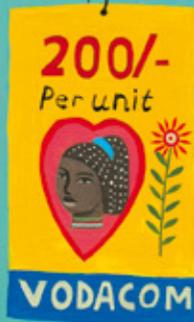


# THE BEAT of a DIFFERENT DRUM





# The BEAT of A DIFFERENT DRUM

Mobile phones are changing the way we live, and nowhere is this more evident than in Africa. The impact of Information and Communication Technologies (ICTs) on African social and economic landscape is explored in an article produced by the World Bank and the African Development Bank, with the support of the African Union.





# PREFACE

While some talk in terms of Japan's lost decades since its financial crisis in 1990, an even stronger case can be made for Africa's lost half century since throwing-off the yoke of colonialism beginning in the 1960s through to the 1970s. Ask a room full of experts as to the origins of this lost opportunity and the responses would absorb gigabytes of memory.

Without wishing to add my opinion to causes, it has always struck me how astonishingly large and diverse the continent of Africa is with a land area of over 30 million km<sup>2</sup>, about the combined size of the US, China and Canada, and with a population of some one billion people. It always concerned me that the cost of providing adequate infrastructure was so prohibitive that Africa was doomed to a long period of slow growth.

Another factor that has borne heavily on the shoulders of Africans is the prevalence of graft, or to use the jargon of the not-for-profit donors, rent-seeking behaviour. It would be unfair to pick out Africa as unique in this way, but with a relatively poor record of representative government, many African states have seen their institutions wither with a corresponding rise of a sense of entitlement by those in charge which has cascaded down the command structure to the lowest of poorly paid enforcers.

At times, one could have become progressively more pessimistic as the cycle of maladministration and protectionism spiralled into a deteriorating tax base which in turn diminished the opportunity for self-help, culminating in inertia, the abandonment of hope and the ultimate declaration that, "it has always been thus!"

It is therefore with delight that we can now point to the origins of change that will break this cycle of despair and dark thoughts. The emergence of the internet and in particular its application on mobile devices has been a game changer for Africa and for that matter, the world. However, what is so significant for countries that suffer from the poor ordering and allocation of resources is that the *network effect* created by communications and data mobility circumvents the dead hand of government. Moreover, the extraordinary leaps in technology and falls in equipment costs have made this change possible in even the poorest countries.

To think that at the turn of *this century* there were fewer than 10 million fixed lines in all of Africa, mostly in a single country, and there are now more than 700 million mobile subscribers!

This gives one a hint of the information revolution that is evolving. Imagine the changes to come as smart handsets become available for say \$50 to \$70 each.

In the accompanying edited article produced by The World Bank and the African Development Bank, with the support of the African Union, there are some fascinating insights as to how mobile devices are changing communications, commerce and even government in Africa. As we have seen in other parts of the world this is a self-feeding process and is exponential in nature. To have reliable information about anticipated weather conditions and prices of agricultural products, to be able to transmit funds to relatives in remote and distant villages, to be able to access healthcare advice on one's mobile phone, are huge breakthroughs.

It can have a disproportional impact on productivity in the creation, and flow of goods and services as it removes ignorance and wasted effort. Having the ability to pay one's water and electricity bills and even government taxes by mobile phone not only eliminates queuing but also improves the balance of power between the ruled and the rulers. This is even before one gets into the realm of political change where mobile communication has been so evident in movements like the Arab Spring in both galvanising action and publicly recording the subsequent outcomes.

In February I wrote a short piece titled "Africa Rising" that is available on the Platinum Asset Management website ([www.platinum.com.au](http://www.platinum.com.au)) but the article that follows here highlights some of the services and effects of the digital revolution.

Optimists among us can extrapolate and realistically make a case for the gradual reductions of rent-seeking behaviour. We can also envisage how the empowering of the individual that is the consequence of radio-based internet connectivity can lead to a more just and prosperous society.

While the accompanying piece may not give you direct investment ideas, it may trigger thoughts that will impinge on your investment thinking.

## Kerr Neilson

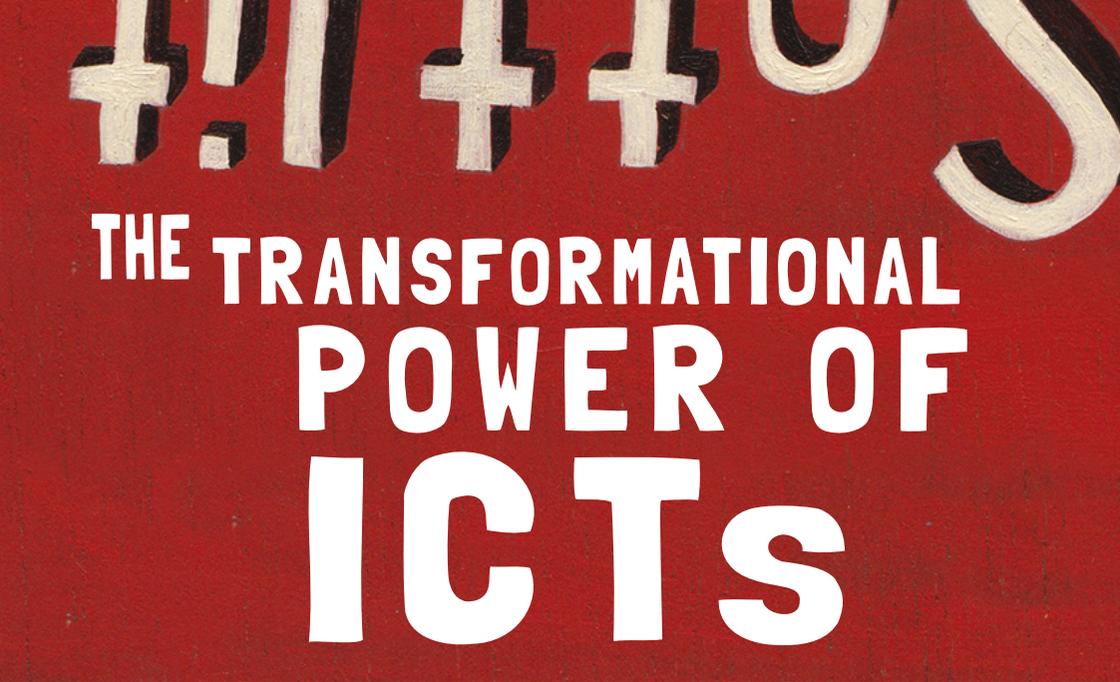
*Managing Director*  
August 2013



# The **TRANSFORMATIONAL** **USE OF INFORMATION** **& COMMUNICATION** **TECHNOLOGIES** **IN AFRICA**

The World Bank and the African Development Bank,  
with the support of the African Union.

