A Continent Embraces the Cell Phone

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-- Author's Biography --

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Abstract

From Nigeria to Somalia to South Africa, the effects of the mobile phone in sub-Saharan Africa have been extraordinary. Individuals who previously had little access to banking services and no accounts are now opening 'm-bank accounts' and using their phones as debit cards anywhere there is cellular coverage (credits and debits get exchanged and confirmed via text message). In nearly any village or city one now finds entrepreneurs with multiple mobile phones who buy airtime in bulk and charge a small premium for the cellular-less to make calls. Others offer 'step messaging' where a client sends a message to the very limits of cellular coverage, then, for a fee, a runner takes the message the final distance on foot. Mobile phones are even being used in the fight against HIV/AIDS. New mobile software has been specifically developed so medical practitioners can feed into cellphones information about patients, from what symptoms they show to what medications they are on. And patients and care-givers receive information via text message on everything from drug adherence instructions to advice about how to provide home-based palliative care. In the African context, the mobile phone holds the promise of being a tool for widespread, sustained economic development from the grassroots level up.

Something in the Air

Monoliki, a spear-toting, red-clad Maasai warrior, is leading your author up a 600-meter-high vertical face of the Great Rift Valley Escarpment in Tanzania, in East Africa. He points to grasslands in the distance and talks about the nomadic life of his people. He explains how his people's very survival depends on whether they find grass and water for their cattle and goats. He speaks of those in his village who died in the last drought. He describes how he defends his herds from wild animals with nothing more than the spear he carries. It is as if I have trekked back in time decades, if not centuries. I could easily be in the company of one of Monoliki's ancestors who, most assuredly, spoke of similar matters of life and death.

Suddenly a shrill whistle is heard. Monoliki stops in his tracks. I wonder what rare bird we might see. *Habari yako?* – 'What's your news?' Monoliki asks in Swahili. He has pulled a cellphone out from under his

traditional *shuka*. Our elevation is such he is now able to pick up a signal
from a distant, unseen tower near the town of Mto wa Mbu.

The above incident highlights how ubiquitous the mobile phone has become in Africa,
much as it has elsewhere. In fact, cellphone usage in Africa is growing faster than in any other
region. In 2003 there were an estimated 63 million cellphone customers on the continent. By 2006
that number had climbed to 154.9 million. In one country alone, Congo, almost 8,000 new
cellphone customers sign up each day.[1] Gilbert Nkuli, an employee of Vodacom Congo has
observed: 'People would rather be without a shirt and trousers, and they'd rather go for days
without food, instead of not having a phone.'[2] This sentiment will likely be echoed elsewhere as
cellular coverage grows from covering more than 60 percent of the continent today (up from 10
percent in 1999), to over 85 percent by 2010.[3]

The fact that sprawling Congo has only 20,000 land lines – many of which are down at
any given time -- explains why so many of Congo's 60 million citizens might want a cellphone.
Individuals in distant corners of the country can connect by sending a text message for the
equivalent of five U.S. cents, or speak directly for US$0.26 per minute. But Congo is one of the
world's most chaotic countries, with a per capita income of US$700 at purchasing power parity.
Many individuals in other parts of Africa are even worse off, living on less than one US dollar a
day. The low incomes of customers combined with high expenses of operating in Africa provide a
daunting prospect for some mobile telecommunications operators. For example, it might cost a
cellphone company up to US$164,800 to erect *only one* cellphone mast and base station – enough
for a mere 30-kilometer radius of cellular coverage. And then there are other costs.

When electricity is absent, a company must power its cellular base station(s) through its
own efforts, often with expensive, imported generators which consume lots of fuel. Maintenance is
never-ending as hot savannahs or rain-soaked forests can take their toll on structures. Theft is a
concern, too. Security fences around a cellphone tower might disappear one day only to reappear
the next in a distant village as an enclosure for a person's goats. Wiring inside a base station might
be stripped, the copper sold to a scrap dealer. Personnel issues range from a lack human capital

stemming from poor educational systems and emigration (meaning engineers have to be trained and/or brought into an area at great expense), to absenteeism resulting from AIDS-related complications (nearly 63 percent of the world's HIV-positive cases are in sub-Saharan Africa). Corruption, red-tape and ever-changing laws and regulations can also be a problem. Given such realities, what cellphone companies would want to operate in such an environment?

