Mobile Phone Practices & The Design of Mobile Money Services for Emerging Markets

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Abstract. This paper applies the lessons learned from of a number of qualitative research studies into communication practices, mobile phone use to the design of mobile money services.

1. INTRODUCTION

There was a time when the adoption of mobile phones was expected to be limited to the wealthy and early mobile phone designs included a number of features that supported shared use on the assumption that few people would be able to afford one of their own. 4 billion plus cellular subscribers later and it's the mobile phone owning residents of Accra or Cairo that are more likely to use multiple devices than the residents of London or Tokyo. The first billion mobile phones were sold in about twenty years, the second billion took four years, and the third billion were sold in just two.

That the mobile phone has had a positive qualitative and quantitative impact on many of the world's poor is no longer an issue for debate, and the simple fact that many invest in a few months salary to purchasing one suggests that it continues to meet a broad spectrum of base user needs from directly creating revenue generating opportunities to indirectly supporting survival. As a personally carried, connected device the mobile phone is in a prime position to bring mobile money services to the world's unbanked, and today there is much activity, debate and not a little hype on its potential (Ramussen, 2009). What are the factors that will affect whether recently established mobile money services such as M-PESA can also achieve success in other markets, and whether new services and business models will fly or fail? What can we learn from previous research into mobile phone behaviours and practices?

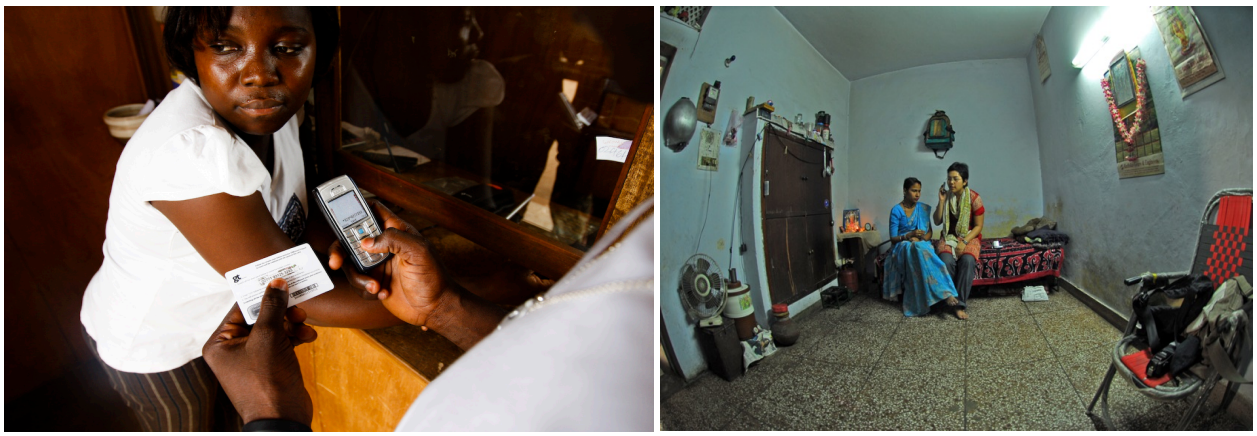

Figure 1 Sending airtime in Accra, Ghana (left); contextual interviews in Delhi, India (right).

This paper was original written to accompany the Designing Mobile Money Services for Financial Inclusion presentation to the Mobile Money Transfer Conference, Dubai. Related material can be found at http://www.janchipchase.com/designing-services-for-financial-inclusion.

2. BACKGROUND

Significant resources have been devoted to exploring the role that mobile money services can play in empowering those earning only a few euro per day: institutions such as Grameen Bank have highlighted the potential of micro-finance; organisations with a global remit such as Consultative Group to Assist the Poor (CGAP) and the Bill and Melinda Gates Foundation have initiated research, including the recently launched Institute for Money, Technology and Financial Inclusion; start-ups like Kiva have helped popularise peer to peer loans; books such as Portfolios of the Poor have brought the issues to a wider audience; and the commercial potential of mobile money services such as Vodafone/Safaricom's M-PESA in Kenya have drawn numerous other players including my employer, Nokia into this space.

According to CGAP-GSMA Mobile Money Market Sizing Study (CGAP-GSMA, 2009) an estimated 3.5 billion people worldwide currently lack access to formal financial services, and there will be 1.7 billion unbanked people with mobile phones in 2012. The largest barrier to mobile phone ownership is cost – with the average Total Cost of Ownership (TCO) how much of a consumers income is required to own and use a mobile phone, currently standing at ~$11 across 77 of the lowest income countries. Research by Nokia suggests that a TCO of $5 or less per month would enable the majority of world's lower income consumers to join the world's cellular-connected community – with 12 countries including India, Pakistan and Indonesia already in these ranks (Nokia, 2009).

Whilst the big-numbers and obvious potential are alluring to what extent do the unbanked poor actually want to become banked? What basic needs do access to mobile money services meet? What direct consumer benefits will drive the adoption of mobile money services?

3. RESEARCH

The contribution of this essay to the growing body of research is, by this authors admission modest and it's relative strength (or weakness depending on your perspective) is that it draws on a number of studies over the last decade that have centered around the intersection of human behavior, technology and culture: from exploring the role of personal communication shanty town life; understanding motivations for sharing; carrying behaviours; interaction; kiosk operators and agents; contact management; personalisation; trust; identity; the impact of illiteracy on communication practices; and most recently a focused study on personal finance and transactions.

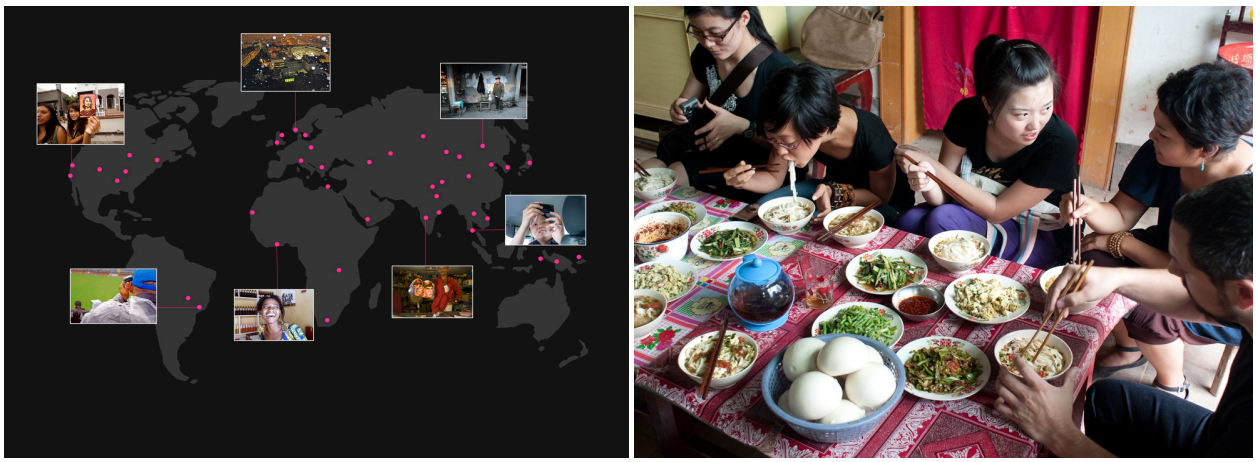

Figure 2 Research typically includes cross-cultural studies to understand both the similarities and dfferences between cultures (left); Hiring the right local team is key to obtaining the right insights (right).