Edited by Enock Yonazi, Tim Kelly,  
Naomi Halewood and Colin Blackman.



# THE TRANSFORMATIONAL POWER OF ICTs

ICTs, especially mobile phones, have revolutionized communications in Africa. The explosive growth of mobile phones in Africa over the past decade demonstrates the appetite for change across the continent.

In the year 2000 there were fewer than 10 million fixed-line phones across Africa, a number that had accumulated slowly over a century, and a waiting list of a further 3.5 million.

With a penetration rate of just over 1 per cent, phones were to be found only in offices and the richest households. But the coming of the mobile phone has transformed communications access.

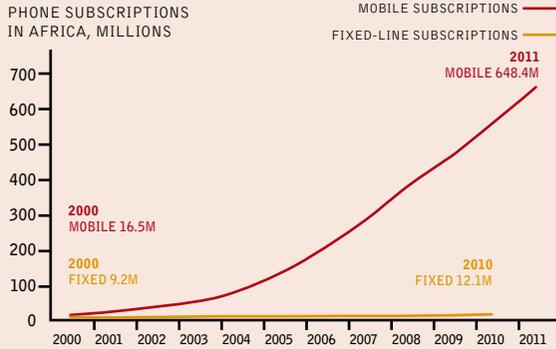
By the start of 2012, there were almost 650 million mobile subscriptions in Africa (A. T. Kearney, 2011), more than in the United States or the European Union<sup>1</sup>, making Africa the second fastest growing region in the world, after South Asia (*Figure 1.1*).

At the start of the decade, few imagined that such demand existed, let alone that it could be afforded. In some African countries, more people have access to a mobile phone than to clean water, a bank account or even electricity. Mobile phones are now being used as a platform to provide access to the internet, to applications and to government services<sup>2</sup>.

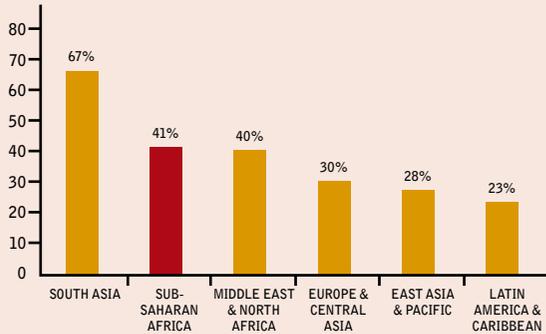
The direct contribution of ICTs to Africa's economy and its growth is impressive.

**FIGURE 1.1: AFRICA'S MOBILE REVOLUTION**

Mobile phone and fixed line subscriptions in Africa, 2000-2011



Average mobile growth rates by region



Source: World Bank, Wireless Intelligence and ITU.  
 Note: Regions in the chart above include developing countries only.

In 2011, the mobile phone ecosystem provided more than five million jobs and contributed around US\$15 billion directly to government revenues in sales and import taxes and regulatory fees (A.T. Kearney, 2011, p 21).

Unlike the traditional fixed-line telecommunications sector, the mobile industry in Africa has always been competitive in most African economies, with Nigeria having as many as nine licensees, and most countries having three or more operators<sup>3</sup>.

# Sett lite SHOP

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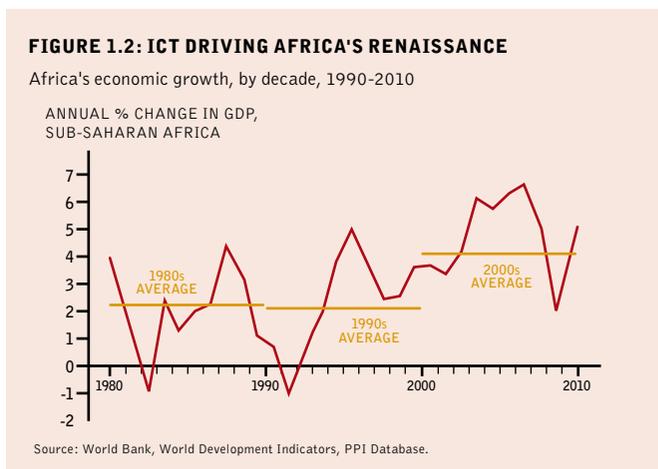
Even South Sudan, which has one of the lowest levels of cellular penetration in the world at about 12 per 100 inhabitants, supports five separate operators, soon to be six (Kelly and Minges, 2011).

The industry has gone through several waves of expansion and consolidation, and some of the largest African-based groups have recently been sold to foreign owners<sup>4</sup>. Nevertheless, African-owned mobile phone operators, like MTN Group, have grown to become major players on the world stage.

But the significance of the direct contribution of ICTs to the African economy is secondary to their indirect contribution, in driving growth in other sectors.

**Africa's "mobile decade" has driven its economic growth. World Bank research has indicated that, between 2000 and 2008, Africa's early reformers enjoyed an extra 1.2 percentage point boost to GDP compared to those that only liberalized their telecom sectors later (Williams *et al*, 2011, p 111).**

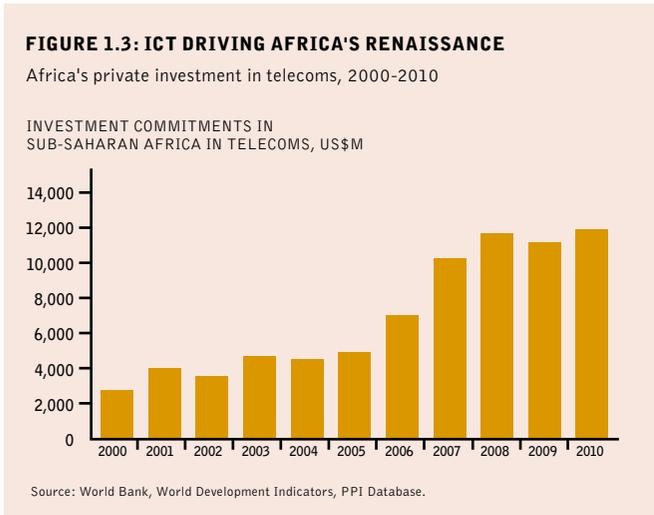
Africa's economy has enjoyed a renaissance in the 2000s (OECD *et al*, 2011) with the average rate of economic growth of almost 5 per cent, which is higher than anything achieved since the 1970s (Figure 1.2).