The five biggest mobile phone companies in Africa are MTN of South Africa, MTC of Kuwait, Egypt's Orascom, the United Arab Emirate's Etisalat, and Vodacom, an Anglo-South African firm. There are innumerable smaller operators, also. For most, market space opened up after the telecommunications bust of 2001. All are playing the numbers: in 2006 subscriber growth in Africa was 40 percent on average but exceeded 100 percent in some countries; revenue growth for established mobile telecommunications companies in Africa is increasing by 20 to 50 percent annually; profit margins for most mobile phone companies on the continent are hovering at around 40 percent. And still only an estimated 15 percent of Africans have a cellphone.[4]

Of course profits are not guaranteed in Africa and competition is growing. Mobile phone companies must therefore be creative with their business models. To attract customers, Celtel (bought by MTC for US$3.4 billion in 2005) created a 'One Network' which eliminates roaming charges for customers travelling between the neighbouring countries of Kenya, Tanzania and Uganda. The company also created a system which allows subscribers to add airtime in different currencies.

Somalia – A Mobile Mecca

In Somalia, there are a dozen or so mobile phone companies in the country. None can compare to MTN, MTC, or Vodacom in terms of market capitalization. Where they do compete is in finding ways to be profitable. Consider the system of flat-rate billing which has emerged. For US$0.30 a minute or less a person can use a local mobile provider's service to call *anywhere on the planet*. This practice stems from the unfortunate fact most Somalis have little or no hope of ever leaving their failed state, yet those who have left are scattered to the farthest corners of the globe.

A universal, global rate means a customer can call from Somalia to Afghanistan or Zimbabwe for the same rate, at any time. He knows exactly what each minute will cost him. At first blush this billing practice might not seem ideal from a company's perspective because margins on most international calls are slim. Still, the flat-billing scheme does make money, through volume. A company with the lowest flat rate tends to get more word-of-mouth references. More word-of-mouth references results in more customers. More customers mean more calls from, say, Mogadishu to Minneapolis, USA. And when Somalis connect, especially with family members, they tend to chat for quite some time.

Somalia's mobile phone companies have business models which take other local factors into account, oftentimes to the benefit of the consumer. Prices do not need to be inflated to generate revenue for advertising on billboards or flyers because so many potential customers are illiterate anyway (hence the importance of finding ways to encourage word-of-mouth recommendations). Likewise, prices do not need to be inflated to cover customs duties and licensing fees; Somalia lacks a central government capable of collecting such things. This said, there are taxes of a kind in Somalia. For example, weapons-laden warlords often demand protection money. But even then, most warlords show restraint in what 'rates' they charge. This is because even the harshest Somali warlord wants to have a working mobile with the best cellular network possible. Charge too much and cellular providers might quit an area.

Ironically, it is in places with more effective governance than Somalia where one sometimes finds near banditry. Some African governments appear to go out of their way to hit mobile network providers with stifling taxes and endless red tape. This is because most cellular companies operate in the formal economy, with requisite storefronts and office space. Many are also profitable – sometimes very much so. Accordingly, they are easier targets for tax collectors and bureaucrats than, say, informal street vendors and day-labourers. To this one must add that occasionally governments' reasons for taxes and red tape are more nefarious: their goal is to

protect lumbering state-owned telecommunications companies while squelching any would-be competitors.

Giving Credit (or Debits) Where Due

Beyond Somalia, companies are encouraging people to use their mobile phones – and consequently, more billable minutes -- for activities beyond talking or text messaging. In South Africa for example, Vodacom has begun offering Wizzit services to all its clients. Wizzit was one of the earliest, if not the earliest, mobile phone banks in Africa, or 'm-bank.' Founded in 2004, Wizzit has no branches of its own. Instead, the company helps cellphone customers set up an account with credits, and then lets them use their phones as a debit card everywhere there is cellular coverage (Wizzit works with all types of phones across all networks in South Africa). It is a win-win for both companies: Wizzit takes a small fee for each transaction; each transaction takes airtime, for which Vodacom can levy a charge. Growth of m-banking should continue for quite some time. It is estimated 14 million South Africans have no bank account, but of these, nearly 60 percent do have a mobile phone.[5]

