realised. Such networks are generally referred to as Next Generation Networks (NGNs) and allow for lower-cost IP-based services, such as Voice over IP (VoIP) and IP Television (IPTV), to be transmitted over single platforms. These developments require that any value-chain analysis of operators, services or ICT companies be dynamic, flexible and open-ended.

A major implication arising from these trends is the huge increase in available capacity, historically a scarce resource. This effectively means that the marginal cost of the network capacity that is required to provide carriage services is insignificant and may even be approaching zero. Network infrastructure is increasingly being characterised as a fixed cost. The implication of these trends for the global telecoms industry is that networked business models will increasingly be based on services supplied. In conjunction with the changing dynamics of the telecoms industry, the role of regulation has extended from concentrating on consumer disputes, universal service issues and price-setting to a much broader role of regulating the sector to enable competition.

However, the commoditisation of bandwidth has yet to be felt in Africa. In the US and Europe, bandwidth competes solely on price – in other words, there are no other differentiating features. Africa has too little infrastructure for bandwidth to be commoditised, but developments in East Africa (building of an undersea cable on the eastern seaboard) and in Southern Africa (Infraco), together with the proposed mammoth NEPAD fibre network might change this in the medium term. Once commoditisation of infrastructure begins to occur in Africa then the role of regulation will change, following the experiences of the US and Europe.
African e-Index

African countries have by and large not been very engaged in debates around enabling NGNs, which have been raging over the last few years at international fora such as the ITU. Policymakers, and regulators often argue that they have not yet established effective frameworks for current generation networks and access to them cannot be burdened by the demands of new IP-based networks and services. However, the key driver behind the low take-up of NGNs is their inherent efficiency and therefore lower costs. In fact the greatest resistance to moving to NGNs has been incumbents with highly developed legacy networks. Countries with very little infrastructure would do well to explore the possibilities of establishing virgin NGNs to cost effectively deliver seamless IP based services. This is resulting in countries that wish to embrace NGNs to shift from traditional infrastructure and service-dominated market definitions to service that allows for service-neutral licences that will encourage entry into the markets.

REGIONAL DEVELOPMENTS
Commercial regional initiatives such as the initial EASSY cable project to bring undersea cable to the underserviced eastern seaboard and the decision by operators to scrap roaming charges in East Africa have probably had more impact on the regional than the ongoing efforts of formal regional bodies to harmonise telecommunications regulation and integrate markets. The cable project is discussed in detail below but the initial intention to move swiftly on its implementation by the consortium consisting of a range of public, private and civil society bodies was stalled when governments intervened to ensure the negative outcomes of SAT-3’s club consortium were not repeated.

Other regional developments have had a more obviously positive spinoff, most notably the scrapping of roaming charges in East Africa by three mobile operators in Kenya, Uganda and Tanzania following the lead of regional operator Celtel. The agreement between Safaricom, which operates in Kenya, MTN Uganda, and Vodacom in Tanzania has allowed 10 million subscribers in East Africa to make calls and send messages at local rates. Pre-paid subscribers can also top up their airtime in any of the three countries.9

These positive gains in the region have been countered by increasing interest by governments in the region to tax further mobile equipment and services, the latest being the government of Rwanda. East African mobile operators lose a third of their revenues to governments by way of taxes and other government tariffs, according to a recent study by Deloitte10, and blame these taxes for the high cost of mobile services in the region. The study argued that if Rwanda, for example, goes on to impose the proposed 10% excise tax on mobile telephones, it would have the second highest tax rate in Africa, behind Uganda, which as this com-

9 See Sapa AFP report in Business in Africa for fuller account
https://www.businessinafrica.net/news/africa/604469.htm
10 See Pambazuka News, Reform Taxation Laws on Telecommunications.

26 2007 Telecommunications Sector Performance Review
parative sector performance review demonstrates, has amongst the highest tariffs for mobile services of all the countries surveyed.

While some countries are seeking to emulate the punitive tax regime of East Africa, most notably Namibia and Rwanda, other regions have not followed the initiative taken by Celtel that catalysed the scrapping of roaming charges in the East Africa region. This is perhaps due to the failure of a single regional operator in other regions of the continent, and the vested interest mobile operators currently have in extracting monopoly rents from each others’ customers through roaming charges.

The West African Telecommunications Regulatory Association (WATRA), the youngest of the regional associations, which serves both Anglo- and Franco-phone countries in the region, continues to struggle to integrate the region at a policy and regulatory level. While East Africa has seen the benefits of lifting roaming charges, WATRA and the regional economic bloc ECOWAS were encouraging roaming between the 45 networks that operate in the region. This was being punted to operators as a revenue generating opportunity in order to drive interoperability necessary for seamless business across countries. Little consideration appears to have been given to the high costs associated with roaming and the negative impact on business.11

The Communications Regulators’ Association of Southern Africa (CRASA) continues to seek the harmonisation of regulation in the region and has sought to develop licensing guidelines that would enable easier market entry. Unfortunately, there are no catalytic developments or practices that are likely to see greater integration of the region in the near future and despite the rhetoric of competition most markets in the region continue to be constrained by protectionist policies and ineffectual regulation.

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Policy and Regulatory Environment

With the shift from public to private investment in the ICT sector globally, the conditions in the telecommunications sector for investment provide a good indicator of the effectiveness of the policy and regulatory environment and whether countries have filled one of the necessary conditions for the development and expansion of the sector. A policy and regulatory perception analysis draws on the Telecommunication Regulatory Environment (TRE) methodology developed by LIRNEasia (See Samarajiva et al in Mahan and Melody 2004 161-162). This seeks to capture perceptions of efficacy of the regulatory environment by collating the opinion of sector stakeholders. The telecommunications regulatory environment survey seeks to assess not just the regulator but also rates the inputs into regulatory action such as policy.

Telecommunication Regulatory Environment Assessment

The dimensions of the survey are based on the Reference Paper of the General Agreement on Trade and Services (GATS) Fourth Protocol.

These include:
- competitive safeguards (market entry and anti-competitive measures);
- interconnection;
- universal services;
- licensing;
- independent regulator; and
- allocation of scarce resources.

In the LIRNEasia study, tariff regulation was included and universal service taken out, as it was often not the core responsibility of the regulator (it is often still within the Ministry or in a dedicated agency, RIA! has retained universal access because in the developing country context it is so critical to an assessment of the environment and also as this is not an assessment of the regulator per se but of the entire regulatory environment. Categories are, of course, overlapping and universal access for example, should also be considered in relation to the effectiveness of tariff regulation. The relational factors between institutions and outcomes have been considered in each case. Independent regulation was also removed as a dimension as it was regarded as an overall measure.

The period of assessment in such studies is a much debated issue. Too short a period might not accommodate regulatory lags and a longer period might reflect more positive factors that no longer pertain. As the

12 Studies using this method have, subsequent to the Asian studies, been carried out in Chile and Guatemala (see www.regulateonline.org).
SPR and TRE are conducted on a triennial basis, followed by the demand-side household and SME survey, and on the grounds that this may accommodate regulatory and policy implementation lags, the period for this first study is the last three years, which will then be reviewed in three years’ time again.

The questionnaire is very simple and takes only a few minutes to complete and was targeted at CEOs/senior management of operators, heads of industry associations, specialist ICT journalists and heads of ICT NGOs; government representatives concerned with investment; financial sector representatives with ICT sector regulatory knowledge, and regulatory agency senior staff. As with the government survey, extracting this information in a regulated and commercially competitive environment is extremely difficult. In many of the countries surveyed a culture of tolerance of criticism does not exist. Despite undertakings of anonymity, several stakeholders were reluctant to commit their views to paper for fear that their views, especially where there were only a few players in the country, would become apparent to powers that be with the potential to undermine their competitive standing.

As indicated by LIRNEasia while assessment for individual countries should be informative, assessments conducted using uniform methods for several countries have all the benefits associated with comparative analysis. Despite the unevenness of the information gathered, the TRE is presented as an indicator of regulatory perception with the necessary caveats about its representivity.

Using the adjusted WTO Reference Papers criteria as described above the evaluation for each dimension is undertaken on a five-point Likert scale: poor (1); unsatisfactory (2) neutral (3); satisfactory (4); and excellent (5). Each of these dimensions is then weighted according to its assessed importance to the overall assessment.

The interplay between policy and regulation and between the different categories is evident in an assessment of the first category, market entry, which seeks to capture the overall reform concept of markets shifting from monopoly to competitive markets. The market structure in a particular country will be determined by the policy – how many players and what kind are allowed in the market. The regulator can only do what is permitted by the law but the way in which it does this can determine investor confidence. In a perfect market players would be able to enter, and exit, the market freely. In infrastructure industries that has not happened historically due to the assumptions of natural monopoly on at least certain elements of the network. Despite new lower-cost technologies making possible the economic duplication of the network and global trends towards liberalisation of markets, in most countries in Africa
entry into the market has continued to be restricted, sometimes to the incumbent monopolist only.