Many factors have contributed to this, including increasing political stability, higher commodity prices and reforms in other sectors of the economy. But it is not too fanciful to believe that the wider availability of ICTs has also contributed greatly to this African renaissance.

Foreign Direct Investment is also booming, increasing almost fivefold between 2000 (US\$27 billion) and 2010 (US\$122 billion), though it has declined in the north of the continent recently owing to the fall-out from the Arab Spring (OECD *et al*, 2011).

In the telecommunication sector, private investment, much of it from foreign sources, is growing and contributed some US\$77m between 2000 and 2010 for Sub-Saharan Africa (Figure 1.3).



Africa is now a much easier place to do business, thanks to its much-improved connectivity. ICTs directly contribute around 7 per cent of Africa's GDP, which is higher than the global average. That's because, in Africa, mobile phones are also substitutes for many other types of service, such as financial credit, newspapers, games and entertainment so the value of a mobile phone may be higher in Africa than elsewhere.

**We are now seeing the rapid development of mobile broadband with smartphones and affordable tablets across Africa. This will bring even greater social and economic impacts over the next decade.**

ICTs can empower the lives of Africans and are driving entrepreneurship, innovation and income growth. The effect of ICTs on the African economy is impressive, but it is the way they are changing the everyday lives of Africans that is genuinely transformational.

The eTransform Africa report contains more than 20 detailed case studies of ICTs in action.

The case studies show, for instance, how mobile phones are being used to provide financial services in Kenya (M-PESA) and agricultural market information services in Ghana (*Esoko*, see Box 1.1), how electronic filing of taxes in South Africa or sensor-based irrigation systems in Egypt are revolutionizing traditional practices, and how ICT tools are helping Africans face up to new challenges, like climate change, or tackle ongoing issues, such as HIV/AIDS.

Furthermore, the wider use of ICTs in government is bringing more transparency and openness, for instance through Kenya's Open Data initiative (Rahemtulla *et al*, 2012) or the use of Twitter and Facebook to coordinate protests and inform international opinion as part of the Arab Spring (Dubai School of Government, 2011).

This growing social and economic dependence on ICTs brings new challenges, not least the need for infrastructure to become more robust and resilient, and for services to become more reliable.

Issues of cybersecurity and data protection will also come to the fore as security and trust become increasingly important.

### **BOX 1.1: ESOKO, A MOBILE PLATFORM TO SUPPORT FARMERS**



Esoko is a pioneering mobile tool, developed first in Ghana and now being used in some 15 different countries in West and East Africa.

The application provides users with agricultural market information service (AMIS) such as up to date prices and their recent trends, weather forecasts and alerts, and crop production levels in order to help farmers to improve their productivity and sell their products at the right price, the right place and the right time.

Esoko has proved to have a significant impact on farmer's businesses. For example in Ghana, a randomized trial survey of farmers using the system compared with those not using it has shown 10 percent increases in revenues for maize, nuts and cassava. It also shows that only 14 per cent of Esoko users report not having access to credit compared to 47 per cent for non users.

Esoko also reached its sustainability threshold of 10,000 subscribers overall or 2,000 subscribers in any country in most of the markets it serves, sometimes in as little as one year.

But the market for AMIS is becoming crowded with mFarm (in Kenya) and Manobi (primarily in francophone West Africa among Esoko's African competitors (Kelly and Pehu, 2011).

Currently Esoko has an edge over other entrants due to its early start, its wider coverage and its user-friendly interface. Because it uses standard mobile services that are available on even the cheapest handset, like Short Message Service (SMS) and Unstructured Supplementary Service Data (USSD) rather than mobile applications, that are specific to particular operating systems and devices, it currently has a wider reach.

But this may prove a limiting factor as more smartphones enter the market and users demand visual applications that work on touch screen devices.

Source: Esoko ([www.esoko.com](http://www.esoko.com)) and Subervie, 2011.



# FROM ACCESS to APPS

It's not about the phone or the computer; it's about the applications and the information they deliver.

ICTs now offer major opportunities to advance human development – from providing basic access to education or health information to making cash payments and stimulating citizen involvement in the democratic process.

Phones, computers and websites are powerful tools but it is individuals, communities and firms that are driving change. Mobile phones and the internet are helping to release the dynamism of African society.

State-owned monopoly telephone companies were, for too long, a barrier to African ingenuity – owing to waiting lists, high prices and unreliable services – but now a thriving local ICT sector is part of the solution, not the problem.

In many of Africa's largest cities, smartphones can now be obtained for under US\$100, and fake phones, sold under-the-counter, are even cheaper. Today's smartphones have the equivalent computer power of a PC that would have cost over US\$3,000 a decade ago. With cheap data packages and free Wi-Fi, smartphones can be used to start a business, or to find a job.

Africa's mobile phone subscriptions will grow to over a billion well before the end of this decade, and the actual phones themselves will be replaced and upgraded.

Few phones are thrown away and there is a thriving second-hand market, which partly explains why mobile phone subscriptions (i.e. SIM cards) outnumber actual users. But the phones in use in Africa are becoming more powerful and the uses to which they are put are becoming more sophisticated (Rao, 2012).

One indication of this is the wide range of mobile applications now being developed locally (*see Box 1.2*).

### **BOX 1.2: IT'S NOT JUST M-PESA: A SELECTION OF AWARD-WINNING AFRICA-DEVELOPED ICT APPLICATIONS**

Although Safaricom's M-PESA mobile money application continues to gain a lot of international press attention, there are a number of other locally developed ICT applications that have been winning awards recently. Those shown below are just a sample.