As cellular coverage has expanded across the continent, so too has the number of m-banks. From Globacom's 'Glo Mobile Banking' in Nigeria, to Safaricom's 'M-Pesa' in Kenya (*pesa* means 'money' in Swahili), to 'Wizzit' in South Africa, mobile banking holds the prospect of fostering microenterprise to a degree previously unseen. Granted, it might seem m-banking works against consumers because they have to pay transactional fees to an m-bank, plus they incur costs when they use their mobiles. But in many parts of Africa, especially rural areas, there are no banks, no ATMs and no credit card or debit card facilities. Consequently, individuals have to spend time and money travelling to a town with a bank, hide money in huts and homes, or carry lump sums on their person and hope they do not get robbed. In an m-bank arrangement, these same individuals can make secure deposits at local 'cash points' consisting of an m-bank employee with a company cellphone. A text message confirms each deposit almost instantly. Thereafter, all kinds of goods and services – vegetables in an open-air market, haircuts in a local shop, soda at a road-side stand –

can be purchased and provided through the exchange of text messages noting credits to, and debits from, respective accounts.

M-banking is even playing a role in resolving one of Africa's most horrendous conflicts.

M-Banking on Peace

Between 1998 and 2002, an estimated 4 million Congolese died as armies and rebel groups from no less than eight different African countries rampaged across Congo. In 2003, a tenuous peace agreement was reached, armies withdrew and rebel leaders were enticed into a transitional government. By 2006, the largest United Nations peacekeeping force in the world, over 17,000 strong, was on the ground to help carry out Congo's first democratic elections in nearly 46 years. When Joseph Kabila was declared the winner in November 2006, rival leaders threatened a return to war. Fortunately, many would-be fighters were dissuaded from doing so thanks to a program meant to integrate ex-combatants back into civil society.

The program is financed through the World Bank, Britain, France and other donors to the tune of US$200 million. Former combatants are enticed to turn in their weapons with the promise of a one-time payment of US$110, followed by monthly payments of US$25 for a year plus skills training. Initially, the effectiveness of the program was hindered by the logistical nightmares posed by keeping track of handwritten entries in thick account books for 75,000 people scattered across a country the size of western Europe. When administrators realized 70 percent of Congo has at least some form of cellular coverage, payments began to be dispersed through m-banks such as Celpay (Celpay being the largest mobile-bank in Congo). Text messages now provide accurate records-of-account, all easily and quickly retrieved and shared through mobile phone networks.

Calling to Account

But if cellular technology is playing a part in ending Congo's war, the world's insatiable appetite for mobile phones has created other problems. Cellphones, like most electronic devices, use coltan, a heat-conducting mineral. Congo is estimated to have almost 80 percent of the world's

known reserves, most of it in the country's east. With prices for the mineral hovering around US$600 a kilogram, compared to a value of US$65 per kilogram a few years ago, a UN Security Council report has charged there are numerous instances in Congo of 'highly organized and systemic exploitation' taking place. Culprits include local 'big men' and armed elements from neighbouring Uganda, Burundi and Rwanda -- all supported by a network of illegal miners, smugglers and corrupt officials. Some miners work in forced-labour situations. Nearly all miners work under the harshest of conditions. The prevalent extraction technique typically requires teams of men to strip layers of rock and dirt by hand, carry the material in baskets over broken ground to a stream-side hole, immerse themselves in water and mud in the hole, then 'pan' soil and rock away. If cobalt is present, it settles to the bottom. On a good day, a team of men might produce one kilogram.

During Congo's war, Kahuzi Biega National Park became a favoured mining centre for cobalt. During that time, the park's mountain gorilla population was cut nearly in half, from 258 to 130. The 128 mountain gorillas killed represented nearly 20 percent of the world's known animals. While some gorillas died from habitat loss, many more were killed for 'bush meat' and sold to hungry miners and militants.

Other environmental concerns arise from what happens to mobile phones once they are discarded. It is estimated that 200 million cellphones are put out of service each year, and that only eight percent are recycled or refurbished.[6] A 2004 University of Florida study in the United States found at least seven toxic substances inside most mobiles, including lead, arsenic and cadmium. As some countries have tightened regulations regarding the use of these substances, such as members of the European Union, Africa has become a convenient dumping ground. Many African governments lack regulations regarding such toxins, or only half-heartedly enforce existing policies.