The methods used in this research were mostly qualitative: observing and interviewing people in the contexts in which they carried out everyday tasks; home visits; expert interviews; small experiments such as breaching behaviours; wallet mapping and empathic design research techniques. The research has been global in scale spanning 'developed' and 'emerging markets' with a personal preference for the latter simply because that it presented the greatest opportunity to learn, the biggest opportunity for disruption. The author recognises that the combination of research focus and the short research cycles of these studies inherently frames the kinds of mobile money service insights that can be meaningfully obtained. Put simply - money is a sensitive topic for most people and it takes a while for participants to feel comfortable about sharing the intricacies of their financial lives.

4. BANKING THE UNBANKED?

A useful way to think about new *technology is as an amplifier of existing behaviours*. For example - the mobile phone's success as a business enabler is largely down to network effects and its ability in helping people fine-tune coordination across time and space, something that is perhaps best personified by the boda-boda (motorcycle taxi) drivers of East Africa. It doesn't take a Ph.D. to understand the commercial benefits of having the right resources in the right place at the right time – an entry mobile phone can be used by a broad spectrum of people straight out of the box, no explanation required. Media consumption; the ability to capture and share experiences; location services all strengthen the original mobile phone proposition each requiring varying degrees of connectivity to fulfill their potential. The less tangible benefits of personal mobile phone ownership are also well documented: the psychology of connectivity; the user of music for mood management; the mobile phone's role as a status signifier.

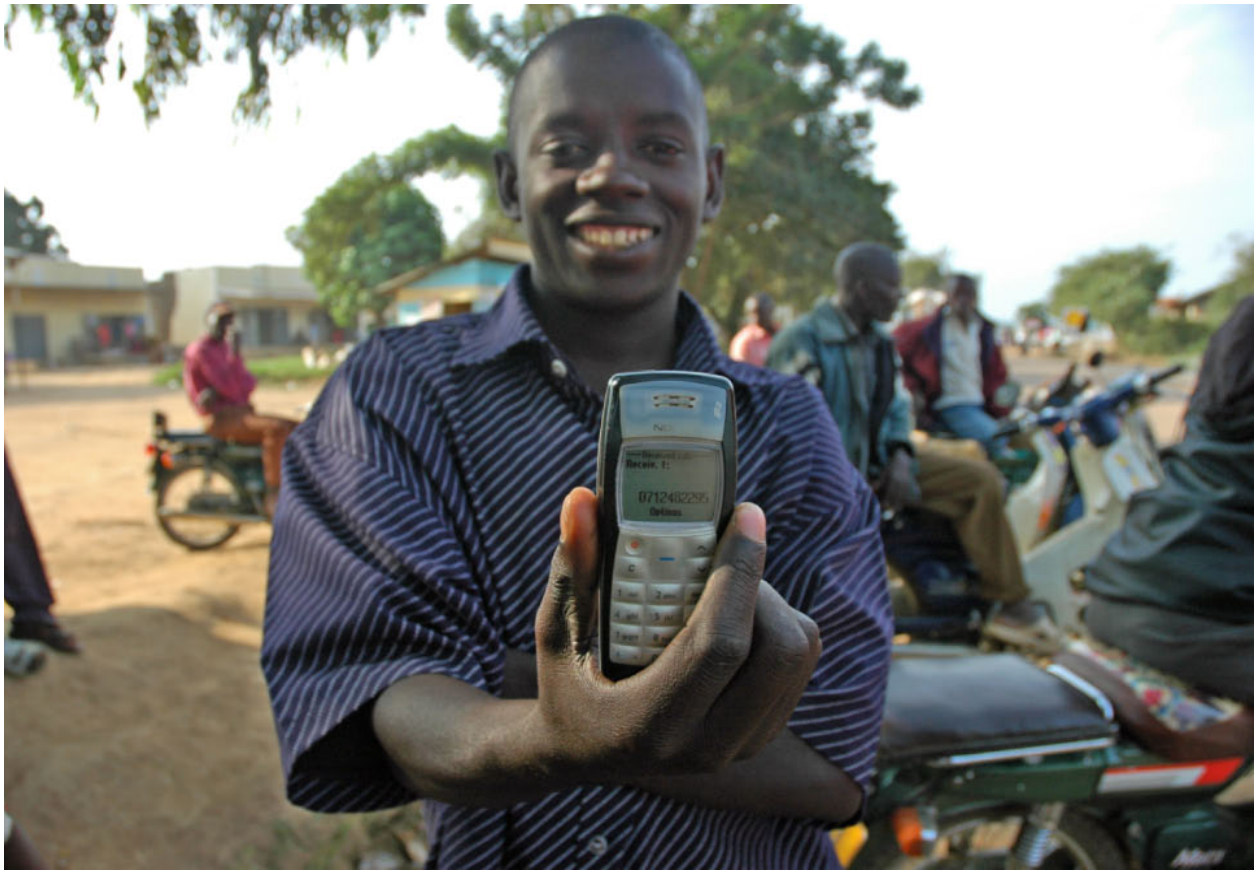

Figure 3 One of the biggest beneficiaries of the ability to fine tune the location of oneself, and resources through mobile phone ownership – a Boda Boda (motorcycle taxi) driver, Kansensero, Uganda.

Arguably the *largest disruptions* in mobile phone use over existing practices have come from the very *personal* nature of mobile phone ownership: incoming and outgoing communication; social networking; web browsing and media consumption; search queries are now by default a private matter with sharing a matter of choice. There are of course exceptions – it is wrong to assume that personal mobile phone ownership results solely in personal use – some devices are shared amongst families and businesses[1]; it can be socially or contextually inappropriate to refuse to hand over a mobile phone when requested; use may be mediated through more technically or textually literate peers; and every day many mobile phones are indirectly shared after being lost or stolen. But broadly speaking the privacy afforded by personal ownership, its pocketable size and the modalities of use it supports make the mobile phone well suited to tasks that we prefer to keep private – including those in the realm of personal finance and transactions.

In 'developed' markets most banks now offer some form of mobile banking component – with services ranging from money transfers, checking daily balances and notification of withdrawal from ATMs. In 'emerging' markets the lack of fixed banking infrastructure and the lower cost per transaction afforded by mobile banking promise to bring basic banking services to the world's poor – including remittances; money transfers and bill payments. Whilst deposits and withdrawals from interest earning savings schemes may seem like an obvious extension to this list in many territories the regulatory environment would require any service provider offering this to be classified and regulated as a bank, something most are keen to avoid.

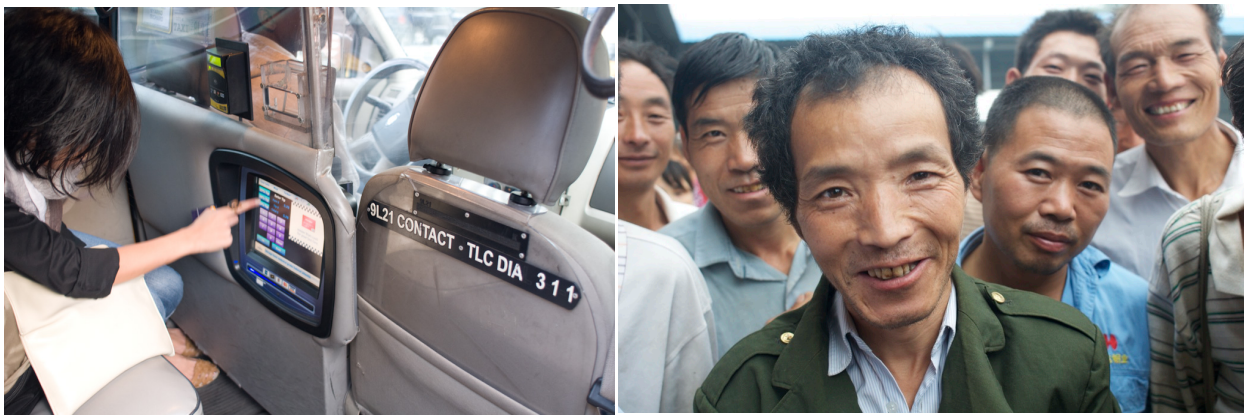

Figure 4 Who benefits more from the introduction of mobile phone banking services – a white-collar worker in New York City (left) or a migrant manual labourer living out of a dormitory in Xi'an? (right).

