User-led innovations in mobile use in sub-Saharan Africa
Jonathan Donner

Jonathan Donner is a Researcher at Microsoft Research India, where he studies the social and economic impacts of wireless and mobile technologies in developing countries. Between 2003 and 2005, he was a Postdoctoral Research Fellow at the Earth Institute at Columbia University, where he participated in a project to develop a nationwide information system to support Rwanda's HIV/AIDS care and treatment activities. In his receiver contribution he outlines this project, as well as other developments in mobile communication in Africa.

http://www.jonathandonner.com/
Jonathan Donner's site

The mobile telephone offers all users the same basic – yet profound – power to connect with others almost anytime, anywhere. Yet as the wireless network extends to every corner of the globe, distinct regional and national conventions of mobile communication are emerging. Individual users and small organizations play a major role in the development of these conventions. Over time, the choices they make about how to use mobiles to solve their most pressing problems become common practice.

The continent of Africa is experiencing a mobile boom, both in infrastructure investment and user adoption. In many communities in the region, virtually every telephone is a mobile, and mobiles are providing affordable connectivity to millions of people who previously had limited access to telecommunications of any kind. As a recent report from Vodafone has highlighted, the social and economic impacts of this boom are numerous; mobiles offer better access to markets, improved security, and the comfort of speaking with loved ones over great distances.

http://www.vodafone.com/assets/files/en/AIMP_09032005.pdf
Vodafone report

Recent research and projects in Rwanda provide evidence of how users in sub-Saharan Africa have adapted the global mobile/cellular system in innovative ways. This essay presents three examples that emphasize how regional practices appear in response to conditions of economic scarcity, and to the lack of landline infrastructure.

Public mobiles

One such regional innovation is the public mobile phone. We might consider mobiles as belonging to individuals, but in Africa, as elsewhere in the developing world, handsets often pull double-duty, used by multiple family members, shared among friends (perhaps by swapping SIM cards in and out), or perhaps by a whole set of users in a village or neighborhood. Across the region, many people make their living by selling individual calls on handsets. These micro-entrepreneurs play an important function in extending connectivity to people who can not afford their own handset, or who might only require an occasional call.

The most famous example of this model is Grameen Village Phone, formed originally in Bangladesh. Grameen Village Phone has recently introduced its programs in Uganda and Rwanda. A similar franchise model is found in the phone shops of South Africa, where tens of thousands of locations provide GSM-based telecommunications services. Developed originally to fulfill some of South Africa's universal access provisions, these franchises have proved extremely important to the townships and rural areas in the nation.

http://www.gfusa.org/technology_center/village_phone/
The Village Phone

But these mobile-based payphone businesses need not have the backing of major telecommunications companies or NGOs. In West Africa, for example, "Umbrella Ladies" simply set up at the side of the road with a lawn chair, a mobile, and some shade from the sun; informal resale of individual calls are common throughout the continent. This is the local user innovation I wish to highlight in this article: the impromptu phone booth!

These approaches provide a livelihood for the individual micro-entrepreneurs. They also allow people who know the communities/villages to bring mobile coverage to places off the beaten track. Of course, the shared-mobile model offers only limited capacity for incoming calls, and walking to the payphone to make a call is not as easy as reaching across one's desk or kitchen table. Nevertheless, when the alternative is no call at all, having an umbrella lady or village phone nearby is helpful indeed.

Beeping, flashing, and intentional missed calls

Who would have imagined that so many mobile users in Africa would be placing calls fully intending to hang up on one other? By placing a call to a mobile handset and stopping it before the owner on the other end can pick up, a person can leave

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evidence of a missed call on the handset's call log. The practice is used in both Europe and Asia, but is particularly common in Africa, where it is known by many as beeping or flashing. It is the basis for an elaborate set of customized, coded messages.

Usually, the beep means "Call me back". A beeper hopes to make his target call him back, and thus avoid paying for the call. Thanks to the high proportion of prepay accounts, minutes are precious and easy to measure/conserve. In addition, network access is relatively inexpensive. It can cost just a few dollars a month to keep one's mobile active and able to receive calls. Hypothetically, a crafty beeper could never pay for a call, as long as people are willing to respond. In practice, the success of this kind of beeping is highly contingent on the quality of the relationship between the parties, and each new beep becomes a micro-negotiation about who should pay for the call. The conventions behind these negotiations are relatively clear. In business, employees and customers expect to beep, and employers and vendors must respond and pay. In personal relationships, relatives or associates with less money can beep more prosperous ones, which often means that rural family members can beep those living in cities or overseas. In matters of romance, men can expect beeps from women they are courting, but not vice versa. Strangers have a lower chance of getting a beep returned with a call than close colleagues, and it is helpful if the beeper's name and number are programmed in the receiver's address book.