Cellphones have even become associated with some of Africa's most intractable problems. In conflict areas, rebels coordinate operations across cellular networks. Corrupt government

officials now demand bribes in the form of transferred airtime minutes. In South Africa, thugs now rob children walking to or from school of their cellphones at gun- or knifepoint. And in Nigeria, text messages were used to intimidate political candidates and voters in the run-up to state gubernatorial elections in 2006. One mass-distributed text message of note said: 'Since you continue to oppose Governor Fayose, we shall kill you – The Fayose M Squad.' (The 'M' in the message being shorthand for 'murder.')

Buy and Sell, by Cell

Yet the good in Africa resulting from mobile phones far outweighs the bad. For example, one of the fathers of Africa's mobile industry, Mo Ibrahim, the Sudanese-born founder of Celtel, has created a foundation that offers US$5 million to African leaders who promote good governance. Geographically limited to the 48 states of sub-Saharan Africa, award rules stipulate 'Eligible candidates will have taken office through proper elections and left having served the constitutional term stipulated when taking office.' He has also created a US$100 million venture fund for African entrepreneurs – not that all business-minded Africans are waiting for angel investors like Mr. Ibrahim.

Already Manobi, a telecommunications firm based in Senegal, has clients who pay for the company's text message dissemination of agricultural and fish prices in different markets. Trade at Hand, a UN-funded project, informs cellphone-carrying farmers in Burkina Faso and Mali daily about fruit and vegetable prices in local and global markets. Producers now shop for the highest prices they can obtain.

Alternatively, farmers can advertise their agricultural products and wait for buyers to contact them – as one initiative under way in West Africa proposes. TradeNet, a software company based in Accra, Ghana, has developed a stripped down version of eBay for mobile phone owners. Buyers and sellers of all sorts of goods and services send TradeNet a text message stating what they want or what they have. The company's software then makes appropriate matches and notifies relevant parties with a text message in one of four languages (the parties get to choose what

language they prefer). Listing offers is free. So, too, is receiving text messages. The company says it plans to make money in the near term by collecting information on those who trade on its system – names, locations, interests and telephone numbers – and then selling the information to advertisers. Cellphone dating services in Africa are employing a similar TradeNet format.

Mobile phone markets are benefiting economies and the environment in other ways, too. In Nigeria, a cellphone consortium led by MTN Group has moved away from powering mobile phone base stations with fossil fuels. They instead prefer to use biofuels derived from locally-grown palms, groundnuts, pumpkin seeds and jatropha, a drought-resistant hedge plant. Farmers receive a premium for their bio-products even as the cost of providing cellular coverage is lowered for everyone else. On this last point, the Swedish telecommunications giant Ericsson estimates up to 80 percent of the cost of a rural cellular network in Africa is related to obtaining, transporting, storing, securing and using fossil fuel at base stations when no other type of energy is available or reliable. The company further notes a typical mobile phone base station in rural Africa might use up to 25,000 litres of fuel every year, or the equivalent of 20 cars each driving 20,000 kilometres annually. By significantly cutting their consumption of fossil fuels, the company is able to pass savings on to consumers (or reinvest such savings to expand its cellular networks) even as it provides for cleaner air.[7]

The cellphone is also bridging the digital divide. Eric Schmidt, the CEO of Google, has written: 'In sub-Saharan Africa, less than one percent of households have a landline. Even if every home had a high-speed broadband connection, a lot of families could never afford a personal computer. Mobile phones are cheaper than PCs, there are three times more of them, growing at twice the speed, and they increasingly have internet access.'[8] Google and Yahoo are both pushing mobile manufacturers to make *every* handset e-mail and internet-capable. Skype and other voice-over-internet protocol companies already enable individuals to make calls world wide without having to pay expensive roaming charges or costly international rates. As voice-over-internet protocol mobiles become the norm, and as e-mail and internet features on phones become more

common, more Africans will be able to buy, sell and communicate globally with even greater economy and ease.

Nearly everywhere in Africa -- in village centres, in crowded open-air markets, around transportation hubs -- one now finds entrepreneurs with multiple mobile phones who buy airtime in bulk and charge a small premium for the cellular-less to make calls. Around them has sprouted a host of other informal enterprises. Self-taught repairmen, equipped with little more than a screwdriver and know-how, rebuild almost any phone. A person with a multi-socket powerstrip recharges customers' phones – or sells modified car batteries and hardware for the same purpose. A person can be hired to type text messages for the illiterate. Another offers 'step messaging' where a client sends a message to the very limits of cellular coverage, then, for a fee, a runner takes the message the final distance on foot.