Given their relatively low level of income, to what extent do the unbanked need access to mobile money services? One way to think about this issue is to consider two people living in very different urban environments - who would benefit more from the introduction of mobile phone banking services – a white-collar worker in New York City or a migrant manual labourer living out of a dormitory in Xi'an? The former has alternatives at her disposal: a bank account, credit and debit cards since her student years; account information can be checked through home and work computers; the nearest ATM is no more than a block or two away; debit, credit and cash options for most purchases; and credit companies proactive pre-approving her for yet another piece of plastic. Over in Xi'an his highly variable income means that the latter is most likely not considered a viable customer for the established banks; his identity card has been held by his employer as collateral to be returned when the labouring job is complete, meaning that even if he had an account there would be a considerable barrier to withdrawing money at a branch; living in dormitory shared with 50 others means that things of value have a tendency to go missing and the alternative, carrying or wearing is at risk of damage or theft; and that the very long hours spent working or waiting for work plus the relatively limited mobility make simple tasks such as remittancing cash to family

[1] Nokia sells a number of mobile phone models that actively support sharing – for example with multiple address books.

in the village a time consuming and non-trivial task. This author's position is that *the introduction of mobile banking services is having, and will continue to have a disproportionately positive impact on the poor compared to their wealthier counterparts*.

What are the needs of the poor in this space? What does it mean to 'design for inclusion'? And given that growth is largely driven by profit seeking corporations where do the needs of consumers, corporations and other stakeholders diverge?

5. LIFE, A REFRESHER

Whilst recognising the diversity of the worlds poor the following is a reminder that life on less than two dollars a day presents challenges and opportunities.

5.1 The Home Space

Compared to their wealthier counterparts the poor are far more likely to be living in a shared living space with family members, extended family or strangers often sharing one room. In extremis 'home' will simply be a patch of ground or a shared bed that is available in shifts. If their trade is transportation related e.g. a rickshaw puller, it is common to sleep in or next to the transport.

Migrants working in factories or construction are highly likely to be living in bunks in a dormitory with anything from 4 to 50 others. Formal 'security' when it is available comes in the form of a locker, although using these for all valuables tends to be considered risky simply because the impact of any compromise will be high.

5.2 The Commute and Other Forms of Travel

The working poor are likely to be using overcrowded public transport with the duration of the journey and the density of fellow passengers making the context ideal for pickpockets and petty thieves. On longer commutes it is difficult to maintain awareness of possessions and this is compounded by general drowsiness and falling asleep. As a rule of thumb in any given context where people can physically fall asleep, they will fall asleep.

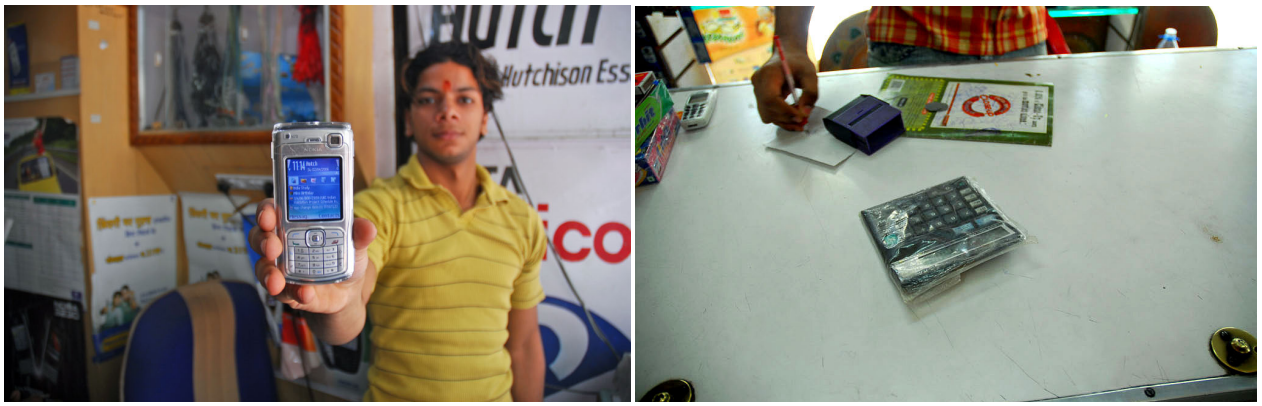

Figure 5 Protective phone covers and laminates for phones, identity cards (left) and protection from dust and dirt (right) both New Delhi (2006).

5.3 Identity Cards

Simply being able to prove who you are can present a problem particularly for migrant workers. In many factory and manual labouring jobs the employer takes the worker's identity card as a form of collateral to be returned at the end of the contract and/or when a replacement is found.

Without an identity card it can be difficult to sign up for a pre-paid mobile phone account – just how difficult varies from market to market, and the extent to which know your customer (KYC) requirements are enforced or enforceable. Accessing regular banking branches to withdraw or deposit money can also be problematic without an identity card since the task requires prior interaction with the employer.

In cultures with a high level of graft the police are more likely to use physical ownership of an identity card as a leverage point to exhort fines/bribes - as a risk-aversion strategy laminated facsimiles are likely to be carried. In contexts where identity information is frequently asked for some people carry multiple photocopies. In these environments migrants make easier pickings and can fall under suspicion with the police for the simple reason that they are not local. For many migrants obtaining a locally recognised identity card, either through formal or illegal means is a job in itself.

In countries that have a monsoon season such as India, Indonesia Bangladesh services spring up offering to laminate identity cards, other important papers and even mobile phones.

FRAMING MOBILE PHONE PRACTICES, BEHAVIOURS

5.4 Proximate Literacy

Textual and technical illiteracy is often cited as a barrier to the adoption of services, and if the assumption is that being able to understand and complete the task oneself is the benchmark for success then this is certainly the case. But given that there are 'literate' people nearby to what extent does it matter?

It is often assumed that, for any given mobile phone related task the user is required complete all of the steps of the process themselves. In emerging markets social norms make it far more socially acceptable to turn to others for help – whether for completing a form, entering numbers into a phone's address book or using an ATM machine.

5.5 Mediated Use

'*Mediated use'* is simply recognising that part of a task or process is mediated through others. The mediator may be other family members, friends, peers, kiosk operators, agents or other dedicated service providers. It is defined as 'an aspect of a service that where it is expected the user can complete a task without any assistance but which for various reasons part or all of the task is carried out by a 'mediator'.

Mediated use can exist in any country or context but is far more prevalent in countries with high levels of technological or textual illiteracy. Common examples include telephone kiosk operators; mobile phone content providers; topping up pre-paid phones; and providing the authentification to sign up new customers.

Figure 6 The mediated use of fixed line phone kiosks by an MTN PubliCom attendant in Kampala, Uganda (2005).