Most countries on the continent, however, followed the global trend towards liberalisation of their markets, though often the lag in doing so meant the investment appetite was not there, either due to changing global economic conditions, the absorption of capital by earlier liberalising markets, or the very small markets for relatively costly services in low income countries. While all of these factors will be significant on a case-by-case basis, the single common factor that is likely to attract or repel, particularly foreign investment, is regulatory risk. This relates more formally to the validity of the law, the transparency of the administrative process and the assessed regulatory transaction costs, but over time it is also determined by the effectiveness of the regulator in creating a fair competitive environment, specifically with regard to the categories assessed below.

**Market Entry Regulation.**

The starting point for assessing regulatory risk is the process by which new players gain entry into the market. One of the key methods for ensuring fair competition remains the ability to lower barriers-to-entry for new players and fundamental to this is the licensing process.

**FIGURE 5: TRE – Market Entry Regulation**

As can be seen from the countries represented in the perception survey, less than half the countries scored positively and these often do not correlate to positive sector performance. Countries with some of the poorest indicators nevertheless score positively in terms of stakeholder perception. The degree to which this reflects an absence of a culture of criticism of government has to be reflected on by country researchers.
The reasons for the positive perception of Mozambique with regard to market entry are unclear, considering the dominance of the incumbent in the Mozambique market and the limited opportunity for new entrants, though the opening up of the mobile sector long after it had opened up elsewhere on the continent may explain this. Though process was messy and the licence was recently cited as one of many, Vodacom has secured accommodation of senior politicians in its bid (*Mail and Guardian* 2007). The other licence is held by the incumbent. ISPs require licences as in many other countries, though these are granted on request on a non-competitive basis. The high cost of facilities necessary from the incumbent, though, inhibits entry into the market and service offerings are limited to data.

The deregulation of the telecommunications market, which witnessed the licensing of several small operators as a tool for effectively meeting market demands in Nigeria, has been largely successful. The arising regulatory challenge is the management of a complex market consisting of two national carriers, four mobile telephony service providers, 22 fixed telephony operators, 52 VSAT operators, as well as 36 registered Internet service providers.

Sector development in Zambia has been constrained by the inability to privatise Zamtel, who continues to struggle from an absence of investment in network extension and modernisation. The mobile market has been successful with three operators, who have driven down prices while extending their networks, if only along the copper belt and the main cities. Zambia was one of the first countries on the continent to introduce ISPs who are licensed on request and of whom there are now 16, though most of them are located in urban and major urban areas along the railway line.

The positive performance of Zambia with regard to market entry can be attributed to a number of factors. Firstly, the guidelines and licensing structure and procedures in the country are well documented and accessible, thereby enhancing transparency of the licensing process. There is also a detailed eight-stage licensing procedure that is readily available to all persons intending to apply for various licences. The licensing procedure also provides for an appeal mechanism against the decision of the Board of Regulators. Secondly, the current anti-corruption drive in the country has made it increasingly unattractive for public officers to engage in corrupt activities. Corruption is clearly one of the major contributing factors to constraints to market entry, as the normal licensing procedures are flouted with impunity making it difficult for the majority of the people to enter the market using legally laid down procedures. Thirdly, the various licensing fees are comparatively low, albeit there are high fees for the international gateway.

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13 In particular, Part III of the Telecommunications Authority Act Chapter 469 of the Laws of Zambia contains detailed provisions pertaining to licensing.
Côte d’Ivoire has one of the oldest regulators on the continent, ATCI having been established as far back as 1995. This was also in the context of reforming the market, the result of which has been the licensing of two fixed-line operators, seven mobile operators and twelve ISPs. Although well-trained officials with extensive foreign and local training run the regulatory agency, it is still subject to Ministerial intervention and political interference is widely accepted.

Regulation in Benin, on the other hand, remains ensconced in the Ministry of Communications despite ICT policy framework acknowledging the need for a separate agency. The recent arbitrary decision by the Government of Benin to retrospectively increase licence fees, without any apparent sense of the negative impact this has on investor sentiment, suggests a lack of understanding of the critical role of regulation in providing an arms-length, stable and certain investment environment. The only marginally negative perception of the Benin environment for market entry may be explained by the familiarity of things as they have always been in the absence of a very strong reform agenda.

With regard to Cameroon, regulation of market entry is perceived reasonably positively. This may reflect the entrance of MTN into the ISP sector. In 2006, MTN bought one of the country’s major ISPs, GLOBALNET. The move sent shockwaves through the whole sector, to a point where the Minister in charge of the sector was obliged to intervene, allowing MTN to go ahead with the move, authorising the second mobile operator, ORANGE to operate an ISP as well and providing a third mobile licence to the incumbent.

The rest of the countries surveyed are perceived as having an inefficient regulatory environment—highly inefficient in the case of Rwanda, to less inefficient in the case of Ghana. The negative perception in Rwanda relates to the constraints that there have been on market entry and the inefficiency with which recent attempts to introduce competition/privatisation have been handled. Rwanda’s recent decision to consider retrogressive taxes on mobile equipment and services, as in Uganda, has also been negatively received. This decision is clearly not a sectoral one and reflects far more on national government, and impacts directly on cost of services in poor countries and therefore on the business case for investors. Ethiopia’s poor showing appears to result from its continued monopoly in fixed, mobile and Internet services. Recent initiatives to introduce competition in the Internet market did not bear fruit, despite international pressure to liberalise that market segment. It also faces a significant capacity challenge in the allocation of scarce resources.

While Ghana has over the last few years registered some improvements in its licensing processes, after years of mismanagement, the perception of incompetence still lingers.
The inability to attract a strategic equity partner for the privatisation of Telkom Kenya and the preference shown to the incumbent in the regulation of the market (with the head of the regulator being the former head of the incumbent and vice versa), make entry and operation in this market difficult. This has played itself out in the mobile market as well, where Safaricom, the mobile company owned by the incumbent, is dominant.

While Uganda continues to provide leadership in the area of regulation on the continent, it provides a good example of a credible regulator’s hands being tied by the restrictions of the policy environment where, following the original decision to have a duopoly in fixed and mobile, there has been little opening up of the market, with the associated negative impact on market prices that we see in the data.

The perception of the Namibian market reflects the longstanding inertia in the policy and regulatory environment that will hopefully change with the revision of the nine-year long legal reform process for telecommunications. Currently, two ministries are responsible for regulating the telecommunications sector. The Ministry of Works Transport and Communication (MWTC) is responsible for providing policy guidelines and regulating Telecom Namibia and the Ministry of Information and Broadcasting (MIB) is responsible for the Namibian Communications Commission (NCC) and therefore MTC. Another conflict of interest exists due to the fact that MWTC is directly responsible for the Namibia Post and Telecom Holdings (NPTH) which owns 100% of Telecom Namibia and the majority of MTC. International best practice suggests that ownership and regulation should be separated. The proposed draft telecommunications bill addresses both issues by creating a single authority, the Communications Authority of Namibia (CAN), as an independent juristic person responsible for the entire sector. The draft bill suggests that the MIB would be providing the new regulator with policy guidelines. MWTC could still be in operational control of NPTH but it would lose its regulatory power over Telecom Namibia or fixed line telecommunication in general. It makes sense to task MIB with the policy guidance of CAN. However, the continuous delays in getting the bill off the ground create uncertainty and dissatisfaction with the regulator and ministries involved among stakeholders.

Botswana presents quite a different case. It has managed controversial market entry decisions quite effectively. With the advent of telecommunications liberalisation in Africa and globally, the incumbent fixed-line operator was normally a government-owned, sometimes even government-run entity. By opening up the sector for competition the incumbent’s ‘cash cow’ for the fiscus would lose ground to the newer operators. In order to compensate for this loss, the incum-
bent, either on its own or in partnership with other companies, would be given a cellular licence.

It was with this philosophy and practice in place, particularly in Africa (Telkom in South Africa had shares in Vodacom; in Ethiopia the fixed-line operator also owned the fixed-line monopoly and similarly in Namibia), that Botswana begun its transformation process in the telecommunications sector in 1997. Two cellular licences were advertised and awarded. Amongst the applications for these was the French Telecommunication-supported consortium, Vista Cellular (now Orange Botswana, a subsidiary of France Telecom), Mascom Wireless with backing from the Portuguese incumbent, the incumbent Botswana Telecommunications Corporation (BTC) consortium backed by the African telecommunications giant Telkom (South Africa) and others. In the context of what was happening elsewhere in Africa and the developing world, including even the developed world where incumbents always had cellular subsidiaries (France, BT (UK), Germany, etc), the BTC-Telkom team was expected to get one without difficulty. That they lost out was regarded as quite scandalous, since BTC is a national asset that was being stripped of the opportunity to make ‘money for the nation’ and its returns, being owned wholly by the Government of Botswana, were returns accruing to the nation at large.