<b>Application (country / website)</b>	<b>Short description</b>
AkiraChix (Kenya) <a href="http://www.akirachix.com">www.akirachix.com</a>	AkiraChix is an association that inspires and develops women in technology through networking, training and mentoring. Among the applications it has developed is Magme, an open source project for visual accessibility, developed for Computer Aid International.
mFARM (Kenya) <a href="http://www.mFarm.co.ke">www.mFarm.co.ke</a>	An agribusiness company and mobile agricultural information service, incubated by infoDev's m:Lab East Africa. M-Farm provides price information over SMS and provides a bulk buying service for farmers.
Etisalat Mobile Baby (Tanzania) <a href="http://www.etisalat.ae">www.etisalat.ae</a>	First launched in Tanzania, and now in the process of being rolled out more widely, the Mobile Baby application helps to combat maternal mortality by creating an ecosystem of medical healthcare professionals, NGOs, pharmaceutical and insurance companies, and government agencies to support pregnant mothers.
MafutaGo (Uganda) <a href="http://mafutago.appspot.com">http://mafutago.appspot.com</a>	A mobile application that displays the locations, prices, and special offers of nearby gas stations.
MedAfrica (Kenya) <a href="http://m.medafrika.org">http://m.medafrika.org</a>	A mobile health platform that provides symptom checkers, first-aid information, doctor and hospital directories together with relevant alert services.
Horticultural Remote Irrigation system (Niger) <a href="http://www.tele-irrigation.net">www.tele-irrigation.net</a>	Remote control of irrigation system from mobile handset.

Source: Author compilation based on country case studies at [www.eTransformAfrica.org](http://www.eTransformAfrica.org).

What's more, innovations that begin in Africa are now spreading elsewhere. M-PESA is being used in at least six countries outside Kenya and the Etisalat Mobile Baby service, pioneered in Tanzania, is now being rolled out in nine other countries during 2012. Ideas that originate in Africa are also spreading.

For instance, several African operators, including Safaricom in Kenya have made the informal practice of "flashing" (i.e. making an outgoing call but hanging up before it is answered, as a way of triggering a return call) into a service by making free "call me back" SMS messages available to subscribers.

As the spread of mobile phones begins to exceed the scope of electrification, paid recharging services are also becoming more widely available.

**The growing popularity of mobile phones in Africa is driving demand for bandwidth. At the start of the new millennium, the entire continent of Africa had less international internet bandwidth than the tiny country of Luxembourg (ITU, 2000).**

As recently as five years ago, the situation did not look promising, but a new generation of international cable projects has transformed the situation, at least for international connectivity, as more than a dozen submarine cable projects have connected Africa to the other rest of the world.

Some 68,000 km of submarine cables had been rolled out by, and a further 92,000 km are planned.

**The World Bank is involved in a number of these investments through its US\$0.5 billion Regional Communication Infrastructure Program (RCIP). The available capacity has increased rapidly from 80 Gbps in 2008 to about 15.7 Tbps projected by 2012 in Sub-Saharan Africa alone (ITU, 2010).**

This infrastructure represents the beginning of a new era of connectivity for the continent, promising greater international bandwidth and more reliable connectivity, as seen in Mauritius where the second connection to a submarine cable in 2009 led to an 83 per cent increase in international bandwidth capacity in just one year (Mauritius National Computer Board, 2011).

Getting the cables to the shoreline helps, but more investment is required to bring connectivity to users. Some 676,739 km of backbone infrastructure had been rolled out by September 2011, with new fibre being laid at a rate of 138 km per day<sup>5</sup>, using fibre to establish national backbones and to connect landlocked countries with the submarine cables as well.

### Numerous African countries are now seeing rapid development of their national backbone networks through private sector investment, public finance or a mixture of both.

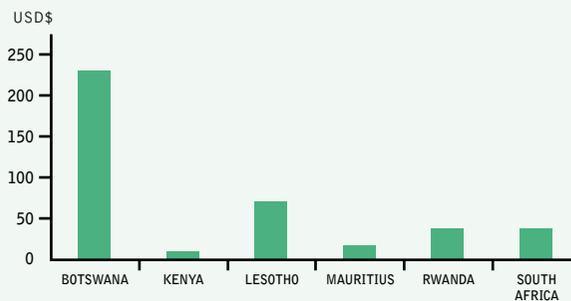
For example, Rwanda is connected to two cable landing stations through Tanzania to Dar es Salaam and also to Mombasa in Kenya. East African states are to spend US\$400m on an optical fibre backbone to link Tanzania, Uganda, Kenya, Rwanda and Burundi with more than 15,000km of cable<sup>6</sup>.

But not everywhere is benefitting. The world's newest state, South Sudan still has no fibre access to international cables and must rely upon very small apertures terminals (VSATs) for satellite access to the rest of the world. Plans to lay cable are hindered by the slow pace of demining, the lack of paved roads and an uncertain regulatory situation.

Even when both international and national connectivity is in place, the impact on users is only noticeable if there are improvements in broadband speed and reliability and a reduction in the price paid per MB. Kenya is a striking example: the connection to the TEAMS, EASSy and SEACOM cables in 2009-10 led to a wholesale price decrease of almost 70 per cent in one year (ITU, 2010) (Figure 1.4).

**FIGURE 1.4: UNEQUAL BROADBAND**

Cost for 1GB/Month in USD (October 2011)



Source: World Bank, TeleGeography.

Lower retail prices for consumers are also filtering through as seen with the announcements of tariffs reduction for broadband by Airtel and MTN (Rao, 2012) and, with help from the regulator, in South Africa<sup>7</sup>.

Broadband speeds are improving too. Ghana ranks as Africa's broadband speed star with an average household download speed of 5.29 Mbps in April 2012. Although this ranks only 70th among global economies, and is only slightly over half the global average of 10.17 Mbps, it is still a noticeable improvement on recent years.

Behind Ghana, Libya, ranks 75th with 5.13 Mbps, while Angola, Kenya, Zimbabwe and Madagascar also make the global top 100<sup>8</sup>.

### ICTs can ease cross-border communications, financial transactions, and sharing of data and information and are having a catalytic impact upon regional integration and trade facilitation.