5.5.1 A User's Perspective

From the user perspective mediation is driven by a desire to: complete a task without having the necessary skills to do it oneself; convenience - asking someone else takes less time and effort; reduce error rates; generate opportunities for social interaction; reciprocate; show off - the lack of transparency is a useful way to project one's status or aspiration; and that asking re-enforces or challenges the power relationship between mediator and mediated. Mediation can also be considered as a first step to independent use by either party – the simplest way to learn (Chipchase, 2005b, 2006a, 2006b, 2006c, Chipchase et al., 2007e).

For the user the primary costs of completing a task through a mediator are *lack of privacy, inconvenience and the cost of social investment*.

Given that mediated use is likely to reveal the minutiae of the task at hand and thereby compromise privacy - to what extent does communication or a transaction need to be kept private? Research into mobile phone and kiosk practices in Kathmandu and Delhi taught us that whilst users value privacy and often expect it as a default (Chipchase, 2006a) a large percentage of day-to-day communication is not only fine being overheard with others, often it is pro-actively shared. There are of course significant personal, cultural and contextual differences in attitudes to privacy, and the sometimes unpredictable direction of say, a phone call can mean that the user rapidly wishes to switch from being overheard to complete privacy. Communication topics lean towards privacy include: medical and health issues; relationships; work; and money.

In situations where the user is required to use a mediator but still wishes to maintain a degree of privacy one strategy is to travel further afield and use an agent or kiosk operator from another neighbourhood or in a busy environment where their conversation will be just one of many (Chipchase, 2006a). The larger the pool of potential mediators the less of an issue this will be, a simple example of positive network effects. Using an 'alternative' agent or kiosk operator is somewhat of a trade-off since the task requires pre-meditation, takes longer to complete and that using someone new can trigger a re-evaluation of risk.

Turning to friends, peers or indeed agents for help in completing a transaction requires different levels of *social investment*, for example spending time being sympathetic to the mediators long list of current ailments or in the context of an agent the implied promise of being a more loyal customer.

Whilst asking for help may be thought of as burdening others, from a task-flow design perspective it is very similar to having an assistant complete part of the task. Hence the illiterate and the reasonably wealthy share something in common – the ability to affectively *delegate* those parts of the task process that they don't want to, or can't complete themselves. (Chipchase, 2007b)

5.5.2 An Agent's Perspective

From an agents perspective mediation is driven by a desire to: make money by allowing the customer to successfully complete a revenue generating task; increase loyalty; reduce error rates (and avoid dealing with arguments that come from erroneous use of the service e.g. double-checking a phone number prior to dialing puts the onus on the customer that the number is correct (Chipchase, 2006a); and/or reciprocity. If the agent is engaged in another businesses e.g. runs a grocery store or phone kiosk, then simply offering a service that brings in more customers for longer periods of time enables cross-selling and the time spent on mediating the task can be considered an effective loss-leader.

In situations where the transaction is likely to generate repeat business, where there is minimal competition for the agent i.e. the customer does not have practical alternatives to turn to, and where mediation takes 'too much' time and effort the agent will be motivated to teach the customer how to complete the task

themselves. How realistic a scenario this is depends on the task complexity, the ability of the user interface to shorten the steps required to repeat positively completed tasks, and the skills of the mediator and the mediated. The risk of empowerment is that it becomes more viable for the customer to take their business elsewhere.

In contexts where there is demand for services and a sufficient gulf between the skills required to complete a task and the skills at hand services are services are more likely to spring up to meet a need: from writing letters; filling forms; navigating processes; to signing up pre-paid customers (Chipchase, 2005b, 2006a, 2007e; Ratan, 2008; Morawczynski, 2009). This is particularly prevalent is contexts with high numbers of illiterate consumers.

Figure 7 The agent is there to help you spend money, Kyotera, Uganda.

5.5.3 A Service Providers Perspective

From the service providers perspective mediated use generates a huge amount of flexibility at the front-line of their service offering – and demonstrates that they shouldn't try to control *every* aspect of the service offering. Whilst the cynical observer might describe it as shifting the cost of customer service to the agents, this misses the point in that the customers, agents and service provider are, in most instances, all winners in the equation (Chipchase, 2007b).

One should not assume that the service agent will always act in the best interest of the consumer – if a moderate sum of money can arguably be sent in 1 or 2 tranches, each of which costs the same set commission how many tranches the agent prefer? Logic dictates however that over time consumers

compare notes on the agents they use, and as with everything else in the marketplace understand the need to shop around to find the best deal.'

5.5.4 Step Messaging

One example of the malleable boundaries of service design *step messaging*, was documented during study in Uganda (Chipchase & Tulusan, 2006). Step messaging is the process of delivering either a text or verbal messages via shared mobile phone or kiosk where the message is delivered the last mile on foot. It is largely driven by necessity and cost and takes advantage of both social ties and an available pool of people to deliver the message. In many instances the message is simply foreplay to the main event: 'please come to the phone, I will call back in 10 minutes'.

The practice relies on the fact that it is socially acceptable to leave messages with a neighbour or phone kiosk operator even if the recipient lives hundreds of meters away from the kiosk and that the call receiver is socially obliged to fetch the person being called. If the kiosk operator is busy with customers he or she can call on members of the social network that tend to hang around the kiosk. After all, the phone kiosk often forms part of the social hub of the community - in the cases of remote and newly connected communities it's the point through which communication with the 'outside world' flows.

There are a number of areas where step messaging can be improved: message details can be lost over time or incorrectly communicated; it can take considerable time before the message is delivered; and if the receiver is illiterate the message is likely to default to 'person A called'. As with *sente* (see below), there is no confirmation that the message has been successfully delivered.

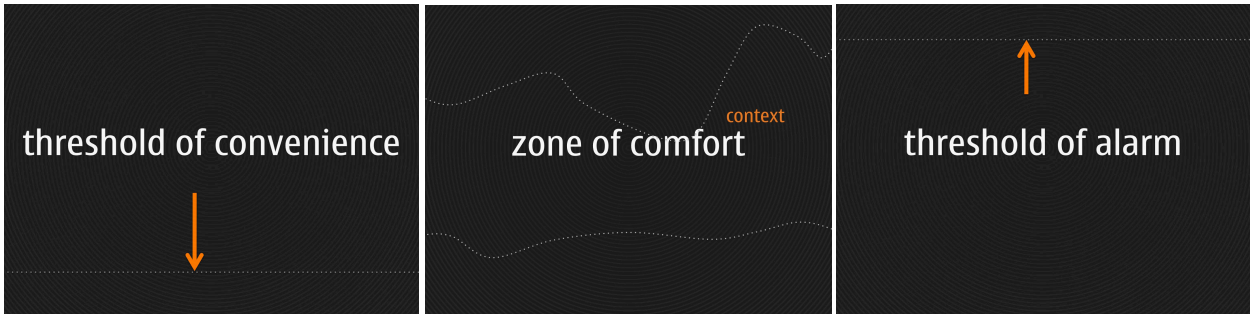

Figure 8 Not all transactions are equal.

5.6 Threshold of Concern, Threshold of Alarm and the Zone of Comfort

Not all transactions are created equal. Some fall below the so-called *threshold of concern* – where it takes the user more effort to acknowledge and mentally process the transaction than the utility and/or satisfaction derived from knowing the transaction has taken place. For many people a small, frequent purchase such buying a newspaper might fit this criteria. Other transactions rise above the so-called *threshold of alarm* and can significantly threaten the users quality of live and consequently users expect more checks, reassurance and feedback. Examples include large or highly time-dependent purchases. Between these two thresholds lies the so-called *zone of comfort* – a space within which most everyday purchases take place, and within whose boundaries most of today's service designs cater for.

