Section 2. Shaping communicative practices

Chapter 5

Managing the cost of mobile communication in Ghana

Araba Sey
Technology & Social Change Group, The Information School, University of Washington
arabasey@uw.edu

Abstract

This paper discusses the strategies employed by low-income mobile phone users to manage their daily communication needs. A study of mobile phone practices in Ghana shows that users combine the affordances allowed by this technology in expected and unexpected ways thereby creating low-cost modes of communication around voice calls, missed calls, late night calls, scratch cards, electronic airtime transfers, and payphones. In spite of high adoption rates, cost remains a significant limitation to users' ability to fully exploit mobile telephony for direct and intensive attainment of economic development.

Keywords: mobile phones, technology appropriation, cost, Ghana

The impact of information and communications technologies

It has been historically difficult for researchers to document the distinct impacts of information and communication technologies (ICTs). So far, one of the most concrete pieces of evidence on the general impacts of ICTs on socio-economic development is that a high level of ICT adoption is an important prerequisite to benefits at the national level (e.g., Bedi, 1999; Roller and Waverman, 2001). Arguing that the factors inhibiting observation of the impact of ICTs are demand rather than supply-related, Pohjola asserts that "the most significant benefits of the New Economy should show up as an improvement in the welfare of consumers of knowledge products" (2002: 394). This implies that impacts will only be seen when there is clear evidence of consumer welfare through actual use of ICTs. While populations may benefit from the network externalities when ICTs are present, the benefit would arguably be greater if they also directly engage with the technology in meaningful ways. As, Powell suggests, the greatest potential for experiencing ICT impacts in Africa,

> *…lies in millions of Africa (sic) using their family, village and peer group connections within countries, across boarders (sic) and inter-continentally to develop exchanges which could evolve into business opportunities and new political organization. From such mass engagement with new ways of doing things…. Specific African ways … of exploiting the medium will emerge … (2001: 257)*

Not only is this broad-based micro-level access needed; it should be accompanied by depth of use (Milne, 2006) – more users making more use of the technology. Affordability of service has, however, emerged as a significant obstacle to both breadth and depth of ICT use for low-income communities around the world.

Individuals and groups have found ways to access and use ICTs despite this obstacle and there is much to admire about these innovative strategies. In this decade, mobile

telephony has been one of the most celebrated tools in the way users manipulate its features to gain communicative power. Yet these strategies should also be seen for what they are – ways to get around problems that could potentially be resolved in other (possibly less cumbersome) ways.

This paper presents results from a study of mobile phone use in Ghana. It shows that users are developing patterns of engagement to keep down the cost of mobile phone communication, working within the limits of their resources, personal knowledge and skills, as well as limitations imposed by the technology itself or the organizations providing services. I argue that at this point in the history of the industry in Ghana, emerging innovation and innovative behavior are driven by affordability challenges, in contrast to other conceptualizations of innovation that are related to design-use gaps or the natural curiosity of consumers. The triumph of users over their circumstances in order to gain access to mobile telephony is both a reason to celebrate and reason for pause. Furthermore, in so far as the cost of communication limits people's ability to use mobile phones fully, it also limits the extent of the benefits they can receive from such use.

The rest of the paper is organized as follows: it begins with a discussion of the cost barrier to mobile phone adoption and use, followed by a brief outline of the research methods used to collect the data discussed in this paper. After, study findings on mobile phone users' cost saving strategies are presented, and the paper concludes with a discussion of the findings in the context of user innovation and technology appropriation.

Cost: A major barrier to ICT adoption and use

Mobile phones are one of the most accessible two-way ICT tools available to poor people compared to earlier technologies. Mobile phone network connections are less expensive to acquire than fixed lines or Internet access, hence their rapid adoption

around the African continent. This does not however make them accessible for all poor people. Notwithstanding the drop in prices and calling rates over the years, in addition to all the other contextual variables that influence mobile phone adoption, the cost of acquiring and/or using a mobile phone is still a significant barrier to adoption in most developing countries (World Bank, 2009). A comparative analysis of ICT access and use in ten African countries identified cost as the primary issue inhibiting widespread access to and use of ICTs in African countries (Gillwald and Esselaar, 2005). There is both a "barrier effect" that prevents people from adopting mobile telephony, and an "inhibitor effect" that prevents those who have adopted it from using the phone as fully as they wish to (Milne, 2006; 2007). In addition to already being constrained by low incomes, poor people generally pay higher prices than rich people do to access telephony, and spend a larger proportion of their income for this purpose (Barrantes et al., 2007; Skuse and Cousins, 2005; Souter, 2005). Souter (2005) also found that low income groups perceived the telephone to have a negative financial value to them, in contrast to high-income earners for whom telephones brought positive value.