Yet missed calls do not necessarily mean "Call me back". Some represent other messages, and are pre-negotiated codes between two people who know each other, such as "I'm safe" or "Pick me up". In business, our interview subjects in Rwanda reported customers beeping restaurants to see if food is ready, and suppliers beeping customers to signal that their products are ready for pickup.
Other beeps carry emotional meaning, rather than information. Popular with teenagers and between family members, these little beeps are a way for one person to remind a friend or loved one that "I'm thinking of you" or "You are important to me". This last form of beep will remind many readers of how teens elsewhere use SMS messages. The difference here, as with the other forms of beeping, is that the beep is completely free. In response to significant economic scarcity, this social convention has emerged which allows messages of various sorts to be sent across the network at no additional cost to either participant.
Taken together, the different forms of beeping emphasize the importance of relational and environmental cues in understanding otherwise ambiguous messages. The same beep can mean anything, yet it seems that people know what a beep means when it is sent. Depending on the time of day and the identity of the beeper, people quickly

decide what action to take in response. Beeps also remind us that the mobile handset now enables a complex repertoire of communication options for users. Depending on the nature of the exchange that they want to have (and whether they want to pay), they can call, they can send an SMS, or they can beep.

Beeps, flashes and missed calls are a worldwide phenomenon, and have their roots in tricks of reversed charges and shared codes in ringing phones that are almost as old as the telephone network itself. But their popularity in Africa is enormous, thanks to the interaction of many factors: of the call log and address book on the handset, of the 'calling party pays' and 'prepay billing' structures of the network, and, of course, of the extreme economic conditions which make almost every investment in minutes or text messages precious. As I mentioned above, every beep is a form of micro-negotiation – about who should pay, about who should act, or about how important one person is to another. As such, beeps don't merely reflect social and cultural structures, they reinforce and reshape them. This is an important function indeed for a practice which most users might think just saves them a little money.

Mobile-phone based health information systems

Individual users are not the only source of innovation and new practices; larger organizations in sub-Saharan Africa are also deploying mobiles in unique ways to serve their goals. Take, for example, the case of the Government of Rwanda's Treatment and Research AIDS Centre (TRAC), which is responsible for scaling up delivery of anti-retroviral drugs to Rwandans living with HIV and AIDS. This is a national challenge, with hundreds of health centers throughout the country being asked to provide anti-retroviral treatment. Such an effort requires close coordination between the field and the central government offices, to track drug supplies, monitor patient enrollments, and process lab results that anti-retroviral therapies require. Yet due again to economic scarcity and a poor telecommunications infrastructure, many of these clinics lack electricity or a landline phone, let alone PCs or reliable dial-up access to the internet.

http://www.tracrwanda.org.rw/
TRAC

With support from the US Centers for Disease Control and Prevention, TRAC deployed TRACnet, a nationwide internet/mobile/landline information system which uses the mobile network to extend coverage out to every participating clinic in the

nation. The system allows clinics and managers to exchange information in real-time, using voice prompts and a toll-free number donated by Rwanda's landline and mobile carriers. Thanks to TRACnet, nurses no longer have to drive to the national pharmacy in the capital to ask for drugs, and potentially deadly stockouts are avoided. Managers can keep real-time data on enrollment, and manage by performance, sharing critical information with government and donors right away, and doctors don't have to wait days or weeks for lab tests for their patients.

There are many public health systems like this under development, using mobiles to promote TB drug compliance in South Africa (1), or to deliver HIV prevention-messages via SMS (2) in Kenya. Similar functions are under development in the business domain, providing information on agricultural prices (3) or job listings for job seekers (4). Each is an innovation, developed in close partnership with local users, which fills a need unique to the context. Like TRAC in Rwanda, each sponsoring organization built applications for the mobile platform because no other communications platform (landline, internet, postal service) was available or sufficiently reliable or affordable to offer the same level of coordination across Africa's urban neighborhoods and rural areas.

(1) http://www.on-cue.co.za/
(2) http://www.digitalopportunity.org/article/view/118756/1/
(3) http://www.manobi.net/worldwide/
(4) http://www.oneworld.net/job/list/professional/

Concluding remarks

The three innovations discussed in this essay (public mobiles, beeping/flashing, and TRACnet) are each user-led practice innovations which have emerged in an environment of economic scarcity and poor telecommunications infrastructure. Some are informal, like the umbrella ladies or beeping. Some are formal, like Grameen's village phone program or the TRACnet initiative; however each takes full advantage of the spreading wireless network, further integrating it into personal and business networks.

In addition, each example makes us consider how mobile technologies are used differently in places with poor landline infrastructure. All three innovations work in relationship to the current level of landline service: TRACnet's software accepts incoming mobile phone calls because not everyone has a landline from which to dial-in to an internet-only system. Shared mobiles simply replace conventional payphones in villages and neighborhoods where such landlines are unavailable. Even beeping involves the landline system, as users will sometimes beep from landlines to mobile phones in order to take advantage of differing tariffs for incoming calls.

We should not see these user innovations as relevant only to Rwanda or even to Africa, but rather to the hundreds of millions of new users of mobile telephony throughout the developing world. As more users from the developing world purchase their first handsets, their emerging social practices and conventions of mobile use may become as popular and relatively pervasive as any practices developed elsewhere. As observers of and participants in the worldwide adoption of new communication technologies, we should look for further trends in mobile behaviors emerging in sub-Saharan Africa. The next great contributions to global mobile culture, perhaps in political mobilization or in m-commerce (both are well underway), or in something we can't yet imagine, may be coming from users in the region.

This article was written exclusively for receiver
contact: jonathan@jonathandonner.com

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