It's important to note that these thresholds are *highly dependent on context*, cultural and personal preferences: a transaction completed in the safety of the home might be well within the zone of comfort but when carried out in the context of a bus station might trigger alarm like behaviours; an everyday purchase that is normally considered trivial might be elevated to alarm status late at night when the user is close to running out of cash and there are no alternative ways to pay. There are cultural differences: a user can have

different engrained assumptions about risk depending on whether they are from a fatalistic or deterministic society; people from societies with a high level of social cohesion are more likely to value chopping a few seconds off a transaction because of a desire to avoid inconveniencing others (Mainwaring et al,, 2008).

5.7 Primary, Secondary and Tertiary Users

We typically describe a 'user' as someone who is directly using a product or service, but what if the benefits associated with use are obtained with the entire hands-on experience mediated through someone else? A common example of this is where text messages or emails are sent and received through literate members of the family and passed on verbally, though it can apply to any situation where the receiver lacks the skills or technology to complete the task.

5.8 Replacement Cycles, the Speed of Small Objects and an Awareness of the 'Cutting Edge'

All large mobile phone manufacturers use market segmentation models to understand market potential, build a profile of their customers and guide what products to develop and pitch to whom. However in a ~1.1 billion products a year industry where every years millions of devices are recycled, resold, passed on, lost and stolen it is no surprise that there are people end up with devices that fall squarely outside their segmentation categorization. Whether its mobile phones that would be considered cutting edge in London or New York in the hands of Chinese rickshaw drivers and Indian tea-wallahs; or phones designed for urban career women in the hands of hardy, Tajik mountain men (Chipchase, 2007d).

Small, pocketable objects whose functionality has an almost universal appeal (such as mobile phones) travel far and wide and as such help prime consumers in distant locales to global norms and benchmarks, which in turn can affect local perceptions of what makes an appropriate service offering.

5.9 SIM Card Ownership versus Mobile Phone Ownership

Is it possible to experience the core benefits of mobile phone ownership without having a mobile phone? In contexts where income is highly variable people living on the poverty line are more likely to be forced to sell off assets in order to buy essentials such as food. The mobile phone is such an asset. The net result is that there are people with a sufficient technological literacy to understand what a phone can do, a nuanced understanding of the communication norms, own an active SIM card but no mobile phone and most likely live in a community where people understand the variability of income and ownership. In these contexts it can be socially acceptable to ask peers, even strangers to borrow their phone, take out their SIM, insert their own and send off text messages or make calls – since the monetary costs are passed on the SIM card owner.

The increasing prevalence of dual-SIM card supporting mobile phones and the tools to manage current calls costs (Benner et al., 2006a, 2006b) make this an interesting space to watch since it lowers the barriers to sharing, whether for personal or profitable reasons[2].

5.10 Ownership versus 'Expected Use'

With poor, highly price sensitive customers a useful distinction to make is between *ownership* of a mobile phone and *its expected use*. For any aspect of phone use that costs money assume that the consumer will actively consider cheaper alternatives such as using phone kiosks, waiting until lower tariffs kick in before sending a text message or delivering messages through other channels. Whilst convenience is certainly valued, it is not necessary in every instance. Practices driven by more social motivations are stickier simply because the decision to opt out of using the technology becomes one of whether to opt out of society.

[2] Cairo is a good example of low barriers to entry for ad-hoc phone kiosk operators. All one needs to set up business is: a mobile phone, 8 year old Nokia 51xx models are preferred; some pre-paid credit; and somewhere to set up shop.

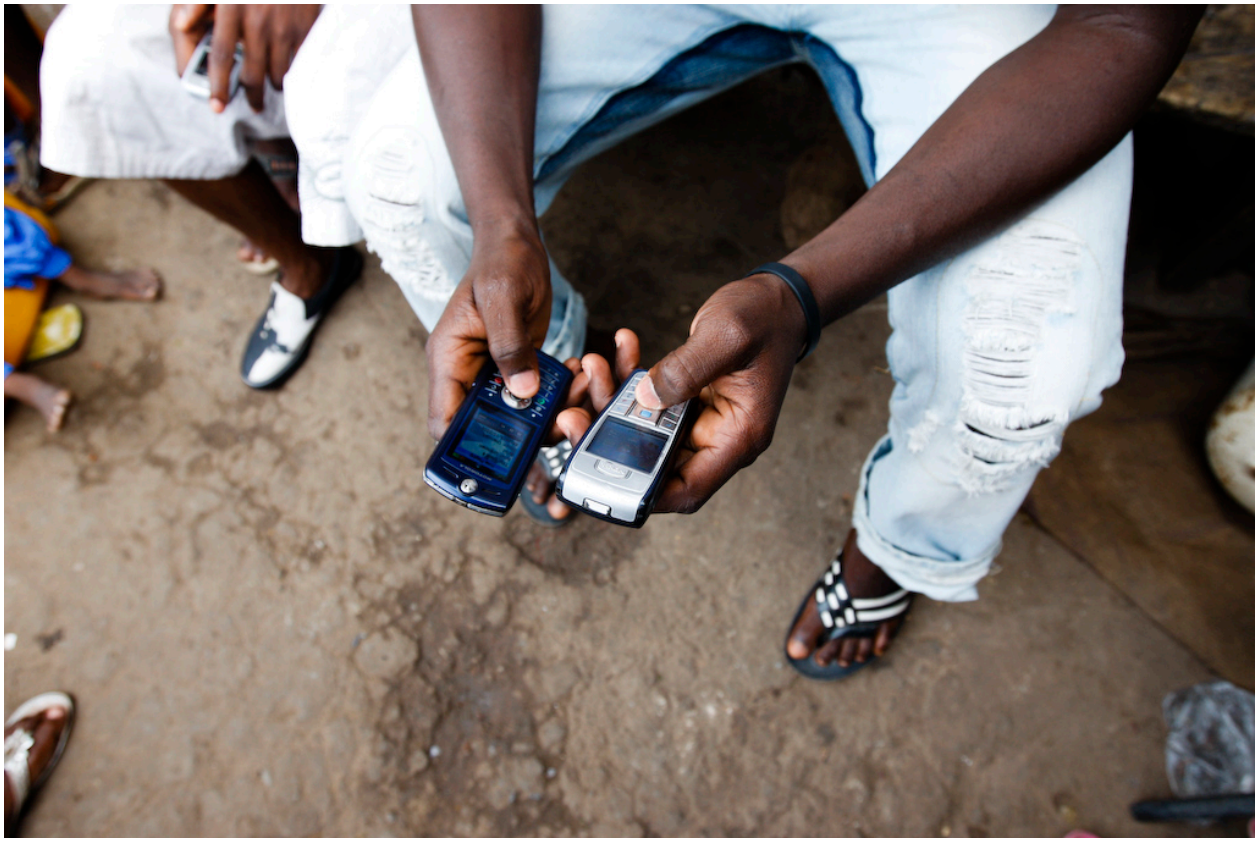

Figure 9 Why pay more? Using multiple SIM cards to save on communication costs, Accra, Ghana.