Until recently it was cheaper to call America or Europe from Africa than to call a neighbouring country. Such disparities hindered cross-border regional trade. But, as noted above, the internet bandwidth available to Africa's one billion citizens grew 20-fold between 2008 and 2012.

These electronic highways will provide the trading routes of the future supporting Africa to improve its trade performance both within the continent and between the continent and other world regions.

One consequence of this is that an increasing share of Africa's international traffic is shifting onto IP-based (Internet Protocol) networks. This is happening both as individual subscribers use popular voice over IP (VoIP) services such as Skype, even where it is not legal to do so, and as operators themselves take advantage of the lowcost transit arrangements for their international traffic.

As an increasing share of traffic travels over IP networks and terminates on mobile phones, thus bypassing the bilateral accounting rate system, the price of terminating a call will tend to be the same, irrespective of origin.

This is reducing the disparities that used to exist between interregional and international traffic. But in this new world of globalized pricing, geography and policies still matter.

**PHONE DOCTOR**



**REPAIRING**

**CALL BOX**

**CELTEL 200**

0-40 Secs



For instance, the Union of the Comoros is disadvantaged by geography, as its population of fewer than one million means that it is bypassed by international submarine cable systems. Thus to terminate a Skype call there costs 66 US cents per minute, almost ten times higher than in more populous South Africa.

By contrast, Djibouti is advantaged by geography, because of its situation at the entrance to the Red Sea, through which many international submarine cables pass. But it is disadvantaged by market liberalization.

Djibouti Telecom's monopoly over incoming international traffic means that to terminate a Skype call there costs 39 US cents per minute, or three times the rate of more liberal Egypt, at the other end of the Red Sea<sup>9</sup>.

**Such price differences matter because there is increasing competition among countries to compete for internationally footloose investment and to be the "next India" in the global market for ICT-based services, estimated at over US\$500 billion (Sudan *et al*, 2010).**

Kenya, in particular, through the Kenya ICT Board, has set itself the goal of becoming "Africa's most globally-respected knowledge economy" by 2017, the end-point of its 2012-2017 National ICT Masterplan (Kenya ICT Board, 2012). It plans to create 50,000 jobs in ICT industries, development and innovation in 500 new organizations.

In particular, through a business process outsourcing (BPO) operation at Konza City, it hopes to attract increased foreign direct investment in this field. Mauritius has similarly ambitious plans.

**In its national ICT Strategic Plan, 2011-2012 (Gilwald and Islam, 2011), the government sets out its vision to make ICT the "fifth pillar" of the national economy, with offshore ICT services to contribute some 7 per cent of national GDP.**

The report on the competitiveness of the ICT sector carried out for this study (Excelsior and TNO, 2012, p 2) argues that reducing the cost of access for mobile and broadband is the most important single step a country can take for enhancing ICT competitiveness.

Mauritius and Kenya are better placed than most African economies to achieve this. Kenya has the lowest price and Mauritius the fifth lowest price for mobile service in Africa according to one recent survey (Research ICT Africa, 2012), with the cost of the OECD low-user mobile basket being just US\$1.90 in Kenya and US\$2.39 in Mauritius for a basket of 30 calls and 100 SMS per month.

In the case of Kenya, this is a result of regulatory intervention to set a mobile termination rate which is the lowest in Africa at 1.44 shillings (1.68 US cents) per minute (Communications Commission of Kenya, 2010).

**The deployment of ICTs and the development of applications must be rooted in the realities of local circumstance and diversity. Despite the optimism caused by Africa's ICT revolution, there is no one-size-fits-all model, and services that prove popular in one country may fail elsewhere.**

National ICT strategies must be developed locally, building upon consultative stakeholder processes and adapted to local circumstances. The private sector will drive the investment, and the influx of capital has been boosted recently, in particular by significant investments from Chinese equipment manufacturers.

**But this may not be enough to ensure competitive markets, or to reach rural areas. Furthermore, there are still whole countries, such as the newly independent South Sudan, that are connected to the outside world only through slow and expensive satellite links.**

One recent approach to the problem of market failure is via public private partnerships (PPPs), i.e. agreements between the government and private organizations to develop, operate, maintain and market a network by sharing risks and rewards.

The advantages to the private sector include reducing capital risk while for the government there is reduced operational risk. PPPs in Africa's ICT sector can take several forms:

- A cooperative model, such as the Burundi Backbone System (BBS), where a World Bank loan, made via the government, has been used to finance the construction of a national fibre backbone network jointly operated by 17 private operators and ISPs,

operating under a self-regulation model. This scheme addresses the shortage of fixed infrastructure in Burundi which, like many African countries, is dominated by wireless operators.

- A special purpose vehicle (SPV) share ownership model, as applied in Sao Tome e Principe, Liberia, Sierra Leone and elsewhere, in which the government as well as private investors are stakeholders.
- A bulk purchase model, applied in Rwanda and Malawi, where World Bank investment has been used as an anchor tenant and to aggregate demand, without any government ownership.

An older approach to market failure in the telecommunication sector involves using universal service funds (USF), usually run by the regulator or a special body, as a way of recycling the profits of the incumbent operator or from spectrum auctions and licence fees to subsidize network roll-out and to reach rural and remote areas.

Following a push in the late 1990s and early 2000s, most African countries now have a USF or, like Botswana, are planning to create one.

**But while USFs in Africa have proved efficient at accumulating cash, through levies on operators, they are less good at disbursing it, with as much as three-quarters remaining unspent according to one recent study (GSMA, 2006).**

In part, this is because mobile network roll-out has largely occurred without a need for subsidy (Williams *et al*, 2011). Universal Service obligations placed on private operators, when added to other taxes, such as spectrum fees, sales taxes, profits taxes, equipment import taxes and increasingly taxes on incoming international calls (A. T. Kearney, 2011), can place a high burden on the local industry.

And when funds accumulate without being spent, it can sometimes prove a temptation for fraud. An opportunity now exists to revise the mandates of these USFs so that they can be used for broadband network roll-out, both mobile and fixed, not just voice, and for encouraging the development and deployment of applications.



# THE ROLE OF GOVERNMENTS

Governments have an important role to play, in creating an enabling environment and in acting as a role model in adopting new innovations and technologies.