As a result, it continues to be regarded by international monitors, such as the International Telecommunications Union, as an example of regulatory good practice. However, from a policy point of view, the market has been relatively restricted and the new policy announced last year which includes service neutral licensing should provide for a more flexible market structure.

Negative perceptions of the South African regulatory environment in relation to market entry reflect the constraints on entry and the historical incompetence by both the Ministry and regulator, ICASA, in the licensing of new entrants. The third mobile licensing process was marred by controversy and legal challenges that undermined the confidence of investors in the second fixed network-operator licensing process. The competitor to Telkom was only licensed in late 2005, two years after Telkom’s monopoly came to an end, and only became operational in 2006 with a limited range of services.
SCARCE RESOURCES REGULATION

The management of scarce resources such as spectrum, rights of way and numbering is one of the greatest challenges for African regulators. The positive perception of developments in this area in Nigeria can be attributed to the Nigerian Communications Commission’s successful intervention in the chaotic VSAT market, bringing order to what was highly chaotic exploitation of that spectrum, and the successful auction of the GSM spectrum. The transparency of the latter process was acknowledged even by the losing bidders.

FIGURE 6: TRE – SCARCE RESOURCES REGULATION

Spectrum management is an area in which Côte d’Ivoire is perceived to be weak relative to other areas, where it is scored more positively. This can be attributed to the fact that access to frequencies, considered easy in the beginning of the liberalisation of the sector, is becoming more and more restricted. A major cause of the negative perception in this area is the anti-competitive practices in the VSAT segment. These have resulted in a decrease in the number of stations from 84 to 48 between 2002 and 2004. The rules imposed by ATCI are not always respected and there is a perception that the granting of licences has been corrupt.

As in other areas, the regulator in Ethiopia has remained overly dependent on the parent ministry (the Ministry of Communications and Transport) for its decision with regard to spectrum allocation, which is reflected in the negative perceptions by stakeholders in this area.

The management of scarce resources is viewed in Cameroon as poor. The problem has been exacerbated by the shortage of Internet services in the country for more than two weeks in the third quarter of 2007, due to the failure of a portion of the national fibre optic. In addition, the granting of licences and frequencies is not transparent.
Ghana scores marginally better than Kenya and Namibia and this reflects recent efforts in Ghana to address the issue of spectrum through working closely with the ITU (which provided technical support and training) and following the guidelines under Regulations 126 and 143 of National Communications Regulations L.I. 1719 of 2003. The guidelines stipulate that the applicant should present a feasibility report that clearly illustrates the company profile, engineering design system and technical implementation plan, market and business plans. In South Africa the negative perception around scarce resources reflects the protracted delays to both the spectrum and numbering plans. The regulation of spectrum continues to be tightly controlled, with responsibility for the actual plan vesting with the Ministry, which continues to be the dominant shareholder in the incumbent, who controls large amounts of spectrum. The actual allocation of spectrum is the responsibility of the regulator. There are over 3,321 spectrum licences of various sizes and complexity and the re-publication of the licences in terms of the legislation cost over R11.8 million. Number portability has also presented a mammoth challenge for the regulator and operators in South Africa, with the operators clearly dragging their heels and tying the hands of the regulator:

The regulatory environment is a shambles. From a legislation point of view the EC Act was the right thing to do but years too late. It should have been adopted years ago. But it is the execution of that Act which is where South Africa is tripping up. Customers can build their own VPNs but have to rely on Telkom, who dictates price and therefore access. Now that it is freeing up, ICASA can’t manage the spectrum, eg Winmax. Anywhere in Africa you can get spectrum, but when you come to South Africa there is no spectrum left because it has already been allocated to Telkom, Sentech and the SNO. This means that there is a queue of people trying to get spectrum but to no avail. ICASA needs to clean up the spectrum and provide a competitive environment. This should be contrasted with the Nigerian environment, which opened up the spectrum to anyone. This was chaotic, but it did liberalise the market entirely. Now they are consolidating. In comparison, South Africa is still in the dark ages.

(South African Spectrum User)

14 ICASA Annual Report 2006, Engineering & Technology p. 24
15 ICASA ECA Implementation Strategy Presentation to portfolio Committee on Communications, 20 June 2006
Universal Service Regulation

Universal service is probably the area of greatest disappointment on the continent. Despite political rhetoric on universal access and the hundreds of thousands of donor dollars spent there are few African success stories. While most countries have developed universal access strategies, very often involving a levy on players for the creation of a universal access fund, plans lie unimplemented for years and many countries are sitting on large unspent funds. In South Africa, the Universal Service Agency of South Africa is responsible for universal service. It is marked by a flotilla of failed universal service projects from telecentres to underserviced area licences. With a levy of 0.2% in 2006 it had R22 515 000 (2005: R61 269 00)\(^{16}\) unspent in the fund. The fund, intended to support the extension of networks into underserviced areas and to subsidise needy users, was used to roll out supply driven telecentres and other state initiated projects. Earlier studies\(^ {17}\) done in the heyday of the telecentre initiative found centres are largely dysfunctional with the last RIA! household survey indicating that less than 17% of people had used a telecentre or multi-media purpose community (MMPC) in the last three months.\(^ {18}\)

FIGURE 7: TRE – UNIVERSAL SERVICE REGULATION

The Ethiopian TRE survey showed a slight change with regard to universal access. Survey participants felt recent government investment in the telecommunications sector, with focus on its district-based decentralisation programme where Internet and communication access was expanded to all the 611 districts and over 5 000 villages, has been positive, although the sustainability and impact of these are questionable under a public monopoly environment.

Uganda’s rural access strategy was hailed when it was first introduced in February 2003. The negative perception of the performance in this area may reflect the delays in getting the plan implemented and the

\(^{16}\) Universal Service Agency Annual Report 2006, p.30  
\(^{17}\) See Community at [http://link.wits.ac.za](http://link.wits.ac.za)  
\(^{18}\) Towards an African E-index: South Africa
extent of its impact. It has since launched several initiatives to meet its objectives. The RCDF has partnered with bodies such as the World Bank and International Telecommunications Union (ITU). By the end of 2006, the Fund had supported the roll-out of Internet cafes; 55 ICT training centres; multi-purpose telecentres; payphones; district web portals and Internet Points of Presence. While these efforts are critical to the extension of services to uneconomic areas, the removal of retrogressive taxes on mobile services might go a long way to making at least voice services more affordable and therefore accessible to more of the population.

Nigeria represents the only positive perception of universal access delivery. This is likely to reflect the consultations that went into the establishment of the Universal Services Provision Fund (USPF), which effectively came into existence at about the time of the survey, and must have contributed significantly. Industry stakeholders not only had input into the adopted modus operandi for the USPF, but are also regularly informed about ongoing and planned activities.

**TARIFF REGULATION**

The high price of telecommunications across the continent bears testimony to this negative perception of regulatory effectiveness with regard to regulating prices. Barring Botswana, in most countries surveyed the ineffectualness of tariff regulation was evident. Since 2000-2001, the Botswana Telecommunication Authority has sought to have stakeholder-endorsed policy on the pricing of telecommunications services. This, together with other subsequent policy positions such as further liberalisation (2005) and the opening up of the telecommunications landscape with the ushering in of service neutral licences (2006-07), has combined to force operators to charge rates that can be ascribed to the underlying economic costs of providing such services. The reason the Botswana Telecommunications Corporation (BTC) has seen its local and national call rates increasing over the last year, with a concomitant fall in international call rates, is because the BTA prescribed a period over which all tariffs had to be rebalanced to ensure they reflected the costs of providing the particular service without one end of the market subsidising the other. Thus most informed users of telecommunications services, whilst they may quibble over the overall costs of telecommunication services, are aware of the fact the BTA has regulated costs of these services in such a manner that, other than for the local wireless telephony, costs have dropped in real terms over the 10 years of its existence and the initial liberalisation, when mobile telephony was allowed by law.
Perceptions in Nigeria were nearly neutral which, although not as positive as other indicators, may reflect positively on the regulatory environment when considering the dissent particularly around mobile pricing in the past. The decision to introduce a price cap N50 and to compel operators to introduce the ‘per second billing’ method not long after the introduction of GSM may have improved the popularly held negative view of tariff regulation that has prevailed in Nigeria historically. Indeed tariffs are now on average about half the cap, and the NCC has not had to force prices on operators.

Perceptions of tariff regulation in South Africa were neutral rather than negative, giving credence to the recent efforts of the regulator to investigate retail pricing, after years of the fixed incumbent’s revenues having been legally and politically protected and the mobile operators’ high prices being treated as the outcome of initially a start-up, and subsequently a competitive market with high technology costs. ICASA’s recent wholesale price termination hearings have put these prices under scrutiny with implications for retail pricing.