The ITU/UNCTAD 2007 Digital Opportunity report notes that mobile phone prices are more than half the average per capita income in low-income countries, and identifies small market size, as well as unfavorable regulatory environments and tax regimes as major contributors to higher mobile phone tariffs in these areas.[1] Barrantes et al. (2007) consider that overall, mobile phone services are unaffordable for most of the Latin American population, and propose micro-prepay and per second billing as strategies to lower cost and stimulate demand for low-volume prepaid users.[2] Consequently, Gillwald and Esselaar (2003: 30) conclude that although advances have been made in most countries with respect to voice telephony,

[1] See also GSMA (n.d).
[2] Similar proposals are made by Milne (2007).

> *…they are unlikely to see the positive network effects that build the value of infrastructure networks and are associated with economic growth and development unless there is a quantum leap in the numbers of people accessing and using ICTs. This will not happen until the prices of services and equipment across the continent is [sic] dramatically reduced*.

This speaks directly to the importance of universal service, or at the very least, meaningful universal access. In the face of high costs, low-volume users have a choice between personally owning a mobile phone and making only limited use of it, or relying on shared access systems such as payphones. Furthermore, at the right price level, low volume users will become higher volume users, increasing their quantity and range of uses (Milne, 2006). At present, the total cost of mobile phone ownership (handset and airtime) is such that users often have to limit their use to the bare minimum, or find ways to stretch their resources as far as possible.

Research method

This paper is based on a qualitative study of mobile phone users, subscribers and service providers in Ghana between June 2006 and January 2007. The broad objective of the research was to answer the question: "How are mobile phones being adapted to local conditions in Ghana?" Data collection consisted of interviews, surveys, field observation, and analysis of company records. Three mobile phone network provider managers were interviewed, as well as four mobile phone equipment providers, 14 mobile payphone operators, and 22 mobile phone subscribers and users – these comprised the primary component of the study. Interviews ranged from 30 minutes to several hours and sometimes involved multiple sessions. The interviews were followed by non-random surveys to investigate the broader occurrence of issues emerging from the interviews. A total of 197 respondents were surveyed. Fieldwork was conducted mainly in Accra, the capital city of Ghana; Prampram a village on the outskirts of Accra; and Apemanim, a village near Kumasi; all in the southern part of Ghana (Figure 5.1).

The interview and other qualitative data were analyzed by reading transcripts and identifying themes, similarities and differences; while frequencies and some basic statistical analyses were conducted on the survey data.[3]

Figure 5.1. Research Sites

Mobile phone adoption

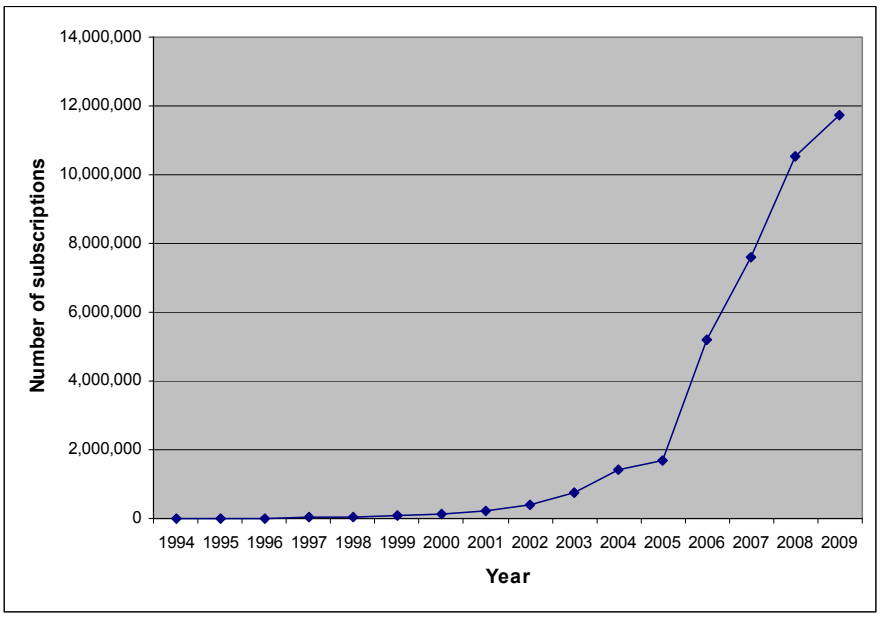
Mobile phone subscriptions in Ghana have skyrocketed over the last five years (Figure 5.2).

Falling costs of handsets, SIM cards and airtime are largely responsible for the growth. However, without diminishing the significance of the dramatic upsurge in adoption, it is necessary to note the likely overestimation of actual subscriber numbers due, in particular, to multiple SIM card ownership (see section on multiple SIM card ownership below), an issue that has been raised by a few authors (James and Versteeg, 2007; Sey, 2008; Sutherland, 2009).[4] It is therefore more accurate to refer to mobile phone *subscriptions* rather than *subscribers* when discussing the penetration of mobile telephony in Ghana.

[3] Due to the non-randomized nature of sample selection, the survey results presented here should not be generalized to the Ghanaian population.