5.11 Multiple SIM Card Practices

The use of multiple SIM cards is a relatively common practice in emerging markets: primarily driven by a desire to save money – calls terminated on a different network cost more hence the smart user that can afford to do so will carry one SIM for each network operator; a desire to separate personal and work communication and/or personal from very personal e.g. extra marital affairs; and because one network operator doesn't offer the necessary network coverage. In addition the monetary cost of obtaining a new pre-paid SIM card is minimal. Know your customer (KYC) requirements for anti-money laundering (AML) and counter-terrorism financing (CTF) means that the effort required to set up a new account should be non-trivial - through anecdotal evidence from the streets shows that in practice it varies from culture to culture and that these measures can be relatively easy for the user to circumnavigate. Given that, with the right permissions it is relatively easy to trace an accurate picture of a user from the content and recipient of their communications, it is relatively easy to retroactively knowing your customer.

One of the primary drivers for using multiple SIM cards - saving money, takes revenue out of the pockets of the network operators it should come as no surprise that they don't distribute products that undermine their business model. Hence the mainstream mobile phone manufacturers, many of who rely on the network operator's distribution channels have not brought products that support multiple SIM cards to market. Realising this opportunity numerous 3rd tier Chinese *shanzai* or 'bandit' phone manufacturers have started offering dual SIM card devices that dynamically switch between two network operators without having to reboot the phone. In addition mobile phone street-hack repair services now also offer a hardware hack that enables two SIM cards to be placed into one physical SIM card form factor that allows the owner of any unlocked GSM phone to switch between two carriers (Chipchase, 2008b). Software versions are available supporting between 6 to 16 virtual SIM cards in one physical SIM card. The street hack services are particularly interesting in that they highlight the marketplaces ability to innovate from the

ground up to offer services for which there is obvious user demand despite from a user perspective, artificial barriers.

5.12 Sharing

As a personally owned device most people assume that one phone number is tied to one person. Research on mobile phone sharing practices in Uganda and Indonesia (Chipchase & Tulusan 2006c) revealed that whilst people recognise the benefits of, and aspire to sole ownership of a mobile phone there are many forms of mobile phone sharing: driven by necessity; not being able to afford sole ownership; transparency 'what's mine is yours', 'I've got nothing to hide'; spur of the moment convenience; or simply because sharing is a natural part of the mobile phone experience e.g. browsing someone's mobile phone music collection or viewing photos of last night's party. To what extent do existing sharing practices undermine or reinforce mobile money service assumptions? As the mobile phone takes on more wallet/account functionality how will these sharing practices shift?

It's worth noting that the study also suggested that shared-use of mobile phones were seen by most respondents as temporary – with users migrating to sole ownership as soon as they were able to afford it. To re-iterate: sole ownership does not exclude shared use of a mobile phone.

5.13 Pooling

One of the strategies adopted by the poor to use services that would otherwise be financially out of their reach is *pooling* resources, for example to purchase air time or to remit money. There is usually some kind of benefit for the *primary pooler* whose device/account is used for the transaction - whether it is building a formal or informal credit history or extending 'access days' – the time before the credit on their phone will expire.

5.14 Smoothing

Whilst everyone has ups and downs in their income and expenditure – the variation and income of the poor tend to be far less predictable and the consequences of running out of money are potentially far more severe. Manual labouring in particular can be notoriously fickle and after a few days without work savings can quickly run dry – a problem given that upwards of 50% of income can be spent on purchasing the food that is required to be an effective labourer[3] (Nandhi, 2009). Informal support networks – extended family, friends typically can help cover shorter lean periods, but longer spells without work, health issues or the need to cover big expenditures funeral expenses can rapidly force individuals to seek out money lending options. Access to credit at a reasonable interest rate either from established money loaning services or through the membership of self-organising credit unions can help smooth the peaks and troughs and avoid entering into a cycle of debt.

It's worth bearing in mind that the kinds of interest rates that you might consider to be extortionate can look positively tempting if the consumer expects the loan to be repaid in short order and when no other forms of loan are available. Whatever else we may think of them, the loan shark meets a very real need.

[3] An example of the range of financial instruments in use by the poor in India include: saving with a local shopkeeper/trader; remittancing cash home; savings on person; storing inside belongings, locked trunk, dug pits; storing with a relative; offering/receiving interest free loans to friend/peers, reciprocity; buying daily goods on credit; saving with a money guard. No formal use of bank accounts in the migrated-to city, and rarely use post office accounts at home town. They often think its not possible to open bank account (Nandhi, 2009).

5.15 Theft, Loss, Awareness & Recovery

Millions of mobile phones are lost and stolen every year. How likely the user is to recover the device varies from market to market, but the assumption of most users in cities like Accra, Delhi or Rio de Janeiro is that once gone the phone is lost forever.

Users tend to maintain a high awareness of where the mobile phone is at any one time compared to other so-called *mobile essentials* – cash, identity card and keys (Ichikawa et al., 2006) largely because of frequent use and checking status updates and missed incoming communication. Hence the time between the mobile phone being lost and taking steps to recover or mitigate risk of misuse tends to be short (Chipchase et al., 2005c; Hasan & Chipchase 2006). For most people the first step to attempt recovery is to borrow a phone and call their own.

5.16 Supporting Multiple Modalities

The environment in which mobile money service use takes place will vary – from the relative peace and quiet of home to a noisy, crowded bus driving over pot-holed road. Where possible it is desirable to support different modalities – from text based interfaces to interactive voice response (IVR) systems.

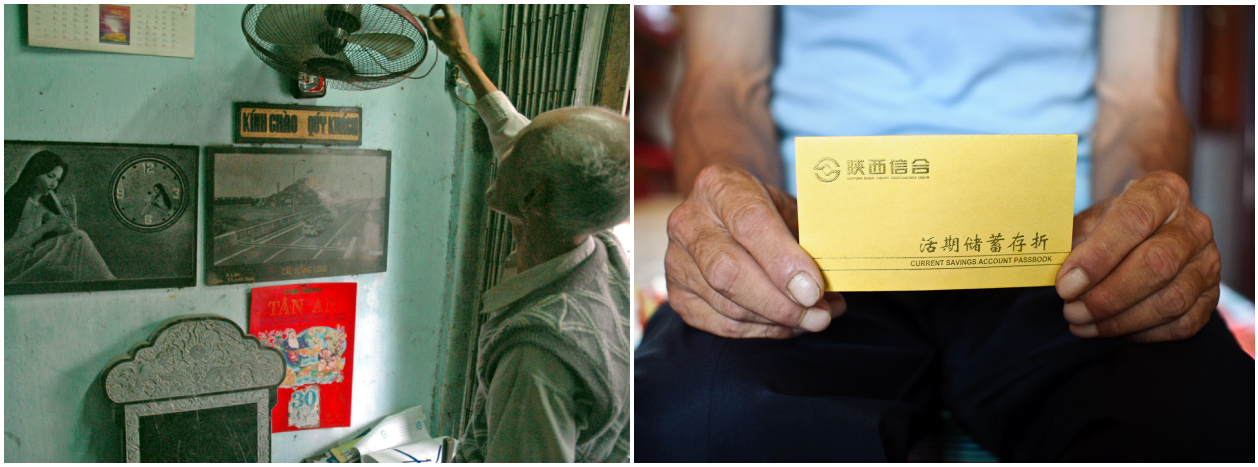

Figure 10 To what extent do you need to know how to complete a task yourself, when there's someone conveniently able to do it for you? (left) Don't assume that concepts such as 'passwords' or 'account withdrawals' are understood by the user. (right)

The harsh reality for the resource constrained service provider is whether to offer a mobile phone/SIM based application or to develop an IVR system, one that will likely need to support multiple languages and dialects. Assuming the design is well implemented, and by default we shouldn't jump to conclusions that this is the case, an IVR system that best meets the need of illiterate consumers may result in a sub-optimal design for their more-literate counterparts. Obviously it pays to know your customer base.