The positive perception of regulation of tariffs is more likely to reflect the market reforms that have impacted positively on tariffs across services. That said, while the average costs of local calls on fixed lines, has dropped by 20% due to liberalisation, the drop in mobile telephony calls stands at 6.9%, despite increasing competition. The less positive score on this count than on many other criteria for Nigeria may reflect the failure to curb these prices.

In South Africa the issue of tariff regulation has historically focused on fixed services, and price increases were capped within a basket of services and subject to a rate review every three years. This has been the subject of a classic conflict of interest with the Ministry, who was respon-
sible for approving the rate set by the regulator while being the dominant shareholder in the incumbent. The relatively high cost of various fixed services in South Africa despite the legal ability to regulate prices might explain the residue of negative perception of price regulation. It may also have tainted the perception of the regulator’s ability to effectively control prices in the mobile market that are currently under review and until now have been treated as ‘competitive’ services, though this initiative by ICASA may have shifted perceptions from a negative to more neutral position on tariff regulation.

The capacity to regulate tariffs effectively corresponds to some degree with ease of market entry. Countries that have a policy environment that restricts market entry and have less competition tend to have higher prices, such as Namibia and Mozambique. Negative perceptions of price regulation in Namibia are also likely to reflect the failure to navigate reform legislation through Parliament for more than seven years, effectively leaving the country without a regulator. Perception of tariff regulation in Mozambique reflects the political dominance of the incumbent in relation to the regulator and the fact that tariffs are essentially set by the incumbent at its discretion. The negative perception of Cameroon’s telecommunication environment in this area relates to the failure of the regulator to contain what is widely perceived to be the very high cost of communication in the country. But even in countries where there is competition, particularly in the mobile market, the price of service is high. Where there are regulatory efforts to curb this, such as in South Africa, they are based on complex costing methodologies, and with the asymmetries of information between the regulator and those operators on whom they are dependent for information, their ability to fulfil this critical function is limited. In some instance political pressure can be brought to bear on fixed-line operators still owned by the state to keep prices down, but often this is not cost-based and requires cross subsidisation from other sources. The negative effect of this is that without a fair price, which includes a sufficient rate of return for reinvestment in the network, there is little network expansion. In many instances the revenues of incumbents are protected precisely based on this rationale, resulting in high retail prices, and yet profits are not reinvested in the company to extend the network.

Local tariffs were not revised in Ethiopia for over a decade and mobile tariffs remain the lowest in the region. Given the low penetration and scarcity of telephone and cellular services, it is evident that those who cannot afford the services have not yet been connected. It is not surprising that the perception for those who are connected remains positive, but as subsequent graphs show, that does not mean the cost of telecommunications is cheap for the majority of the people.
Regulation of Interconnection and Facilities Leasing

Vital to the successful introduction of competition is the rapid and seamless interconnection of new and existing players. It is unique to such industries that competitors need to collaborate in order to offer and enhance their services. Without an effective interconnection regime and seamless communications between consumers on different networks, the value of the network to customers is very limited. Facilities leasing is equally important, especially as in many jurisdictions service providers may not self-provide and are legally obliged to obtain their facilities from the incumbent. Even where this is not legally required, being able to access network facilities within a reasonable time at a cost-based price has a major impact on the competitiveness of operators.

FIGURE 9: TRE – Interconnection and Facilities Leasing

While default interconnection regimes have simply not been developed in some countries such as Namibia and Rwanda, others have seen protracted interconnection negotiations with new entrants. In Ghana, interconnection difficulties delayed by one year the commencement of business by the second national network. As regards mobile telephone services, the tortuous interconnection negotiation resulted in problems of traffic exchange and termination which largely affected quality of service.

This vital area of competition is the one area where Nigeria scores negatively. Recognising its importance, the Nigerian Communications Commission (NCC) gave specific attention to interconnection of telecommunications networks in the commission’s guidelines on this issue, building in the principles of transparency, non-discrimination, cost orientation, good faith negotiations and accounting separation. Part of the negative perception of regulation in this area may result from the commitment in the guidelines by NCC, to limit the extent of the obligations of the dominant operators during the period of transition to full competition at the
exact point when new entrants most require assistance and for favourable conditions to default in their favour. However, the regulator intervened to compel the incumbent Nitel to interconnect with the mobile operators and to encourage the mobile operators to connect with the smaller fixed telecommunications operators. They have also ruled against the incumbent in disputes compelling them to pay considerable outstanding interconnection debts.

Generally, interconnection and facilities leasing are most problematic where incumbents are most entrenched or are still protected or preferred by the state, such as in Kenya, Rwanda and Namibia. This is sometimes as a result of continued significant holdings by the state but also of wider political connections to which the incumbent generally appeals. In Kenya the charges on interconnection are perceived by the consumers to be high with 89% of respondents indicating that the interconnection regulation ranged from being ineffective to being highly ineffective. Due to high tariffs imposed on interconnection, the inter-mobile traffic has remained low with most consumers maintaining two subscriptions to avoid making off-network calls.

The de facto monopoly that the incumbent in South Africa enjoys in backbone infrastructure and the local loop, notwithstanding the licensing of a second network operator, means that despite various regulatory interventions in this area conditions for interconnection are still regarded as difficult.

**REGULATION OF ANTI-COMPETITIVE PRACTICES**

Interconnection, together with the capacity of the regulator to curb anti-competitive behaviour are among the major determinants of investment. Only in Côte d’Ivoire and Mozambique was the regulation of anti-competitive practices perceived as effective. In Côte d’Ivoire the introduction of competition has seen the competitive benefits that allow for the regulator not to have to act as a proxy for competition. With the early liberalisation of the market in Côte d’Ivoire and reasonable access to the market, a relatively well established body of regulation and remedies has developed. Anti-competitive practices end up in court and court decisions are respected by players. The regulatory body has the power to punish and therefore secure discipline among operators, but the various ICT operators enjoy relative freedom in the operating of their activities, as well as the settling of interconnection expenses with the approval of the regulator, ATCI.
Regulation appears to be perceived as ineffective in those countries where the incumbent is perceived to enjoy the protection of the state, where there are weak or nonexistent regulators such as Rwanda and Namibia, or where they at least enjoy some preferential position in the sector such as in Kenya and South Africa. This remains true to a lesser degree in Nigeria, but there too the capacity to regulate the anti-competitive behaviour of incumbents presents a major challenge.

**TRE Summary**

All the individual TREs have been consolidated into one graph that shows each country’s score. The categories have each been given equal weight and each country’s score has been averaged out. In future versions, a weighting could be given to each category depending on importance in terms of achieving policy objectives. With these limitations in mind, perceptions of the regulatory environment in two countries, Nigeria and Côte d’Ivoire, were positive. Both countries have been lauded for their pro-competitive regulatory environment even when operating under difficult circumstances. The regulator in Nigeria, the NCC, has also enhanced its credibility over the years after overseeing the privatisation of Nitel after several failed attempts, and in its management of mobile entrants in a complex and large country. The Commission’s notable achievements include the publication of interconnection rules and guidelines, development of a viable spectrum plan for the country, the institution of a consumer affairs bureau, and development of various regulations directed at promoting fair industry market practices. Nigeria is reaping the benefits of a sustained period of reform and an increasingly experienced regulator in an environment where it is able to influence policy and act with a level of autonomy.

Although the Botswanan regulatory environment is not perceived as effective overall, Botswana comes in third and scores well in a range of areas. This is a reflection of its regulatory maturity and consistency.
under strong leadership for many years that enables the regulatory agency to assert its authority on the sector. Its decision not to grant the incumbent fixed-line operator, BTC, a mobile licence and its tough stance on tariffs have come up against intense resistance, but this has been withstood. Zambia, which comes in fourth, is also seeing the benefits of far more recent but strong leadership of the regulatory authority. The comparatively positive position it enjoys is also attributable to its relatively timely efforts to liberalise the non-PSTN segments of the market and the relatively early introduction of Internet. The failure to privatise the incumbent despite several calls for investors is one of the greatest challenges facing the sector in Zambia.

FIGURE 11: THE SCORES ACROSS COUNTRIES

In the index above, Rwanda, Namibia, Ethiopia, Kenya and South Africa have scored poorly overall though for different reasons. The negative perception on Ethiopia reflects the lack of reform of the telecommunications market with a continued strong public monopoly market in fixed, mobile and Internet segments and a very weak environment for regulating the behaviour of the government-owned incumbent. Benin’s poor showing across all indices reflects the relatively recent liberalisation of their market and the constraining institutional environment where the regulation of the sector remains split between the Ministry and the incumbent. The failure to establish an independent regulatory agency despite commitment to it in the 2003 national ICT policy framework appears to explain some of the arbitrary actions in the sector such as the retrospective raising of licence fees of mobile operators. While this may produce negative sentiments in foreign investors there appears to be a resignation among stakeholders about the conditions that exist in their relatively benign assessment of the regulatory environment.