[4] At the same time, one recognizes that the number of people with access to mobile phones will be significantly higher than the number of subscriptions because people share phones with family and friends and also because of the availability of payphones running on mobile networks. However there is a clear distinction between subscribing to a mobile phone network and having access to one.

Figure 5.2. Mobile Phone Subscriptions 1994-2009



Sources: Ghana National Communications Authority; Ghana News Agency (2009).

Another issue that is hidden or overshadowed by the numbers is the ability of mobile phone subscribers to use their phones to full benefit. The fact that a person is able to become a subscriber does not mean that the cost barrier has been overcome (although mobile phone subscribers are generally not amongst the poorest of the poor). Once low-income earners are able to acquire a mobile phone handset and a SIM card, maintaining an active account becomes the next challenge. A study commissioned by a network provider in Ghana demonstrates the importance of the affordability factor – the top three things respondents in that study considered when selecting a network provider were “inexpensive cost per minute”, “wide geographic coverage”, and “easy to manage how much I spend” (Beuls, 2006).

Table 5.1. Cost of Prepaid Mobile Phone Communication, 2007

Network	Package	$/minute*	Minutes of talk/$1
Areeba (peak hours)	Within network	$0,15	6,6
	Other network	$0,16	6,2
	Friends & Family	$0,10	10,0
	International	$0,19	5,2
	Late night in-network	Free	n/a
	SMS	$0,06	n/a
Kasapa (peak hours)	Within network	$0,10	10,0
	Other network	$0,19	5,2
	International	n/a	n/a
Kasapa Home-Work (fixed mobile)	To Kasapa Home-Work	$0,06	16,6
	To Kasapa mobile	$0,10	10,0
	Other network	$0,12	8,3
	International	$0,32	3,1
Onetouch	Within network	$0,15	6,6
	Other network	$0,15	6,6
	International	n/a	n/a
	Late night in-network	Free after 1st min	n/a
	SMS	$0,07	n/a
tigo (peak hours)	Within network	$0,17	5,8
	Other network	$0,22	4,5
	Late night in-network	$0,05	20
	Late night off-network	$0,08	12,5
	International	$0,16 -$0,22	6,2 - 4,5

Source: Company websites and advertisements. * based on exchange rate on May 15, 2007: $1 = 9355cedis

Relative to global prices, the cost of making a phone call in Ghana can be considered quite low (Table 5.1). However, with a minimum daily wage of roughly two dollars, and about 40 percent of the population living below the poverty line, 10 to 22 cents per minute for a phone call is still high. Consequently, most of the practices evolving around mobile phones are linked to users' need to control, or to use the local term, 'manage' the cost of communication in order to stretch their limited funds as far as possible.

User strategies to manage cost

> *So the little credit that I will have on the card, I will try to manage them aah. So 20 units will do for the night calls. so I manage it aah, in a way the units will not … go below the 20 units.... let's say till there is a serious call, let's say when I'm in school and I need my father, even at times when I flash my father once, my father will call me but when I flash aah and my father is not around, nobody will call back. So I just buy let's say transfer unit, 7000, but even not often. Even month, I can buy only one transfer unit, that will cost me 7000. (Maa Afia, female student)*

This statement by Maa Afia captures the balancing act that characterizes mobile phone use by the study respondents. Mobile phone users have developed practices that combine multiple SIM card ownership; airtime purchase timing; and strategic combination of voice calls, flashing (generating missed calls), free late night calls and payphones to use airtime as efficiently as possible within budgetary constraints. Several interview respondents raised the cost issue, noting for example that, "*If I could, I would make more calls. But it's like, money matters, and buying of the units*" (Osei, farmer); and, *"When the units get finished, it keeps long before I'm able to buy some more"* (village queenmother).[5] Survey respondents expressed concern about the financial drain of mobile phones, with a majority of subscribers (36,4 percent) listing cost of airtime as the major disadvantage of mobile phone ownership. Likewise, most non-subscribers in the survey (54,2 percent) said the main obstacle to becoming a subscriber was the cost of airtime.

Multiple SIM card ownership

About 20 percent of subscribers interviewed in this study said they own two or more active SIM cards. The proportion was even higher from the survey respondents with 62 percent of the sample indicating they owned two or more SIM cards (Table 5.2).

[5] A queenmother is the female co-ruler with a chief.