Creating a vibrant environment where useful information is readily available to help entrepreneurs, farmers, health workers and environmentalists, for example, make better decisions in their daily activities requires a holistic approach and several supporting inputs or pillars.

The key supporting pillars for such an environment includes adequate information and communications infrastructure, digital literacy and nurturing an ICT-skilled workforce that would propel emerging efforts to leverage ICTs to the next level to achieve sustainability and replicability. Taking a holistic view on a sector is a significant challenge for any government, regardless to how developed a country may be.

Yet, as shown in the following chapters, African governments have made significant steps in building these pillars.

In terms of infrastructure, much of Africa's investments, private and public, have been in increasing network capacity or bandwidth so that the quality of internet or broadband service is available to more countries on the African continent.

Infrastructure providing international connectivity (see Figure 1.5) requires large upfront investments which the private sector cannot shoulder. In these instances, public and donor funding are being leveraged. For example, in 2010 Eastern and Southern Africa was the only major region in the world not connected to the global broadband infrastructure by fibre optic cables.

Twenty countries were reliant on expensive satellite connectivity to link with each other and the rest of the world.

**African governments and development financial institutions came together with the private sector to deploy the Eastern Africa Submarine Cable System (EASSy), a submarine fibre-optic cable running 10,000 km along the east coast of Africa, connecting South Africa, Mozambique, Madagascar, Tanzania, Kenya, Somalia, Djibouti, Sudan, Comoros and Mayotte.**

Governments also participate directly in infrastructure investment, as the government of Botswana did when creating an alternative fibre route to the coast via Namibia. Hence, most of the international connectivity issues are being addressed.

However, in order for ICT services to be accessible to more Africans, connectivity within the continent needs to be further improved.

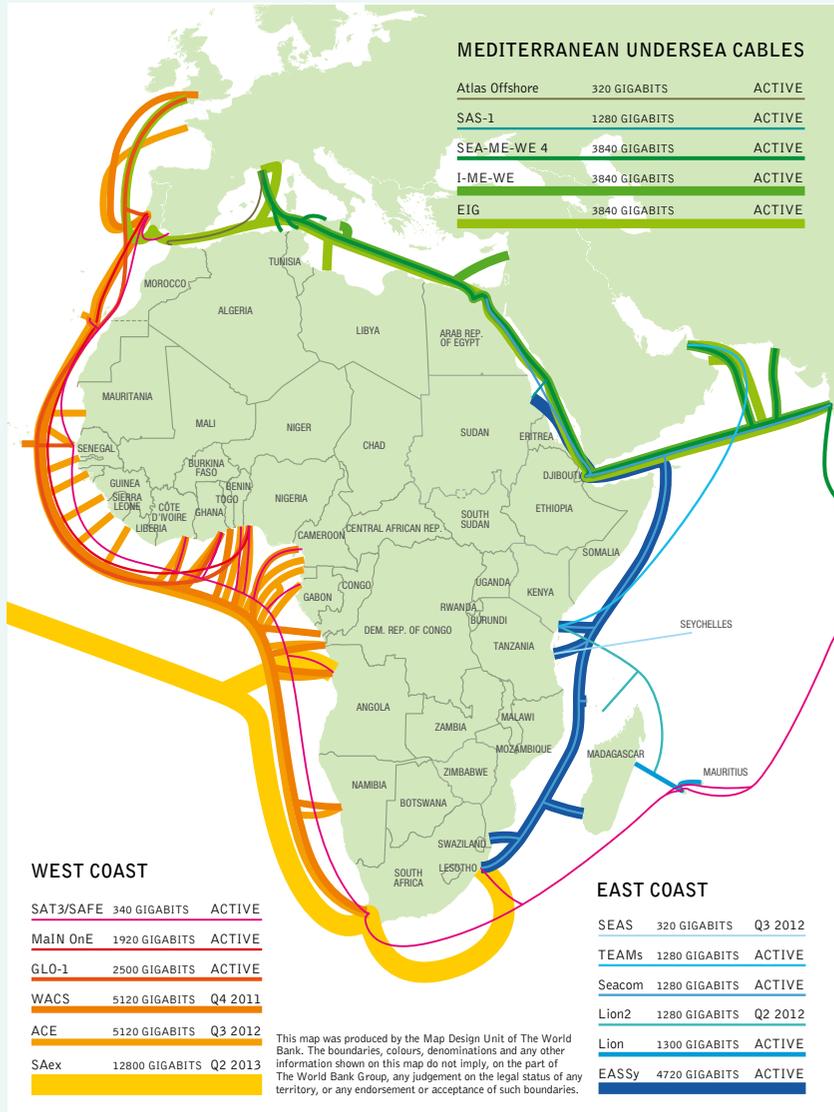
**And the government's larger role lies in creating an enabling environment – issuing licences, making available rights of way, managing spectrum, mandating infrastructure sharing and interconnection and so on – that allows a liberalized market to thrive and bring down price of service for the African consumer.**

Beyond that, governments can serve as an anchor user for faster networks and migrate their own services and data online.

When the Kenyan government opened up its databases and put public data online, including exam results, poverty and census data, it provided a major demand driver for mobile broadband, and stimulated further investment in that country's networks (Rahemtulla, 2011).

**FIGURE 1.5: RECONNECTING AFRICA**

Undersea cable systems serving Africa, actual and projected, April 2012



Source: <http://manypossibilities.net/african-undersea-cables>.

Similarly, in Ethiopia, government and donor sponsorship of eHealth initiatives is helping to finance network investment (Vital Wave Consulting, 2012a).

In order for people to fully leverage and benefit the new ICT capacity that is increasingly becoming accessible in Africa, attention on improving digital literacy rates and ICT skills will become more and more important. ICT can be an engine of growth when it is embedded into the daily activities of people – whether in agriculture, education, financial services, health or delivery of public services.

The challenge to raise digital or ICT literacy is likely to be a greater challenge than deploying infrastructure and creating robust and innovative markets for private operators to thrive in. Increasing ICT skills requires a number of factors.



Throughout this report Kenya is highlighted as having many of the drivers in place including improved access to broad-based primary through to graduate level institutions, a large diaspora who return to the country pursuing opportunities in entrepreneurship, and high exposure to international institutions owing in part to its role as the African base for many multinational companies and international organizations.