Namibia’s regulatory environment continues to stagnate with the regulator only responsible for mobile telephony and with no authority over
the incumbent. Telecom Namibia remains effectively unregulated. The combination of regional events, however, such as Botswana's progressive policy position on liberalising its market, and domestic events, such as the passing of the Telecommunications Bill and the establishment of an independent regulator, provides Namibia with the opportunity to overcome some of the current constraints in the sector.

The weak regulatory environment in Rwanda has a multiple dimension. The most critical is the regulatory institutional arrangement that was established through a multi-sector regulatory agency. This seems to have had a very negative impact on the current performance of the regulator. Rwanda has been facing a huge shortage of capacity in many emerging disciplines and particularly in the telecom sector which in fact is the most critical to regulate compared with other sectors under regulation such as electricity, water, transport and waste management. Ultimately, efforts that could have been made from the beginning to support increased capacity in the telecom sector have been split into a number of sectors that are currently regulated, hence a very low overall impact in terms of creating conducive environment to availability and affordability of access and usage as well as quality of services.

Rwanda’s very poor scores across a range of technical areas from tariff regulation to interconnection to spectrum management reflect the general lack of capacity in the regulator as well as lack of a visible regulatory environment that involves not only the regulator, the Ministry of Communications and private operators but also civil society and academics. The need for a forum that brings together the above groups of different interests seems to be a critical milestone towards achieving an enabling regulatory environment. To some extent the lack of capacity in the Telecom sector as a whole remains the major challenge to overcome if we need to reach a transparent and competitive market that can attract private investment and therefore bring up innovation in the sector.

The government, together with development partners including the ITU and the World Bank, is currently working on plans to strengthen the regulator as well as create an environment that could suit the business community and facilitate innovation in the telecom sector. In addition, academic institutions have initiated post-graduate programmes in telecommunication that provide a broader understanding of the sector in terms of policy, regulation and technologies.

In South Africa, even though the regulator is relatively well resourced its capability to regulate an increasingly complex market is limited by a relatively inexperienced staff and Council. Negative perceptions about the regulatory environment probably reflect legacy issues relating to the perceived political interference in the licensing and regulatory process.
and the historical veto on ICASA regulations by the Ministry of Communications. These formal mechanisms of control are removed by the new Electronic Communications Act which should produce more positive perceptions in the industry, but also extend their mandate considerably. For example, the entire industry has to be relicensed in terms of the new horizontal licensing framework. Even with additional resources which have not been set aside for it, this would be difficult to achieve. Without an innovative strategy, drawing on experience locally or from other parts of the world, negative perceptions of its performance will persist.

One of the major perceived factors inhibiting the development of the Kenyan ICT sector has been the inability to bring about competition in the fixed network. Despite the stagnation in the number of subscribers its dominance in the market produces anti-competitive behaviour which the regulator has been ineffectual in remedying. In particular, the percentage of respondents that considered allocation of scarce resources, interconnection, tariff regulation, and regulation of anti-competitive practices to be either highly ineffective or ineffective was between 70% and 89%. The biggest regulatory challenge in the mobile market has been the inability of the regulator to bring down interconnection charges. This is supported by the regulatory environment survey which showed that 85% considered interconnection to be either highly ineffective or ineffective. Even in the regulation of the more lightly regulated VANS environment, while showing more positive attitudes to tariff regulation and to some degree on market entry, overall the attitudes remained concentrated in the neutral/moderate and ineffective categories. Generally respondents felt that the regulator was not doing enough to protect the interests of consumers. It is interesting to note that the continued interference by the Kenyan government in the regulatory process has started to be felt with high levels of negative perceptions of the regulator.

**Investment and Regulation**

The implicit assumption of the TRE survey is that regulation has an impact upon investment, penetration, usage and competitive outcomes in the telecommunications sector. While there are no direct correlations between effective regulation (as determined by the telecommunications regulatory environment survey), investment and ICT pervasiveness, the positive regulatory perception of Nigeria, for example, correlates with improved investment and improved sector performance. If one compares investment with Nigeria with South Africa for example, which from an economic perspective should be an attractive market to invest in, but which scores poorly in the TRE survey, one does see diminished foreign investment over the last few years in the sector. Of course, there is no evidence of causality but the correlation in itself should be of interest to those responsible for attracting investment.

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19 The entire regulatory board was replaced following a disagreement with Kenyan Government following the issuing by the Board of a licence to Econet Wireless which has severely undermined any perceptions of autonomy of the regulator.
The determining factor, however, appears to be the total policy and regulatory environment, not simply the regulator. This is supported by experiences in a country such as Uganda, which is widely rated as having an effective regulator in most areas, but for which the wider policy environment not only for the sector but at national level with regard to the tax regime in the country, compounds the already unconducive investment environment in the country that exists by virtue of its economic endowments. Rather than addressing some of these more obvious factors inhibiting investment, the state has resorted to inducing it through state initiated build-operate-transfer schemes with the Government of China and through supply companies such as Huwei. On the other hand, it is clear that sector performance though sub-optimal may be significant in countries with higher GDP per capita where there are sufficient numbers of people who can afford to pay for overpriced services and overcome regulatory inefficiencies that might exist. South Africa is a clear example of this trend – it is rated poorly in all TRE categories, but has relatively good mobile and fixed-line penetration in comparison to other countries, and strong overall sector growth.

While the links between strong regulatory environments, investment and sectoral growth are not clear-cut, it is becoming clear that there is a link between regulation and international trade. This link is intermediated by competition: high levels of internal competition increase the likelihood of high levels of international trade. Regulatory obstacles can strangle a country’s ability to develop cross-border trade and to exploit its comparative advantage, thereby increasing its economic growth. One of the most important factors that impact upon the level of domestic competition is regulation. So, a low score in the TRE survey may well tell us something about the levels of effective competition within that country.

For this reason, the low scores exhibited by most African countries are cause for concern. There are only two countries that scored positively in the TRE survey: Nigeria and Côte d’Ivoire. Nigeria has been a leader in regulatory reform on the continent and is seeing the fruit of this massive foreign direct investment. Whether Nigeria is benefiting from increasing trade as a result is the subject of future research. Côte d’Ivoire, despite the political unrest that has wracked the country and the economic turmoil it has faced over the last decade, has seen the benefits of relatively early liberalisation of the telecommunications market and reasonably effective regulation in a range of areas from market entry to curbing anti-competitive practices.

Unfortunately, the rest of the continent lags behind. The most powerful economy on the continent, South Africa, is in the bottom five in terms of creating an effective regulatory environment, along with largely unreformed markets such as Ethiopia. Ethiopia is an outlier because tariff rebalancing has not taken place and overseas calls (to the US for example) cross-subsidise local calls. Even more marked than Benin and Mozambique, Ethiopian subsidisation of local calls means that those that have access are effectively subsidised, but as a result, there is no investment of the profits of the company in the extension of services to those that do not have service. In the case of Ethiopia, the resources for network expansion in recent years were allocated directly by the government and through long-term loans – which remain unsustainable. If African governments are concerned about international trade and foreign direct investment, they should be interested to see their position on the TRE scale in future years. Continued languishing at the bottom of the scale (or even an overall negative perception) could provide a proxy indicator of the level of internal telecommunications competition.
Access/ICT users

Access in Africa is dominated by South Africa across all four key metrics: fixed line, internet subscribers, mobile and broadband. Part of the explanation must be the much higher level of GDP per capita in South Africa compared with every other country in this report with the exception of Botswana. Even with its higher GDP per capita, other countries are beginning to catch up, however – Nigeria has shown significant growth, for example. Of course, Nigeria’s mobile teledensity numbers remain low, but in absolute numbers South Africa will soon be overtaken by other African countries. In terms of fixed lines, South Africa remains the leader, despite its almost stagnant growth. This situation is unlikely to change because most African countries have struggled to liberalise the sector and introduce new foreign investment. Internet penetration as a result remains low, with many countries having insignificant numbers of subscribers. Broadband penetration is worse, with minimal penetration in sub-Saharan Africa. In contrast, North Africa has increased subscriber numbers rapidly.

FIGURE 13: CONNECTIVITY IN AFRICA

Of the nine countries listed here, only two have any noticeable broadband penetration: Nigeria and South Africa. In Ghana, the potential for increased broadband penetration is strong but requires the combination of both price and marketing strategies on the part of the providers. The broadband providers are using both wireless and ASDL to provide broadband services in the country.
The data in Figure 14 is an interesting indication of the absolute size of some African markets – South Africa, for example, is of an order of magnitude larger than Namibia. A more accurate indication of penetration in each country can be found in Figure 14 where three countries dominate fixed-line teledensity: South Africa, Botswana and Namibia. The remaining countries have lower than 2.5% fixed-line teledensity. Part of the reason for the higher teledensity figures is due to the higher GDP per capita with the exception of Uganda which is an outlier here; this may well be a case of even limited competition in the form of a duopoly, together with credible regulation having a positive impact.