Table 5.2. Number of SIM cards

Number of SIM cards	Percent (n=118)
1	38,00
2	39,00
3	14,00
4	9,00
Total	100,00

Source: Fieldwork

Subscribers chose to own multiple SIM cards for two main reasons – to be able to make in-network calls and to reduce the cost of local and international calls. Interconnection problems (in particular between Scancom and Ghana Telecom) were the initial motivation for this practice. Subscribers realized that the best way to get through to subscribers on a different network was to make in-network calls. Because mobile phone handsets in Ghana are generally not locked, users can easily switch out SIM cards so that all calls they make are in-network calls. Due to the low cost of SIM cards, subscribing to an additional network is not prohibitive, other than the need to keep all accounts active. However, the cost of calls is now the main factor promoting this practice, as these interview respondents observed:[6]

> *I do swap my SIM cards…. my reasons are, you know the tariff they charge for each call that you make … So I use a specific, erm, service provider for their numbers. In case if I want to call … a friend using an Areeba number… I use my Areeba SIM card…. So if I want to call a different number too – tiGo or something… I use that one too. (Patrick, intern)*

> *Most of my friends where using Space so when you call Buzz or when you call Space using Buzz it becomes quite expensive So …I had to buy the Space. But why I also bought the Onetouch was that in fact, it was, it was very…it was cost effective or less expensive to use Onetouch to call a, to make a foreign call. So I bought it, normally those times when I wanted to make foreign calls I'll, I'll buy,*

[6] The in-network calling advantage is gradually being eliminated as most networks are moving towards uniform pricing for calls regardless of the terminating network. If there is a corresponding improvement in network interconnectivity, subscribers may soon have no need to subscribe to multiple networks.

you know, credit on the Onetouch and I'll use it for foreign calls. (Charles, development planner)

I use one for texting, that is, the Space one, I use it for texting. Most of the time. And erm, but then you know most people in Ghana, about 60 percent in Ghana have got Spacefon. So when I'm, you know, calling Spacefon I use that one. And then for all my calls, international calls, you know … I make them with Kasapa. Yeah, because of the cheaper rates. (Robert, banker)

Cost differentials for international calls as well as text messaging also affected respondent's decision to subscribe to more than one network. Although network providers do not necessarily favor this practice, it leaves the playing field open for them to entice subscribers to try out their network.

Airtime purchases

Prepaid subscribers have three options for buying airtime – regular scratch cards, vouchers, and unit transfers. Scratch cards were the only option available until around 2005 when paper vouchers were introduced. Vouchers are paper versions of scratch cards which are printed out at the point of sale by the airtime vendor. The major difference between scratch cards and vouchers is that vouchers are available in smaller denominations. The main economic benefit to buying larger denominations of airtime is the extended validity periods, which gives subscribers with more resources greater flexibility to use purchased airtime as and when they want to (there is no retail discount for buying more airtime). Only a small proportion of Ghanaians, however, can afford to part with the amount required for high denomination scratch cards. The voucher and especially unit transfer system have been significant remedies to this limitation.

The unit transfer system, also introduced in 2005, is basically an electronic transfer of airtime from one phone to another.[7] It enables subscribers to buy the smallest amounts of airtime yet possible (three to five minutes of talk time depending on the network), and it has become the primary form of airtime purchase. Introduction of the system was largely an initiative of network providers, motivated in large part by a desire to reduce the cost of printing prepaid cards and vouchers, although also partially informed by the market. A network manager explained:

> *Along the line we realized, one, the cost of production is growing … so [we] needed to find a way of reducing our cost of operation. Then the technology came up where you could transfer credit electronically, over the air, without a card. So that's how this whole … product came into being. We wanted to reduce our cost and so now with that…, there's nothing like printing of cards, importation, flight… all the shipment cost and related things, all of them it's gone.*

Although unit transfers technically enable the transfer of any amount of airtime, in practice they address the needs of those seeking smaller quantities. For example, Table 5.3 shows unit transfer transactions (for the Areeba mobile phone network) for one retailer in Accra from September 1 to 17, 2006 (15 days). Demand was greatest for the smallest category of transfers – during this period, over 50 percent of unit transfers sold by this retailer were 20-unit transfers. Most of the other retailers participating in the study confirmed this trend.

[7] This service is offered primarily through intermediaries – wholesalers and retailers – although some networks enable subscriber-to-subscriber transfers.

Table 5.3. Areeba unit transfers sold (September 1-17, 2006)

Unit transfer amount	Number of transactions	%
20 units	374	53,7
40 units	184	26,4
60 units	113	16,2
80 units	7	1,0
100 units	13	1,9
unspecified	6	0,8
Total	697	100

Source: Fieldwork

The unit transfer system helped subscribers to manage their cost by buying airtime only as and when needed. Unexpectedly, though, it also enhanced people's ability to share handsets and airtime because it was now even easier for individuals to send small amounts of airtime directly to other subscribers, either from their own phone or via a unit transfer agent. Non-subscribers could now have temporary access to a mobile phone – for example, Akua, a trader frequently allowed her mother's caretaker to use her phone, but required the caretaker to put airtime on the phone first; and Cee, a young mother, stated that she often received surprise unit transfers from family and friends and rarely had to buy airtime herself. On the other hand, when he had airtime to spare, Patrick, a student would sometimes send units to his friends to "show love" having apparently bought into Onetouch's "i-Share" marketing message.[8]

On the other hand, system failures occasionally enable mobile phone subscribers to take undue advantage of each other, as for example when electronic airtime is accidentally transferred to the wrong phone number (due to subscriber or unit transfer operator error). Several interview respondents noted that this constitutes a windfall of airtime for them:

> *But if I had my way… sometimes someone can makes a mistake and sends units and it comes to your phone… It's like by that time, then you are overjoyed. ... when they use the wrong number they call to tell you that they were sending the units to someone else and they make a mistake and it came to your phone.*

[8] The advertisement for this product expressly encourage subscribers to "show love" to friends and family by sending them airtime.