### **Creating an enabling environment in which the ICT sector can thrive and stimulating demand for services are important roles but, in the context of transformation, governments need to do more.**

In many of the sectors covered in this report – such as climate change adaptation, education, health or directly modernizing the operations of government – government is the leading investor and provider of services.

It is essential, therefore, that there is policy coherence between the government's objectives for the ICT sector and its objectives for the user sector (OECD and infoDev, 2009). This is also true in other areas where the government provides regulation, such as financial services.

Rules governing access to the SIM card are important in opening up and harmonizing mobile money (Makin, 2009) while financial regulations, such as those relating to money laundering, provision of interest or lending, may also need to be reviewed.



# Stakeholder COLLAB- ORATION

Effective use of ICTs will require cross-sectoral collaboration and a multi-stakeholder approach, based on open data and open innovation.

Valuable and sustainable ICT applications are most likely to develop within an environment that encourages experimentation and collaboration between technologists, entrepreneurs and development practitioners.

Often, stakeholders may combine their interests in communal projects, such as the creation of the Cape Town Internet Exchange. The recent flowering of local ICT development clusters (LIDs) – such as iHub and NaiLab in Kenya, Hive CoLab and AppLab in Uganda, Activspaces in Cameroon, BantaLabs in Senegal Kinu in Tanzania or *infoDev*'s mLabs in Kenya and South Africa – is helping to create new spaces for collaboration, training, applications and content development, and for pre-incubation of firms (Box 1.3).

Stakeholder cooperation is vital also for providing initial fund for pilot programmes and trials.

For instance, among some 92 mobile applications around the world identified in a recent World Bank study (Qiang *et al.*, 2012), only 15 per cent had commercial or private funding as their primary source of income. Donors provided the primary funding source for over half the programmes, and governments and corporate social responsibility programmes provided the rest.

**BOX 1.3: LOCAL ICT DEVELOPMENT CLUSTERS**

Located on the 4th floor of a modern office building in

Nairobi, where a sunny balcony gives views over the bustling city, Kenya's iHub provides a space where young entrepreneurs can network, while joining focus groups discussions, receiving mentorship, and chatting to venture capital investors.

Apart from having the best coffee shop in town, its other big attraction to the nation's digerati is that it offers a fast broadband connection, which is the quickest way to set up a business in Kenya.

Established in March 2010 by Erik Hersman, a renowned blogger, TED fellow and entrepreneur, it now has over 2,000 members benefitting from the co-working space.

It's not quite a business incubator, though there are two of those in the same building, with Nailab next door and infoDev's m:Lab East Africa one floor below. Rather, it might be described as a "pre-incubator" where good ideas come to take shape and be turned into commercial prospects.

The young technologists who crowd into the place are able to get the necessary support to develop their ideas into marketable products.

iHub is part of a much larger technology movement in Kenya and in Africa. Two important predecessor organizations that helped shape iHub are Skunkworks, an informal grouping of mobile applications developers, and Ushahidi, a non-profit software company co-founded by Erik Hersman, that develops free and open source software for information collection, visualization and crisis mapping.

Ushahidi was born in the aftermath of the disputed elections in early 2008 and has subsequently been used in over ten countries, primarily to map critical information to aid disaster recovery efforts such as in the Haiti earthquake in 2010 and the Japan earthquake in 2011.

iHub is now, in turn, giving birth to other spin-offs, such as iHub research, and Akirachix, both female-run start-ups.

iHub's success has been widely followed elsewhere. Africa continues to see the emergence of technology labs in Kampala (Hive CoLab), Dar es Salaam (Kinu), Dakar (Bantalabs), Thswane (mLab Southern Africa) and Douala (ActiveSpaces) as well as new initiatives that are coming online in Accra and Lagos.

The labs serve as an accessible platform for bringing together technologists, investors, tech companies and hackers in the area. Each lab shares a focus on young entrepreneurs, web and mobile-phone programmers and designers.

The technology movement in Africa is being driven by the youth who, through these labs, have the means and foresight to apply new and accessible technologies to solve immediate problems and find useful solutions for common problems. Many of the youth are in tune with the problems and challenges that are faced in the communities in which they live.

The labs conduct workshops among themselves to share experiences and brainstorm ideas, and use digital technology to create tech communities that have no borders.

This approach to nurturing technology is quite different to the top-down approach that had been tried in the early 2000s of building science parks, or government run initiatives to promote business process outsourcing.

The difference this time is that these initiatives are generally bottom-up and community driven. They may receive the blessing of government but are not dependent upon it for providing opportunities for training and capacity building.

M-PESA, the mobile money application in Kenya, is perhaps Africa's best known mobile application, and now a huge commercial success.

**But even M-PESA required an initial boost of donor cash, from UKaid. It is now supported by a large ecosystem including the mobile operator (Safaricom), conventional banks (including Equity Bank) and a network of 27,000 agents across the country.**

In the specific case of mobile money (Vital Wave, 2012b), the study carried out for this report makes the following recommendations to donors:

- Reduce private sector risks by underwriting the risks of “first movers”;
- Reduce shared costs by underwriting supporting systems that are common all financial service players; and
- Leverage limited donor resources to drive private and consumer action towards desired financial service sector goals.

Effective cooperation will require a spirit of openness and transparency on the part of all stakeholders. This is exemplified in the case of agriculture, also profiled for this report (Deloitte, 2012), where the value chain that links consumer and producer is extensive, and often crosses continents. This sector report makes the following recommendations to donors:

- Develop self-sustaining funding solutions;
- Focus on community ownership;
- Make eAgriculture technology robust and accessible;
- Focus on capacity-building; and
- Develop country-specific agriculture strategy maps.

This latter recommendation, in particular, will require transparency and data exchange between many different organizations, including those holding satellite imagery, agricultural production statistics, soil and terrain maps, agricultural market information systems and so on.

Promoting a culture of open data requires a framework, such as that provided by Kenya's Open Data Initiative, which makes available a centralized website where government departments can post data and users can easily find it (Rahemtulla, 2011).

# NOKIA

CONNECTING PEOPLE



Another useful data framework is provided by a national spatial data infrastructure (SDI) which provides the basic set of digital coordinates for geographical information on which specific datasets and geographical information systems (GIS) can be overlain.