FIGURE 14: FIXED LINE SUBSCRIBERS

The countries with the highest fixed-line teledensity (South Africa, Botswana and Namibia) have prices that are in PPP terms very similar. Rwanda and Mozambique’s poor teledensity figures can be explained by their phenomenally high prices and the legacies of war and poverty that made services outside of urban areas uneconomic under current restrictive policy and regulatory conditions. In PPP terms, the cost of a local call in these countries is over 500% more expensive than the cost of a local call in Nigeria, for example, where there has been dynamic regulatory reform. South Africa is around 127% more expensive in PPP terms than Nigeria, reflecting its de facto monopoly since the end of its exclusivity nearly five years ago. The delays to the licensing of second network operator, Neotel, and its limited offering since its formal launch in 2006, provide little competition to the incumbent Telkom.
In nominal US$ terms, the ratings of the individual countries change to a small degree. Mozambique goes from being the most expensive to third most expensive, while Burkina Faso goes from third most expensive in PPP terms to most expensive in nominal terms. These prices reflect the impact of incumbents relatively protected by the policy and regulatory environment, presumably to public provision services in such low-income countries. However, such strategies do not appear to be working, with little state investment in network extension and insignificant fixed-line growth. Nigeria remains one of the cheapest places to call locally. Ethiopia is an outlier because tariff rebalancing has not taken place and overseas calls (to the US for example) cross-subsidise local calls. Even more marked is that Burkina Faso, Mozambique and Ethiopia subsidisation of local calls means that those that have access are effectively subsidised but there is no investment of the profits of the company as a result in the extension of services to those that do not have service. Recently the state has invested in a VSAT network but the business model of the telephone company with its subsidies and failure to build in regular capital for expansion mean it is internally unsustainable.
The contrast between the cost of local and national calls shows that Ethiopia is cross subsidising local calls via both national calls (the second most expensive in PPP terms) and international calls (the most expensive country of all those surveyed). Senegal is doing something very similar with a dramatic difference between local calls and national calls. Senegal moves from 10th place in PPP terms for a local call to fourth most expensive for a national call. Clearly tariff rebalancing has not occurred in Senegal either.

The cost of a national call in nominal terms merely underscores the findings of the previous graph. Senegal is very expensive and moves up to the second-most expensive place to make a national call in Africa. Ghana
is the cheapest by more than a 100% in comparison to the next countries, Uganda and Tanzania.

FIGURE 18: COST OF A NATIONAL CALL IN NOMINAL US$

Since 1996 South Africa’s incumbent, Telkom, has been rebalancing its tariffs and was required to complete this process by the end of its monopoly in 2003. There has also been a fair amount of media attention on the cost of an international call, particularly because of South Africa’s burgeoning call centre industry. As a result, the cost of an international call to the US is amongst the cheapest on the continent. On the other end of the scale, Ethiopia’s charges are astronomical, but this is illustrative of the negative effects of cross-subsidisation on the development of cost-based pricing necessary for efficient and even network development. It also reflects the inability of the regulator to address pricing of telecommunications services effectively. Considering the socio-economic status, the very high international charges in Ethiopia remain unsustainable and have been the main reasons for the presence of a ‘grey’ market in the country.

The point of displaying the nominal rate of a call to the US is primarily to show how a pure US$ analysis hides how large the discrepancies are between countries and the ability of the citizens of a country to pay for telecommunications services.
FIGURE 19: COST OF A 3-MINUTE CALL TO US (PEAK RATE) IN NOMINAL US$

South Africa is top of the list with nearly 70% mobile penetration. Botswana is second, but with a substantially smaller population. The contrast between mobile penetration and fixed-line teledensity is remarkable, with nearly all countries other than Ethiopia showing dramatically higher levels of penetration compared to fixed line. However, it is likely that these impressive figures do not represent actual penetration. Difficulties with definitions of subscribers, active subscribers, and SIM cards sold, make subscriber numbers very unreliable, particularly in traditional measures of per 100 of the population. Demand-side surveys are beginning to show that while mobile uptake is significant it is not even and is highly concentrated in urban areas and in wealthier homes within those areas where individuals and households have multiple SIM cards and phones (Gillwald 2005).

FIGURE 20: MOBILE SUBSCRIBERS

Source: ResearchICTafrica.net, (population based on IMF data)
Fixed lines have the benefit that pricing is fairly transparent. In contrast, there are so many options available in mobile that comparisons are difficult. Basket methodologies are useful in a complex environment because they enable comparisons across multiple countries and multiple packages. However, there is no internationally recognised developing country mobile basket. The only basket methodology that is commonly used is from the OECD. The problem with the OECD mobile basket is that it caters for the relatively wealthy subscribers of the first world, though it does include a range of high, middle and low users. In the absence of any alternative, the OECD mobile basket has been adopted.

The OECD basket is made up of the following categories:
- Usage Bundle Cell2Cell own Network Peak;
- Usage Bundle Cell2Cell own Network Off-Peak;
- Usage Bundle Cell2Cell own Network Off Off-Peak;
- Usage Bundle Cell2Cell other Network Peak;
- Usage Bundle Cell2Cell other Network Off-Peak;
- Usage Bundle Cell2Cell other Network Off Off-Peak;
- Cell2Fixed Peak;
- Cell2Fixed Off-Peak;
- Cell2Fixed Off Off-Peak;
- SMS Peak;
- SMS Off-Peak;
- SMS Off Off-Peak.

Progressing from the low- to the high-user basket entails increasingly higher usage bundles in each of the categories. Of key importance is the low-user basket because this most closely approximates the kind of usage predominant in Africa. If a developing world, internationally recognised mobile usage basket were agreed upon it would improve the accuracy of these results. Currently, the OECD lower-user basket is the most appropriate to Africa and is therefore used.

In the low-usage basket (in PPP terms) Uganda has the highest costs of the countries surveyed, followed by Mozambique and Ghana. The most populous market in Africa, Nigeria, is quite substantially lower than South Africa, which has the highest absolute number of mobile subscribers on the continent, and one would expect economies of scale and scope to produce lower prices. With the exception of Uganda, most East African countries score quite well on the low-usage basket.

Despite the commitment of Uganda of a significant period of time to the development of a strong communication infrastructure for development and with one of the most respected regulators on the continent, prices in Uganda remain high as can be seen in the nominal tables, and when adjusted for purchasing power parity are the highest of those reviewed. At least some of the reason for this is the 30% duty on cellphones and
services. Intended to tax the wealthier users of mobile phones, with the mass take-up of prepaid mobile services in the absence largely of traditional voice services, the tax is in fact a regressive tax on the poor. The portion of their income going to these taxes is far higher than the portion of wealthier segments of the population.

**FIGURE 21: COMPARISON USING LOW-OECD-USER BASKET**

The low-usage basket using nominal USS is included because it takes out affordability in terms of GDP per capita and provides a different perspective on pricing. Under a nominal usage basket, South Africa and Nigeria are the most expensive on the continent. MTN is the dominant mobile provider in both countries and this provides some insight into MTN’s strategy in emerging markets, that is, a low-access, high-usage strategy that subsidises access through high-usage charges. The focus is on increasing the number of subscribers and not on increasing the number of calls that these subscribers make. The difference between the nominal and PPP graphs highlights the real costs of prices and how unaffordable nominally competitive prices are in a particular economy. Uganda, for example, moves from being the most expensive in PPP terms to number 12 on the nominal list. Zambia on the other hand moves from being the cheapest to the middle of the table.
The OECD medium-user basket is very similar to the low-user basket with most countries keeping their positions. One exception is Rwanda which moves from being amongst the cheapest in PPP terms on the low-user basket to being one of the most expensive, in PPP terms, on the medium-user basket. Penetration in Rwanda is very low and as is GDP per capita, so the focus of mobile operators is plainly on the lower segment of the market. Uganda maintains its position as the most expensive in PPP terms. South Africa remains in the middle of the table, but is dramatically higher in price (more than a third more expensive) in comparison to Nigeria.

In nominal terms, South Africa and Nigeria maintain their position at the top of the list for the medium-user basket. One of the criticisms against the South African mobile operators is that they are taking advantage of a high GDP per capita to charge higher usage prices. Given the high nom-
inal-usage baskets, this claim does seem to have any foundation. A similar approach cannot be taken for all countries (for example Rwanda) where GDP per capita is very low and cross-subsidisation between users is not possible – explaining the focus on the low-usage basket by MTN compared to the way it operates in South Africa and Nigeria.