> *But if I have money I can help you, but if I don't have money, then I will tell you that I don't have money so you diee, when I get money… But I've simply had good fortune ... it happens a lot. (Osei, farmer)*

Network providers are generally satisfied with trends in the unit transfer system because, as one network manager put it, "*It's good for us and I think it's good for the consumers as well.*" Nevertheless, at least one network encountered some challenges getting the market to take up its unit transfers, mainly because the network had introduced low-priced airtime vouchers (slips of paper instead of cards) before the electronic transfers became available. Therefore there was less incentive for subscribers to switch. What this illustrates is that the success of the unit transfer system had less to do with the technology and more to do with the fact that consumers were looking for micro quantities of airtime to fit their budget.

Conserving airtime

A number of user practices can all be categorized as attempts by mobile phone users to be frugal with the airtime they purchase. They include measures to avoid communications that are considered "wasteful", generating missed calls (flashing), making extensive use of free late night call services, and using payphones to supplement personal phones when necessary.

Waste avoidance

A young payphone operator explains why she does not call her family members during the day: "*Aiee, because I don't want to waste my units. They like talking too much*" (Yinka).

For her, as with several other respondents, free late night calls (see below) provided the perfect avenue to communicate with others without "wasting" airtime. For taxi drivers in Prampram, mobile payphones (see below) enabled them to contact their casual girlfriends without wasting more than a few units. Units may be "wasted" on

someone who talks too much or someone perceived to be in a better position to bear the cost of the call. For example, Akua, a trader stated that:

> *At times you think that person, you don't have to use, waste your units. It depends. You see that person as a mature person, someone who can afford it. … At times I want, I have credit on my phone, I have units but I don't want to call. I want that fellow to call.*

Interview respondents also indicated that they try to avoid wastage by making as few voice calls as possible while trying to receive as many as they require. Furthermore they endeavored to keep outgoing calls short (generally less than 2 minutes) but would keep incoming calls going for as long as the calling party would allow. Paul, a carpenter, who tries to keep his calls under 5 minutes, explained what happens when he receives a call:

> *For that one diee it will keep long. At times if you were talking and you haven't understand or what you are, you want to know you haven't completed it, you have to go inside to all to hear what, or to understand what you want to know …. And that will take even 10 minutes or 15 minutes. But if, if I rather make the call then I won't take that long. I, my self will go inside*.

By "my self will go inside" he meant that his money would be consumed, and he laughed as he made this comment. Other respondents confirmed that their incoming calls were longer than outgoing calls, suggesting either a deliberate effort to get the most out of incoming calls, or that the caller felt able to finance a long call. Survey respondents indicated that the majority proportion of their outgoing (44,1 percent) and incoming (40,7 percent) daytime calls were between 3 and 10 minutes. A higher proportion of outgoing calls were less than 3 minutes (22 percent) compared with incoming calls of the same length (15,3 percent). Similarly calls over 10 minutes were more likely to be incoming (41,5 percent) than outgoing (30,5 percent). During free late

night calling hours, calls were longer, generally over 30 minutes (63,6 percent). Most survey respondents however said they use their phone primarily in the daytime (65,3 percent), probably because the free late night call periods kick off at a very late hour.

Flashing

Flashing (generating missed calls) is now widely recognized as more than empty communication and its important socio-economic and socio-cultural functions have been acknowledged (Castells et al., 2006; Donner, 2007). In Ghana it constitutes a multi-facetted cost-management strategy that buttresses the argument that the cost of phone calls is an equal, if not a greater, barrier to phone use than the cost of a handset. Respondents used flashing to keep connected without having to complete any calls. Some flashes were intended to get the recipient to call back, either because the person flashing had no airtime or because they did not want to waste their airtime; others were used to communicate prearranged or generally understood messages. Often, people like Sylvia, who were keeping an eye on their airtime, would use a flash whenever it could substitute for a call: "*I flash a lot because I sometimes try to keep my units … I don't want my credit book to get empty*" (Sylvia, student). Others, like Esther, would only flash when they were truly short on airtime, or just to send a greeting:

> *I do call when I have enough credit. So if I flash, then you must know I'm in need. I don't have it, … And sometimes too I have some friends, it's like if I flash you then I'm greeting you, just flash, flash. … we don't have to talk. If I flash, you flash, then it means you have greeted me." (Esther, dressmaker)*

If the objective is to generate a return call, some negotiation may take place in which parties would continually flash and re-flash each other – generally when the original recipient was not immediately willing to call back. If the original recipient stuck to their guns and refused to make the call, the sender would have to decide how important the call was to them,

…when I flash them like this, they too used to flash me, flash back. … If I need the person very urgently, I used to call. Because … maybe he didn't have enough unit to use to call. So I used to call because I need him, or her, to talk to. (Paul, carpenter)

Several subscribers also stated that they often flash people for fun or just to tease. Furthermore, because flashes are free of charge, there is no excuse not to communicate, as Maa Afia states,

Anytime the person want to greet me and he doesn't have credit, the flash will make you feel better, even than the call. Aha, so at times, if even you run to your friend and the person is not flashing you, you even become angry with them, 'oh common flash, you won't flash.' So the flash also serve as greeting. (Maa Afia, student)

The survey results suggest that flashing occurs primarily between friends (Table 5.4).