It's also worth recognising that today's optimal design solution is not necessarily the same as tomorrows. The biggest enabler for next billion to purchase their first personally owned mobile phone is in many instances likely to be *affordability*. The total cost of ownership (TCO) can be broken down into the cost of mobile phone purchase ~7%; the cost of service use likely to be ~79% over the lifetime of the product; and taxes ~14% with the assumption that the device will survive a few years of the dust/heat/sweat and knocks that are an everyday part of a manual labourers day[4] (Nokia, 2009). The 'survive anything phone' is

[4] Total Cost of Ownership for lower-income customers: 2005 Handset 11%, Service 74%, Tax 15%; 2008 Handset 7%, Service 79%, Tax 14%. The total cost of ownership per month in lower income countries ranges from Honduras at ~$2 USD to Brazil at $27 USD, with an average of $11 USD per month. Expanding Horizons (Nokia, 2009).

probably best personified by the Nokia 11xx series that have accumulatively sold in the 100's of millions. As with most no-longer novice consumers – the decision making process that goes into second and third mobile phone purchase is likely to be more demanding than the first – and manufacturers and service providers should expect illiterate consumers to become more demanding over time.

5.17 Charging

For people living off the mains grid keeping a mobile phone charged can be a non-trivial issue that affects urban shantytown and rural dwellers alike. How does a lack of mains electricity affect access to mobile money services?

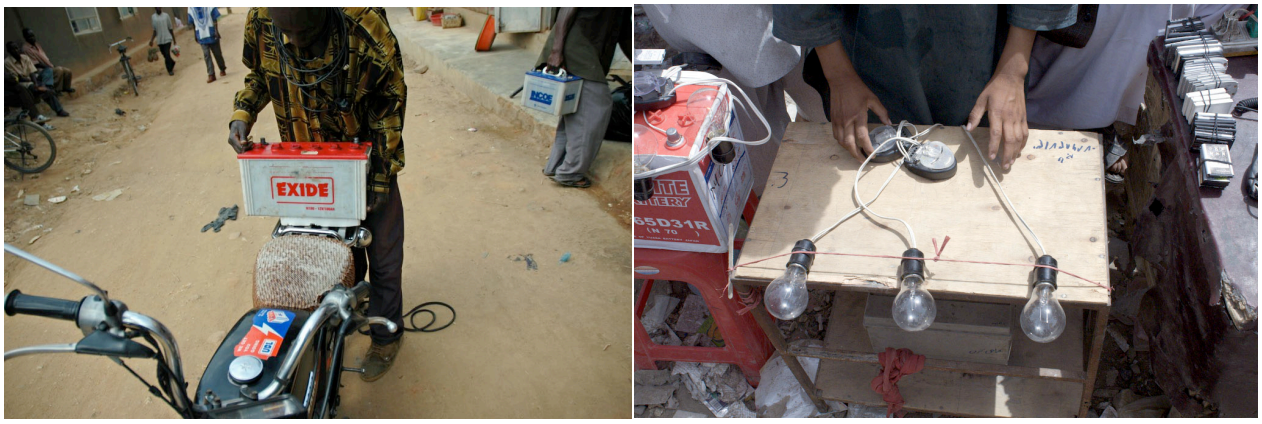

Figure 11 Charging options for those off the electrical grid often include use of a home car battery in Kansenero, Uganda (left) or the relatively expensive phone battery charging kiosks in Afghanistan (right).

For many power comes in the form of a car battery which in domestic contexts can last up to one month to run a light bulb or two; keep a radio and mobile phone charged; and for occasional television use. (Refrigerators are not worth purchasing unless there is continued access to electricity). Charging a car battery take ~3 days: a day to pick up and drop off; a day to charge, and this can take significantly longer if the locale where it is normally charged does not itself have electricity.

Driven by mobile phone customer needs neighbourhood vendors with mains electricity and/or access to a power generator typically offer mobile phone charging as a value added service. The cost of a single charge is relatively high – for example in downtown Kampala charging a mobile phone costs three times the cost of a phone call ~ 500 Ugandan Shillings/0.2 Euro. There are alternative ways to charge: with friends that still have a working car battery; the local church may have invested in a solar panel or generator; in India it is common for longer distance busses to offer mobile phone charging as a value added service. China is also notable in that consumers are far more likely to carry a second battery and own a battery charger - these are often offered as value-added extras when purchasing a mobile phone (Chipchase & Tulusan, 2007f, 2007g, Chipchase 2009).

For people with variable access to power the main charging related issues are that: in environments where the risk of theft of unattended objects is considered high, the battery will be removed from the phone and charged separately; whilst charged the phone cannot be used; the device they use has a higher likelihood of having an used and inefficient or non-authentic battery; and if left whilst charging there is a perceived (or actual) risk that the charger will somehow access money related services on their phone. The latter may not by default be considered important but if there are real or perceived issues about the service later on the time where the 'phone was unattended' may form part of their rationalisation process.

5.18 Street Repairs, Hacks and Content Provision

Cities such as Chengdu, Kampala, Ho Chi Minh all contain large clusters of shops and market stalls selling a mixture of used and new mobile phones and aside from what's on sale there is a thriving market for device repair services ranging from swapping out components to re-soldering circuit boards to reflashing phones in a language of your choice. Repairs are often carried out with little more than a screwdriver, a toothbrush (for cleaning contact points) the right knowledge and a flat surface to work on. Reverse engineered repair manuals are available, written in Hindi, English and Chinese and can be subscribed to online. Many of the repairers rely on informal social networks to share knowledge on common faults, and repair techniques - it's often easier to peer over the shoulder of a neighbour than open the manual itself. India has the distinction of also offering a wide variety of mobile phone repair courses at training institutes. For consumers the informal repair culture is largely convenient, efficient, fast and cheap, reducing the total cost of ownership for people for whom a small drop in price may make the difference between having or not having a phone (Chipchase, 2006d, 2006e, 2008b).

Figure 12 All it takes to get into the content business is a laptop or netbook and a stream of customers, Cairo, Egypt (left) and Delhi, India (right).

It is in this same environment that kiosks first spring up to offer mobile phone applications, ring-tones wallpapers and content, and the service includes installation and setup.

5.19 Risks Associated with Multi-tasking

The mobile phone's ability to distract the user from the immediate environment whether through planned tasks such as using ear buds to listen to music or more impromptu tasks such as answering an incoming call and having a heated conversation can compromise awareness of what and how objects are carried – for a moment at least attention lies elsewhere. The moment of realisation that lapse in security has occurred – typically touching or tapping the object of value often highlights to potential thieves where the objects of value are stored. The disruption that the mobile phone brings to this space is that an observer doesn't by default know whether the user is engaged in a transaction related task. For any given context, to what extent does the user want the purpose of their transaction related task to be transparent? Should a mobile phone that supports mobile payments in whatever form – include physical characteristics that are apparent to observers? (Ichikawa et al, 2006).

5.20 Lessons from Illiteracy

The UN estimates that there are approximately 800 million illiterate consumers worldwide and in addition not all consumers use products that support their primary language. To what extent do designs need to cater for, or specifically design for the illiterate?