More formally, small kiosk owners in rural Uganda (and elsewhere) have begun to transmit money with an efficiency even Western Union or Wells-Fargo might appreciate. The system is called *sente*, and usually involves a sender in a distant city buying a mobile minutes top-up card. Instead of topping off his own cellphone, though, the sender tops up the phone of the distant kiosk owner. The kiosk owner then converts the minutes into money – minus a commission – and gives the money to a designated recipient. Still larger shops upload songs to cellphones and personalize ringtones; in September 2006, Cellulant, a Nairobi, Kenya-based company employing 14 people, claims to have sold more than 220,000 song snippets and jingle at an average price of US$0.82 per personalized ringtone. Perhaps unsurprisingly, the University of Nairobi now offers a nine-week course entitled 'Mobile Phone Programming for Entrepreneurs.' Indeed, the number and types of economic opportunities the cellphone has engendered in Africa, or could, seem endless. Consider 'The Weza' (*weza* in Swahili translates as 'you can' or 'power' depending on how it is used). An African company has created a foot-pedal generator which can charge a cellphone battery in five minutes or a car battery in half an hour. Should this device gain a market, it can only help spread the use of the mobile phone in Africa.

The benefits of mobile technology extend beyond business as well, to matters of life and death. In the field of healthcare, in emergency cases where the nearest clinic or hospital might be a day's travel away, cellphones are being used to call for help or for long-distance diagnoses. Already health workers from Rwanda to Namibia are using cellphones to track and control the spread of HIV/AIDS and other diseases. New mobile software has been specifically developed so medical practitioners can feed into cellphones information about patients, from what symptoms they show to what medications they are on. The information is then stored in central databases. If a patient moves, a new doctor can gain access to the appropriate database to continue the patient's care without pause. Text messages give patients and care-givers everything from drug adherence instructions to advice about how to provide home-based palliative care.

Hands-free for the World Cup?

In 2005, the London-based Centre for Economic Policy released a report which found a 10 percent growth in cellphone users in a developing country can raise the country's GDP by 0.6 percent. It is not unreasonable to think this figure might rise further as entrepreneurs find ever more innovative uses for mobile phones and develop spin-off industries. In the African context, the mobile phone holds the promise of being a tool for widespread, sustained economic development from the grassroots level up.

As but one sign of how prominent the mobile phone has become in Africa, MTN, the biggest mobile operator on the continent, has pledged US$65 million to the 2010 Fifa World Cup tournament, to be held in South Africa. MTN's pledge puts its sponsorship on a par with Coca-Cola and Visa. It also makes the company the first-ever 'global sponsor' from the continent. With this designation comes the opportunity for MTN to showcase to a world-wide audience its cellphones, services and accessories. One way MTN plans to do this is through the delivery of tournament video highlights to – what else? – customers' mobile phones.

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ENDNOTES

[1] Figures come from http://www.gsmworld.com/, homepage for the GSM Association, a trade group of cellular companies which collectively claims 82 percent of the world's nearly 2.5 billion cellphone customers.

[2] Quote is from Kevin Sullivan's 'In War-Torn Congo, Going Wireless to Reach Home; For Poor, Cellphones Bridge Digital Divide', *Washington Post Foreign Service*, 9 July 2006, p.A01.

[3] 'Buy, cell, hold', *The Economist*, 25 January 2007.

[4] 'Out of Africa', *The Economist*, 9 December 2006, pp.67-68.

[5] See the United Nations Foundation report 'Mobile Phone Banking and Low-Income Customers: Evidence from South Africa' (Washinton, D.C.: Consultative Group to Assist the Poor/The World Bank and United Nations Foundation, 2006), available at http://www.unfoundation.org/vodafone/mobile_phone_banking_low_income_customers_evidence_south_africa.pdf.

[6] Ben Singer, 'Mobile Phone Junkyard', *The Nation* (Kenya), 3 December 2006.

[7] See the Ericsson company website at http://www.ericsson.com/ericsson/press/photos/biofuels.shtml.

[8] Quote is from Eric Schmidt's editorial 'Let More of the World Access the Web', *Financial Times* (London), 22 May 2006, p.21.