Table 5.4. Frequency of Flashing

At least:	Family (n=197)	Friends (n=197)	Business/Work (n=197)
Once a day	31,0	45,2	5,6
Once a week	23,4	22,8	8,6
Once a month	13,2	6,1	10,2
Once a year	2,0	1,0	2,5
Never	30,5	24,9	73,1
Total	100,0	100,0	100,0

Source: Fieldwork

Flashing is common amongst low income subscribers, strategic amongst those who have relatively good jobs, but is intensely disliked by others, like Charles.

I hate flashing seriously so I hardly flash… you know, anytime you flash me, one, you put me in a state of suspense. Now, two, my assumption is that … if you need me, I don't need you. If you need me and you have units to flash, why wouldn't you use that unit, that flashing units to call me to tell me whatever it is or for me to call you back. (Charles, development planner)

Free late night calls

Table 5.5. Frequency of Making Free Late Night Calls

Frequency	Percent (n=197)
At least once a day	15,00
At least once a week	29,00
At least once a month	14,00
At least once a year	6,00
Never	36,00
Total	100,00

Source: Fieldwork

Free in-network late night calling periods run between 11 pm and 5:00 am, depending on the network. Although the hours are considered ludicrous by most subscribers, a significant number (particularly young people) have incorporated late night calls into their communication routine (Table 5.5): “Now that we have the free night calls diee, we don’t do normal calls during the daytime. So if you want to call your friend, you just do it at dawn” (Akua). For those who cannot afford daytime chatting and are inclined to stay up or wake up that late to make or receive calls, this is the perfect time to have long conversations with family and friends while reserving purchased airtime for short and important daytime calls.

Unofficial sources suggest that Areeba and Onetouch have been trying to figure out how to back out of this product, assuming that it represents lost revenue from potential daytime calls. This claim was denied by the Onetouch manager who described free late night calls as “one of the most exciting services that consumers want.” In any case, it is unlikely that nighttime call volumes would be transferred to the daytime in the absence of free late night calls, since users have other strategies to limit daytime calling.

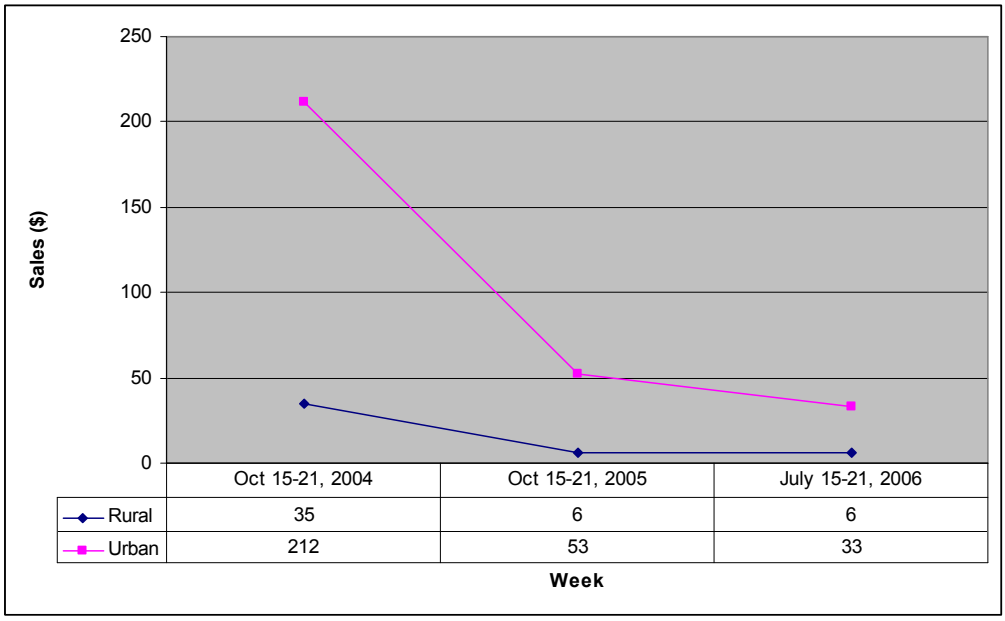
Payphones

Mobile payphones (the use of mobile phones to provide payphone services, usually along the street) emerged on the Ghanaian market when entrepreneurs capitalized on one network provider’s provision of wireless phone sets to communication centers.[9] Payphones are possibly most relevant to people who do not have phones at all.