FIGURE 24: COMPARISON USING OECD MEDIUM-USER BASKET (NOMINAL)

A nearly identical picture emerges in the OECD high-usage basket. Uganda remains on top, Botswana, Kenya and South Africa near the middle and Zambia and Ethiopia at the bottom (the cheapest). One is not really able to compare Ethiopia’s results due to the minuscule number of mobile subscribers and the cross-subsidisation between fixed and mobile. The monopoly operator provides both fixed and mobile services seamlessly and prices do appear to reflect interconnection costs as in other cases. Nonetheless, the pricing in countries like Zambia and Ethiopia does reflect the inherently exorbitant pricing of mobile services in the region, which often end in profiteering via the operators and room for policy and regulatory interventions for reduction of cellular charges in the region. Liberalisation of the sector would initially increase prices (until economies of scale kick in), but at the same time increase penetration rates.
In nominal terms, the same trends are seen with one exception. South Africa moves down into third place, probably due to higher levels of discounting that the operators engage in to attract high-usage corporate accounts.
Wholesale

Getting accurate data on wholesale access in Africa is notoriously difficult. Public companies with obligations to report on stock exchanges (mostly European or American bourses) provide nearly all the available information. As with the incumbent fixed-line operators, mobile operators are becoming increasingly secretive and paranoid about releasing any information. Most companies have a blanket refusal to provide public information without any regard to whether it could possibly be used for ‘anti-competitive’ purposes. As with technology take-up, so does access to information mostly follow an S-curve. At inception, the adoption of a technology means that it is in the interests for new companies to release information to attract customers and favourable press coverage. As take-up progresses, companies no longer need to attract new customers or receive favourable coverage and move from new entrants to incumbents, and information becomes increasingly hard to get. The information that follows is selective in nature, but is indicative of broader trends within the African continent.

INTERCONNECTION

Interconnection is the most important feature of telecommunications networks. The value of a network is directly correlated to the size of the network – being able to make only on-net calls (calls on the home network) substantially reduces the value of a network to a subscriber. In those countries where interconnection has not been an obligation imposed on network providers, costs have been pushed up through the need to carry either multiple handsets or SIM cards.

Both Vodacom and MTN argue that high interconnection rates allow them to increase network coverage (and therefore high penetration rates). Because most poorer subscribers cannot afford to make calls, they send a ‘please call me’ to wealthier subscribers who then return the call. In essence, the wealthier subscriber cross-subsidises the poorer subscriber. However, this argument ignores two important points: firstly, it assumes that the normal relationship of supply and demand no longer applies. As price declines, so quantity (of calls made) should increase, thereby making up the loss of revenues from prices with higher volumes. Secondly, this is not a uniform policy followed across Africa as the interconnect rates listed below illustrate:

- Tanzania (Vodacom) – US$0.089
- Nigeria (MTN) – US$0.091
- Uganda (MTN) – US$0.055 – $0.088
- South Africa (Vodacom & MTN) – US$0.19

South Africa is around 200% more expensive than any of the other countries, which partially explains how South African mobile companies are
able to use their high cash flows to fund rapid expansion north of the borders. Of course, this has been of immense value to the African continent. However, as markets become more mature, so the move from low-access charges to lower-usage charges needs to be made.

A similar argument can be made for mobile to fixed interconnect charges. Benin, Kenya and South Africa show very high discrepancies from the average fixed to mobile interconnect rate. Both of these examples point towards the increasingly important role of regulation with dynamic changing networks and dominant players in the mobile market to prevent market failures and the abuse of dominance.

**FIGURE 27: INTERCONNECTION RATES IN AFRICA**

### LEASED LINES

A major input into business communications is the cost of leased lines. They are a critical input because they have several crucial features:

- Retail end-to-end leased lines are permanent connections that allow end users to connect disparate locations;
- They provide dedicated capacity, that is, capacity on leased lines is exclusively allocated to a particular end user;
- Leased-line capacity is symmetric. This means that leased lines can carry data at a similar rate in both directions between sites.
- For businesses carrying sensitive data, such as banks, leased lines are of considerably more benefit than ADSL and potentially significantly cheaper than other technologies such as VSAT or GSM.
In the figure above, the leased-line prices have been worked out using a basket methodology adopted by the OECD up until 2006. Prices are weighted according to distance and bandwidth. The graph below is based on the Telkom and Kenya Telecom 2 Mbit/s leased line. Even though South Africa has much greater economies of scale, a relatively stable power supply and a much greater corporate sector, the prices are nearly double those of Kenya.

**International Bandwidth**

The price of international bandwidth remains untenably high. As in many African countries, even with the opening up of international gateways there is only one economically feasible source of high-quality bandwidth – the SAT-3/SAFE undersea cable. It was built by, and is operated through, a closed consortium of African incumbents and international operators, who have exclusive rights on the landing stations in their countries. This consortium’s practices have come under fire from multi-stakeholder continental initiatives which have demonstrated the access and cost benefits of non-exclusive open-access regimes for African countries. There have been calls to regulate these landing rights as ‘bottlenecks’ or “essential” facilities. This attention has also highlighted the arbitrariness of the costing of this essential facility for African countries at the national level, and discrepancies in the charges across different portions of the network. A price survey of African countries that use SAT-3 for their international bandwidth showed that South Africa’s Telkom is charging up to 800% more per month than other countries for a megabit per second. While the Senegalese incumbent Sonatel charges only US$ 316, Telkom, which also holds the management contract for the cable, charges US$11 000 (Southwood, 2006).
For some Eastern and Southern African countries, the longer-term solution lies in the East Africa Submarine cable System (EASSY), which is to be completed by 2008. Prices are expected to fall between US$500 to US$1,500 for Mbit connection/month, if the envisaged open access scheme is implemented. Through the intervention of non-governmental and academic organisations and the e-Africa Commission, the consortium established to build the cable has been far more open and the approach to landing rights non-exclusive. Bandwidth will be sold on an open-access model, where everybody can purchase at the same price whether they are an investor or not. However, recent dissent among the parties, largely as a result of perceptions of consortium members that governments, particular South Africa, wish to dominate this multi-stakeholder consortium, have placed the project in jeopardy. While this project smoulders, other private initiatives have come into play, most notably Seacom which has sought to fill the gap in the cable around Africa focusing on an East to South connection. Also frustrated by the delays to Eassy, Kenya entered into partnership with global telecommunications service provider Etisalat to connect east and horn of Africa countries to other international cables. The East African Marine Systems (Teams) undersea fibre-optic cable is expected to cost US$110 million (Sh7.9 billion) but will offer higher quality broadband connections at much lower than current costs.

In response, African governments appear to have sought a solution to Africa’s bandwidth problems in a NEPAD initiative that will see the roll-out of a multi terrabit undersea cable link not only to the eastern African seaboard but also from the western seaboard to Brazil and England. At a recent meeting of African Ministers at the Connect Summit in Kigali, Rwanda, Ministers identified five major goals with regard to international connectivity.

- Interconnect all African capitals with ICT Broadband infrastructure and strengthen connectivity to the rest of the world by 2012 as well as interconnect major African cities by 2015;
- Connect all African villages to broadband ICT services by 2012 and implement shared access initiatives such as community telecentres and village phones;
- Adopt key regulatory measures that promote affordable, widespread access to a full range of broadband ICT services, including technology and service neutral licensing/authorisation practices, allocating spectrum for multiple, competitive broadband wireless service providers, creating national Internet exchange points (IXPs) and implementing competition in the provision of international Internet connectivity;
- Support the development of a critical mass of ICT skills required by the knowledge economy, notably through the establishment of ICT Centres of Excellence network in each sub-region of Africa and ICT capacity-building and training centres in each country, with the aim of achieving a broad network of inter-linked physical and

21 See Kenya signs undersea cable pact at http://www.itu.int/itunewsyanews/Kenya+Signs+Undersea+Cable+Pact+.aspx
virtual centres, while ensuring coordination between academia and industry by 2015;

* Adopt a national e-strategy, including a cyber-security framework, and deploy at least one flagship e-government service as well as e-education, e-commerce and e-health services using accessible technologies in each country in Africa by 2012, with the aim of making multiple e-government and other e-services widely available by 2015 (Bellenet 1 November 2007).

In a subsequent radio interview, the co-chairperson of the e-Africa Commission, the South African director general, Lyndall Shope-Mafole, announced that the Ministers had also agreed that any cables landing on the continent would be required to have majority South African shareholding (SAFM 31 October 2007). With the limited capital on the continent for large infrastructure projects and the current willingness of private investors to land their cable on the continent with the potential of reducing prices through competition with incumbent and often monopoly providers, this additional hurdle is likely to inhibit investment, competition and the consequent lower pricing for international bandwidth on the continent.
Conclusions and Recommendations

**Investment**
Despite the non-conducive policy and regulatory environment for foreign investors in some African countries, the size and untapped nature of the communications markets in Africa continue to be a source of investor interest. The massive investments made by Vodacom, MTN and MTC in licences are evidence of this. However, there is a risk of investment by exclusively one group (mobile operators) with little investment in other critical areas of the information infrastructure required to run a modern economy effectively.