Many GIS have considerable financial value, for instance for navigation or for mining. Others have great social value, for instance, data visualizations showing the impact of climate change or land use.

But without the backbone of a national SDI, the cost of constructing such overlays rises considerably and their usefulness, for the interchange of data, is diminished. A national SDI is therefore a classic example of a public good which is best created through collaboration between public and private stakeholders.

The costs are often quite modest – a feasibility study for creating a national SDI in Uganda, for instance, puts the cost at about US\$3.5m, which is relatively small in comparison to government departmental budgets (Geo-Information Communication and ESRI Canada, 2011) – and the benefits can be long lasting.

But the problems of coordination can be huge as an effective SDI requires the participation of so many different stakeholders.

**Africa is still at the beginning of its growth curve and, so far, most ICT applications have been pilot programmes. Now is the time for rigorous evaluation, replication and scaling up of best practice. The research carried out for this study has highlighted a number of success stories and has shown examples of programmes that could be scaled up and replicated elsewhere.**

But there is a lack of systematic monitoring of outcomes, and cost-benefit analyses of investments are rare (*Box 1.4*).

Indeed, one of the surprises coming out of this study is how little systematic impact evaluation has been carried out and published.

Nevertheless, the evidence that has been marshalled in these studies, the most comprehensive carried out to date, does point to the potential for effective roll-out and a period of rapid growth ahead.

**BOX 1.4: AFRICAN VIRTUAL UNIVERSITY**

AFRICAN VIRTUAL UNIVERSITY  
UNIVERSITE VIRTUELLE AFRICAINE  
UNIVERSIDADE VIRTUAL AFRICANA

Founded in 1997, the African Virtual University (AVU) is a Pan African Intergovernmental Organization whose

aim is to significantly increase access to quality higher education and training through the innovative use of Information and Communication Technologies.

It has its headquarters in Nairobi, Kenya with a regional office in Dakar, Senegal. The AVU has graduated 43,000 students across Africa and established a wide-ranging network of Open Distance and eLearning institutions in over 30 countries in Sub-Saharan Africa.

Since its inception, the AVU has benefited from donor resources and, in January 2012, AVU received US\$15.6 million from the African Development Fund for the second phase of the AVU Multinational Project.

This grant is intended to enable participating African countries and institutions to improve their infrastructure and programmes, and provide technical assistance on their ICT in education policies and strategies. The grant will also support research and development, open educational resources, and gender mainstreaming through the award of scholarships to women enrolled in science programmes.

The AVU would benefit from a more rigorous evaluation to identify success stories and what programmes might be scaled up or reformed.

Source: Authors and <http://www.avu.org/News/the-african-virtual-university-receives-a-grant-of-usd156-million-from-the-african-development-bank-group-to-help-increase-ict-in-education-support-to-african-countries.html>.

Africa was once an ICT laggard, but is now becoming an ICT leader. In virtually every area of ICT – mobile, broadband, international bandwidth, PC penetration – Africa is closing the gap with the rest of the world and in some areas, like mobile financial services, it is setting the pace.

The studies in this report document a huge amount of local-level innovation, both in adapting applications developed in the rest of the world to African circumstances and in developing new home-grown applications. But there is insufficient south–south learning.

**It remains the case that African leaders are more likely to look outside their continent for role models than to look at the successes happening next door.**

Ironically, south–south learning is already happening in Africa, but not so much among its leaders as among its young people.

Social networks, like Twitter, Facebook and Africa's home-grown MXit (see Box 1.5) provide a platform for informal learning to take place in an environment of fun and experimentation.

It is a commonplace to say that Africa's greatest strength is its youth, but in this case it is really true.

**As the generation of Africans that have grown up with mobile phones and social media enter the labour market and government, they will bring with them the habits of information sharing that they have grown up with. That will be a real eTransformation.**

#### **BOX 1.5: MXIT, HOME-GROWN AFRICAN SOCIAL NETWORKING**



MXit, a South African social network, has become the premier social network in its home country and has expanded to reach more than 30 million users across Africa and beyond with 40,000 new users joining every day. Overall, MXit has 50 million users registered in more than 120 countries.

In the first half of 2011, MXit registered 24 million users just in Sub-Saharan Africa compared to less than 19 million for Facebook, making MXit the biggest social media network in Sub-Saharan Africa.

Success has been enhanced by the high level of activity of its users compared to other social networks, with an average MXit user spending 45 hours per month on the site.

Source: [www.mxit.com](http://www.mxit.com) and newspaper reports.

For the complete report and a list of references used within the article, please visit: <http://siteresources.worldbank.org/EXT/INFORMATIONANDCOMMUNICATIONANDTECHNOLOGIES/Resources/282822-1346223280837/MainReport.pdf>.

1. GSMA, "Africa now the world's second largest mobile market, reports GSMA", November 2011, <http://www.gsma.com/publicpolicy/wp-content/uploads/2012/04/africamobileobservatory2011-1.pdf>.
2. "Digital Africa", Intelligent Life, <http://www.economist.com/node/18529875>.
3. Wireless Intelligence (2012), <https://www.wirelessintelligence.com>.
4. For instance, Orascom Telecom of Egypt, which has holdings in seven African countries was acquired by VimpelCom of Russia, via Wind Telecom, in 2005. The African company MSI Cellular Investments, which later became known as Celtel was acquired by Zain and later by Bharti Airtel of India in 2010. MTN, with headquarters in South Africa and operations in 17 African economies, remains the largest African-based operator.
5. Hamilton Research, "Africa's fibre roll-out", <http://www.africabandwidthmaps.com/?p=2572>.
6. <http://thecitizen.co.tz/magazines/31-business-week/11510-east-african-states-to-spend-400m-on-optical-fibre-backbone.html>.
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8. <http://www.netindex.com/download/allcountries/>, speeds retrieved on 14 April 2012, with average speeds being a rolling mean over the previous 30 days.
9. Skype Out tariffs are available at: <http://www.skype.com/intl/en-us/prices/payg-rates/>. Skype is used in this comparison because it publishes rates for all countries on its public website.

Source: World Bank [www.worldbank.org](http://www.worldbank.org), "The Transformational Use of Information and Communication Technologies in Africa", published in 2011.

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