[9] See Castells et al., (2006) for a discussion of the genesis of mobile payphones in Ghana.

However indications from this study are that a significant proportion of their service (if not the majority) has been to mobile phone subscribers as well. Payphones form a strategic component of subscribers' and non-subscribers' communication resources. From the perspective of subscribers, payphones were useful when they had run out of units and could not or were not ready to top up; and for other emergency situations such as when their phone battery was low on power. Even non-users tended to borrow a phone from friends or family to make or receive calls, and used payphones only when such access was not available. Thus between 2002 and 2004, mobile payphone businesses experienced a very profitable run but are now in decline (Figure 5.3) as subscriptions increase, and unit transfers make it easier for other more convenient forms of sharing to take place.

Figure 5.3. Weekly Payphone Revenue



Notes: 1. This chart is based on a sample of sales records of one rural and one urban mobile payphone operator.
2. The October 2004 figure for the rural site is derived from the operation of a communication center using a fixed line. The communication center was replaced with the mobile payphone in 2005.
3. Data on the number of calls made during these periods showed the same downward trend.

The downturn in use of mobile payphones is a stark indicator of the transitory nature of mobile phone appropriations that are strategies to overcome cost obstacles.

Technology appropriation and user innovation for cost savings

The findings presented in this paper have implications for the way mobile phone appropriations by low-income earners are characterized. Barnett (1953: 7) defines innovation as “any thought, behavior, or thing that is new because it is qualitatively different from existing forms.” The general argument is that users innovate when they identify a need that existing products or services do not meet. Users are best placed to design or redesign products to address their individual needs. There is an inherent design-use gap in most technological products which, according to Heeks (2002) often results in product failure the larger the gap between the design and the reality on the ground. On the other hand, to the extent that the technology and/or practices surrounding it are adaptable, user innovation can emerge to fill that gap at least partially. Innovation is often an outcome of technology appropriation, “the process of interacting with technology and modifying both the manner in which the technology is used, and the social framework within which it is used” (Bar et al., 2007) because the appropriation process, as defined here, usually leads to the creation of a new product, service or behavior. Manufacturers sometimes learn from user innovations, incorporating them into new products and services. However, user innovation also has positive connotations of its own as evidenced in von Hippel’s (2005: 1) conclusion that “innovation is being democratized … users of products and services—both firms and individual consumers—are increasingly able to innovate for themselves. The ability to innovate for one’s self is generally considered positive or desirable.

The innovativeness of the practices described in this paper is not in question, and von Hippel’s statement holds true for the respondents in this study. It is important, at the same time, to understand the underlying reasons for the innovation or innovative behavior in order to derive appropriate insights. In the case of the mobile phone appropriations observed in this study, the driving force is affordability, and the insight to be learned is that while cost-saving appropriations are interesting and point in an

overall positive direction in terms of the outcomes, users could possibly benefit from longer-term and more permanent solutions to their inability to access and use mobile phones. The findings described here indicate that most of the developments that have gained some degree of global attention for their innovativeness – flashing, micro airtime transfers, mobile payphone services, etc – may emerge primarily from users' experience of constraints to mobile phone use. If anything, they are symptoms of a problem which, though somewhat addressed by these practices, remains unresolved. Uncritical celebration of user innovation in this context has the potential to mask the underlying problem and turn attention away from other possible solutions that could be developed by identifying and attacking the problem at its source.

This is not to say that these innovative behaviors are not contributing in any way to changes in the mobile phone market. There is evidence that telecommunications network providers are adapting their behaviors and exploring ways to provide even lower cost products and services to consumers, based on observations of user behavior. Overall, some fairly effective strategies have emerged to meet the telecommunication needs of low-income populations. Some of these are driven by large institutions such as network providers and development agencies, others are the outcome of the activities of entrepreneurial individuals, and yet others have simply risen out of the creativity of consumers looking for ways to manage their communication needs within their means. The issue most mechanisms are addressing is how to provide or receive affordable telephony. Ultimately though, networks are driven by the profit motive and are not naturally inclined to pursue low-volume users. Mobile phone appropriations may currently not make a huge dent in the fight against poverty, but they do enable users to address some of the struggles they face on a daily basis, and send a signal to network providers and other industry actors that they are not fully meeting the needs of low-income users. Wilson (2004: 326) states that "ICTs may contribute substantially to growth but [that] the contribution is by no means

inevitable". One of the factors that affect this potential contribution is the extent to which cost barriers inhibit the ability of individuals to employ ICTs as extensively as they would like. Despite the high growth rates of mobile phone adoption, an inhibitor effect can be observed at work, and this arguably slows the process from micro-level use to macro-level impact.

References

Bar, F., Pisani, F., Weber, M. (2007): *Mobile technology appropriation in a distant mirror: baroque infiltration, creolization and cannibalism*. Prepared for discussion at Seminario sobre Desarrollo Económico, Desarrollo Social y Comunicaciones Móviles en América Latina. Convened by Fundación Telefónica in Buenos Aires, April 20-21, 2007.