There are direct correlations between investment in telecommunications per capita and economic growth. The causality however has not been established. What is clear is that benefits of infrastructure investment appear only to kick in when there is a critical mass to create the network effect. Roller and Waverman (2001) have suggested this critical mass in telecommunications appears to be at about 40% of the population with service. In most African countries these positive multipliers of ICTs are not yet felt as a result of limited investment in ICT and consequently restricted take-up. In addition, the lower penetration of fixed lines and the high cost of mobile means that most African countries are not witnessing the benefits of the Internet and other value-added services that would allow them effective participation in the global economy or even effective national citizenship.

**Market Structure**
The slow maturation of the markets in Africa carries a number of consequences. As mobile operators gain dominance in the market and governments are still reluctant to open the market to competition, regulators are required to dedicate far more resources to anti-competitive and abuse of dominance cases. South Africa is a case in point. It has traditionally focused upon the fixed-line incumbent and left the mobile operators to their own devices. However, as fixed-access lines have declined and mobile subscriptions have exploded, so the mobile operators have become the new dominant operators. These new incumbents are as opposed to regulation and to competition as the old fixed-line incumbents.

To remedy this problem, the Electronic Communications Act was passed in 2006 that provided the regulator with far greater powers to intervene in the market. However, these powers were premised on a well funded and resourced regulator with particular skills in competition economics. No study was conducted on the impact of the new legislation upon the regulator or its resource requirements to fullfil its mandate. As a result, the regulator finds itself scrambling against a deadline without adequate
financial and human resources to do the job. The ultimate result has been a stagnation of the sector as it waits for the regulator to complete various enabling regulations for the development of the sector. That this can occur in South Africa, which has the largest economy on the continent, does not bode well for other regulatory bodies which will soon be faced with similar regulatory demands. A successful strategy to attract high-calibre staff to the regulator is a vital condition to successful regulation in the competition environment. This is unlikely to happen as long as potential staff view regulators as subject to the capricious actions of politicians or politically protected incumbents against whom they will be unable to act.

**Competition Regulation**

A shift is occurring in most countries (with the obvious exception of outliers such as Ethiopia) from monopoly regulation to competition regulation. Monopoly regulation is characterised by regulation of a distinct infrastructure and the focus is on the abuse of monopoly power and on reducing prices. In contrast, competition regulation is focused on encouraging new entrants, abuse of monopoly power in certain segments of the market and creating a level playing field so that new entrants can effectively compete.

The move from monopoly regulation to competition regulation means a fundamental restructuring of regulatory bodies. Monopoly regulation required a broad understanding of the market (usually limited to a particular technology and often only one company). Competition regulation requires a detailed understanding of individual market segments and how each segment interacts with another. Operators have become increasingly sophisticated in their understanding of the market and this has to be mirrored in the regulator. Unfortunately, this has the tendency to exacerbate the already dire human resource constraints faced by regulators.

**Pricing, Interconnection and Cost Accounting**

As indicated by the telecommunications regulatory environment survey described above, basic economic regulation of the sector presents a major challenge to many regulators on the continent. Under monopoly regulation a simple review of retail prices was sufficient. Under a competition regulation regime, any market review must include detailed analyses of pricing at a wholesale and retail level to determine the relationship between them. This raises the age-old issue of asymmetries of information between the regulator and operators. To access this kind of information at a level that will allow comparison between operators requires the implementation of account separation methodologies. Account separation allows the regulator to monitor anti-competitive behaviour such as cross-subsidisation, predatory pricing and margin squeeze. In an increasingly competitive market, access to this sort of
information is the starting point for effective regulation and regulators must be empowered by legislation to compel operators to provide it.

Cost accounting, however, requires sophisticated cost accounting expertise. Many countries in Africa do not possess these skills. Even those that have implemented cost accounting methodologies with the assistance of consultants, such as South Africa, find that in the implementation of regulations these skills are in short supply, both in the private and public sectors. Effective training institutions are required to meet these requirements in the longer term. In the short term the transfer of skills through secondment from established regulators may be the only way to move swiftly on critical regulatory issues.

Of course, one of the most oft-quoted mechanisms to achieve competition in the market is to implement cost-based interconnection. While non-cost-based interconnection is known not to stimulate investment in network infrastructure there is little research to back up the claim that cost-based interconnection will result in increased investment in the sector as other, smaller, operators attempt to climb the ‘ladder of investment’ or that it will result in reduced retail prices. Instead, there is research that indicates that cost based interconnection can, in fact, inhibit increased investment in the sector as operators are deprived of the ability to recoup their initial investment quickly enough. So regulators sit on the horns of a particularly pressing dilemma.

One route out of this is to look at a stepped interconnection regime. This would start at a cost-based interconnection in the short term to allow new entrants access to vital infrastructure, followed by stepped increments that allow increasing returns on investment as competition increases. This kind of process requires numerous prior steps to be completed which have been mentioned above: regular, detailed market reviews; accounts separation and a capacitated regulator. If anything, the ICT sector is becoming more interdependent and intervention is increasingly dependent upon smaller steps having been completed first.

Universal Service
Universal service on the continent is the single biggest disappointment to date. There is no universally accepted methodology to implement universal service initiatives and supply-side strategies such as telecentres, fixed-line monopolies for network extension, universal services levies and agencies, and underserviced area licences have largely proved unsuccessful. As mobile penetration increases on the continent the rationale for traditional universal service, through state provision of private or collective access, is under threat. Ironically while governments poured million of dollars into such initiatives across the continent over the last decade, the opening up of commercial services such as mobile has done more to meet the massive pent
up demand for connectivity. Rather than the scatter gun approach to
universal service in the past, evidence suggests that opening the mar-
ket through effectively regulated competition is more likely to benefit
large numbers of users. Limited public resources can then be focused
on supporting the services of genuinely uneconomic areas or commu-
nities. Finally, it is interesting to note that the only country with a pos-
itive TRE score for universal service is Nigeria. Nigeria is also the one
country with the highest scores for dealing with anti-competitive con-
duct and encouraging market entry – all functions that assume mar-
ket competitiveness as one of the mechanisms towards achieving uni-
versal access and service.

**SERVICE NEUTRAL LICENSING**

Supporting the long tradition of cut and paste regulation that is the dom-
inant form of regulation on the continent is the move towards horizontal
licensing frameworks. A move towards horizontal licensing assumes a
fundamental restructuring of the market along with increased responsi-
bilities on the part of the regulator. There is little point in moving to a
horizontal licensing framework when vertically integrated incumbents
are simply issued with multiple horizontal licences that permit them to
continue operating as they have been doing traditionally and issues of
access to networks are not addressed.

Horizontal licensing frameworks can be red herrings. The focus of regu-
lators has to be on creating the conditions for effective competition. In
Africa, given the dominance of wireless networks, this has to focus on
spectrum management and allocation. At this stage, very few regulators
have a handle on how to allocate spectrum in such a manner as to ensure
innovation and new services introduced to the market. The guiding prin-
ciple has to be service neutrality with mechanisms in place to efficiently
allocate spectrum.

**CONCLUSION**

The African telecom environment is undergoing dramatic change. The
telecoms market is increasingly complex as more players enter the mar-
ket, shifting the dominance of traditional incumbents in voice telephony
and creating new dominant players in dynamic markets. Unfortunately,
the old regulatory models no longer apply. A focus upon a single incum-
bent to deliver universal service is no longer possible either. Regulators
need to focus on the inter-relationships between multiple operators, and
now require a sophisticated understanding of market segments rather
than a single telecom market as in the past. While emerging market seg-
ments and new entrants in old markets need to be enabled, extension of
backbone infrastructure growth in the face of dwindling fixed telephony
subscribers that used to drive network extensions needs to be intro-
duced in order to deliver the enhanced services required in an increas-
ingly global economy and society.
As the pricing section makes clear, operators are increasingly sophisticated in their arguments for differential and high pricing across jurisdictions. The objective of affordable access and usage is best achieved through competition, which, in turn, is premised upon market entry, primarily through new and more cost-efficient technologies. In Africa, these rely upon spectrum allocation.

Underlying all these technical requirements to regulate this dynamic and fast changing sector are the institutional arrangements and procedures that provide the necessary certainty and stability required for sector development. Investing in these skills in an environment where interests are not separated out and roles and responsibilities not clarified, creates the conditions for powerful interests to ensure their preferred outcomes. Such arbitrary actions will undermine the finest interconnection or pricing regulations. As this report has shown, policy outcomes can be explained and remedied by examining the interplay between the arising institutional arrangement and market structure. These will determine the competitive behaviour of players and the ability of the regulator to regulate effectively and neutrally in the public interest. Ensuring that markets and institutions are working is the biggest challenge facing the African telecommunications sector at present.
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