Barnett, H. G. (1953): *Innovation: The basis of cultural change.* New York: McGraw Hill.

Barrantes, R., Aguero, A., Galperin, H., Molinari, A. (2007): *Affordability of mobile phone service in Latin America*. World dialogue Theme 4th Cycle Discussion Paper WDR 0706. Accessed January 21, 2008 at http://www.regulateonline.org/component/option,com_docman/task,doc_download/gid,14/.

Bedi, A. S. (1999): *The Role of Information and Communication Technologies in Economic Development – A Partial Survey*. ZEF – Discussion Papers on Development Policy, No. 7, Center for Development Research, Bonn.

Beuls, M. (2006): *Millicom International Cellular*. [Presentation] Retrieved March 3, 2007 from http://www.millicom.com.

Castells, M., Fernández-Ardèvol, M., Qiu, J., Sey, A. (2006): *Mobile communication and society: A global perspective*. Cambridge, MA: MIT Press.

Donner, J. (2007): The rules of beeping: Exchanging messages via intentional "missed calls" on mobile phones. *Journal of Computer-Mediated Communication*, *13*(1), article 1.

Ghana News Agency. (2009): Is mobile penetration in Ghana 47% or 55%? Accessed September 19, 2009 at http://ghanabusinessnews.com/2009/09/02/is-mobile-phone-penetration-in-ghana-47-or-55/.

Gillwald, A., Esselar, S. (2005): A comparative analysis of ICT access and usage in 10 African countries. In A. Gillwald (ed.), *Towards an African e-Index: Household and individual ICT access and usage across 10 African countries.* 18-31. The LINK Centre, Wits University School for Public and Development Management.

GSMA (n.d). *Tax and the digital divide*. Accessed February 28, 2008 at http://www.gsmworld.com/TAX/.

Heeks, R. (2002): F*ailure, Success and Improvisation of Information Systems Projects in Developing Countries*. IDPM Working Paper No. 11, Manchester University.

ITU/UNCTAD (2007): *2007 World Information Society Report: Beyond WSIS*. Available at http://www.itu.int/osg/spu/publications/worldinformationsociety/2007/.

James, J., Versteeg, M. (2007): Mobile phones in Africa: How much do we really know?. *Social Indicators Research, 84*(1): 117-126.

Milne, C. (2006): *Telecoms demand: measures for improving affordability in developing countries A toolkit for action*. London School of Economics. Accessed May 31, 2007 at http://www.lse.ac.uk/collections/media@lse/pdf/affordability%20report%2031.01.06.PDF.

Milne, C. (2007): Improving Affordability of Telecommunications: Cross-fertilisation between the developed and the developing world. In A. K. Mahan W. H. Melody (Eds.). *Diversifying participation in network development: Case studies and research from WDR Research Cycle 3* (pp. 7-32). Montevideo, Uruguay: LIRNE.net/IDRC/infoDev.

Pohjola, M. (2002): The New Economy in Growth and Development. *Oxford Review of Economic Policy, 18*(3): 380-396.

Powell, M. (2001): Knowledge, culture & the internet in Africa: A challenge for political economists. *Review of African Political Economy, 28*(88): 241-260.

Roller, L-H., Waverman, L. (2001): Telecommunications infrastructure and economic development: A simultaneous approach. *The American Economic Review, 91*(4), 909.

Romero, R. (2006): *Market overview, MIC Africa*. [Presentation] Accessed March 3, 2007 at http://www.millicom.com.

Sey, A. (2008): *Mobile communication and development: A study of mobile phone appropriation in Ghana*. Unpublished dissertation, University of Southern California, Los Angeles.

Skuse, A., Cousins, T. (2005): *Managing distance: The social dynamics of rural telecommunications access and use in the Eastern Cape, South Africa*. Information Society Research Group working Paper No. 1. Available at http://www.isrg.info.

Souter, D. (2005): *The economic impact of telecommunications on rural livelihoods and poverty reduction: A study of rural communities in India (Gujarat), Mozambique and Tanzania*. CTO/DFID Report KaR Project 8347. Accessed May 31, 2006 at http://www.telafrica.org/R8347/files/pdfs/FinalReport.pdf.

Sutherland, E. (2009): Counting customers, subscribers and mobile phone numbers. *info, 11*(2): 6-23.

Von Hippel, E. (2005): *Democratizing innovation*. Cambridge, MA: MIT Press.

Wilson III, E. J. (2004): T*he information revolution and developing countries*. Cambridge, MA: MIT Press.

World Bank. (2009): *Information and communications for development 2009: Extending reach and increasing impact.* Accessed September 10, 2009 at http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTINFORMATIONANDCOMMUNICATIONANDTECHNOLOGIES/EXTIC4D/0,,contentMDK:22229759~menuPK:5870649~pagePK:64168445~piPK:64168309~theSitePK:5870636,00.html.