The first thing to recognise is that there are different kinds of illiteracy – the most common definition being *textual illiteracy* 'being able, with understanding to read and write a paragraph on your own life'. Other forms of literacy - technical, financial as well as numerical also play a significant role. Literacy is not, as many people assume a question of intelligence but rather one of *opportunity*, and our research has shown that motivated illiterate users are capable of completing complex tasks - either through rote learning or through engaging others with the task.

Every day millions of illiterate users are able to use mobile phones to receive and make calls – many start by inputting phone numbers written on scraps of paper, a common form of 'address book' amongst this user group, before migrating to using the call log as a form of self-generating address book. Problems using the phone generally start to occur with more complex tasks, in particular anything that requires managing or editing.

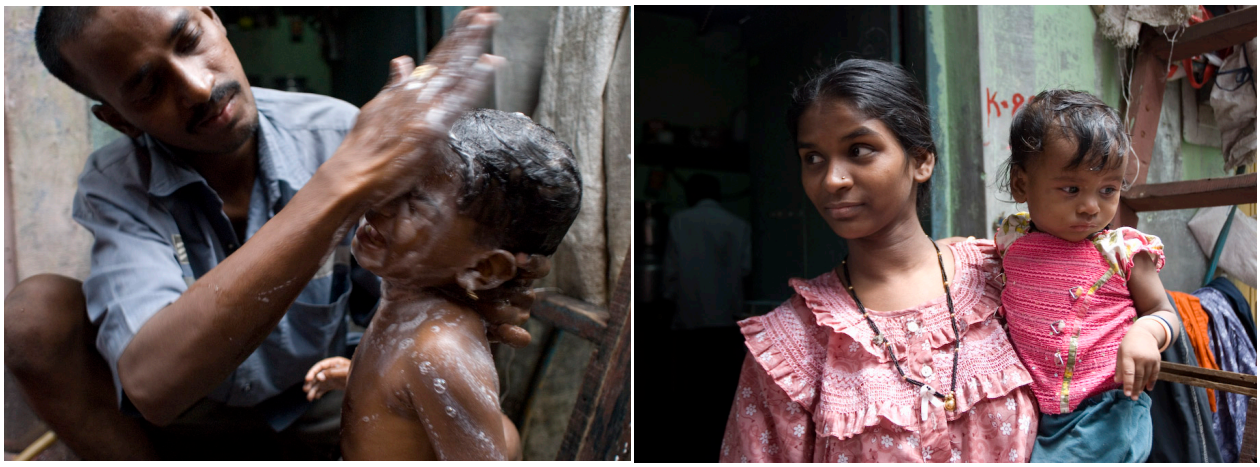

Figure 13 Researching close knit, low-income communities in Dharavi, Mumbai, India (left, right)

From a design perspective - one way of thinking about illiterate users is that they are 'just like us only more so' in that in certain contexts they share behavioural characteristics with their more literate counterparts, such as a rushed or multi-tasking literate user. In this respect a simple, stripped down device or service build around known principles of human computer interaction (HCI) will also meet many of the needs of the illiterate user – issues such as dividing information into easy to remember chunks, consistent use of interface elements and recoverability.

Whilst it is tempting to assume that there is a silver bullet solution for illiterate users - iconic and audio based interfaces being the two most commonly proposed solutions, the reality is far more challenging. Icons are in effect another form of alphabet and their meanings also need to be tested across user groups - challenging enough for a single user group, problematic when you're designing for a global roll-out. Concepts that are new to the user group such as 'passwords' or 'withdrawing from an account' are problematic to articulate in iconic form. Audio interfaces needs to support the users language and dialect, and assume that they understand what is being said, and are less appropriate in a range of contexts. Many of the environments where the services are used are highly noisy.

It should be recognized that literacy, numeracy and basic arithmetic are inherently empowering and that providing realistic opportunities to learn is an desirable goal in itself, one that will have a broad positive impact on society. Instead of asking 'how to design an interface for illiterate consumers' we need to take a narrower focus and reframe the question: 'what skills need to be learned to be able to competently carry out series of simple mobile money related tasks'? If all the user wishes to do is make a phone call then pressing buttons on a keypad and correctly holding the phone to an ear will suffice. Mobile literacy - raising awareness of what a mobile phone can do and how to do it, can be achieved through a variety of means – from in-store posters, booklets, classes to more creative forms of communication such as

leveraging the strong oral traditions in India. Looking ahead it is worth noting that the illiterate probably have the most to gain from ever more of their social and transactional graph being mapped and becoming queryable since it enables the auto-generation of relevant contacts, overcoming some of the problems relating to editing content, and innovative use of SMS data channels through services such as Ovi Mail are pushing the boundaries in this space (Nokia, 2008).

Where possible the user should be able to build on successful outcomes. For example - the first time a consumer wishes to transfer money they may ask a literate family member or field agent for assistance – a process that may take half a dozen steps to identify whom to send money to, how much to transfer and input their details. The next time they approach the same person with the same request jumping directly to a transaction log will allow them to repeat the same task in a smaller number of steps. For subsequent requests the mediator is in a position to show the illiterate user how to complete the task using the transaction log as a short cut.

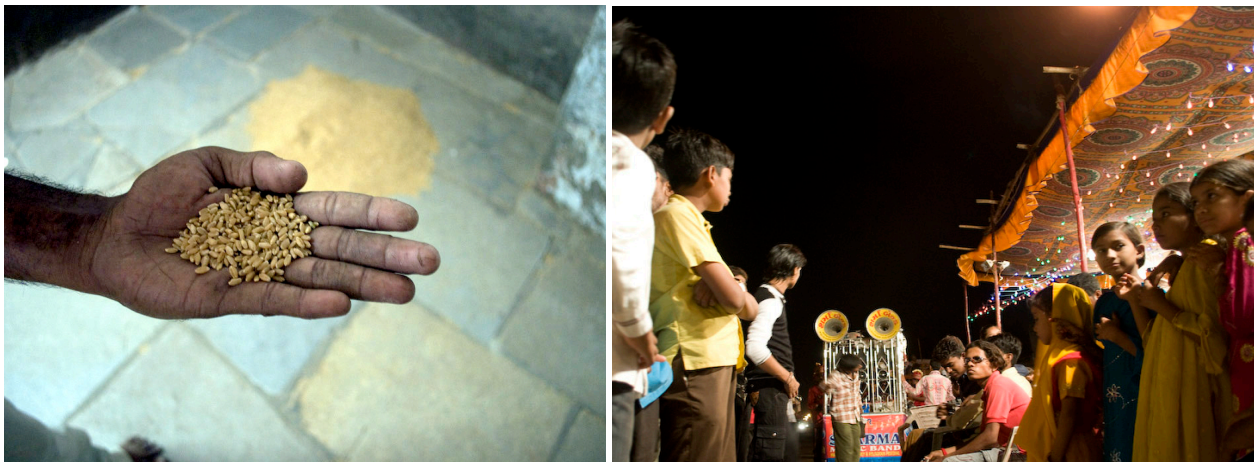

Figure 14 Everyone benefits from smoothing whether to purchase grain for the next crop (rural India, left) or in order to meet the needs of funerals, health expenses and weddings (Ahmadabad, right).

6. MONEY PRACTICES AND BEHAVIOURS

There is a wealth of well-informed research in this area the reader's attention is drawn in particular to Portfolios of the Poor (Collins et al., 2009). To recap: what do the poor want to do with money?

Store: Keep money safe, inaccessible from others and from oneself. Recent research in Kenya has highlighted almost a third of urban customers use M-PESA - a system designed to transfer money person to person, to store small sums of money (Morawzynski & Pickens, 2009b).

Send and Receive: Transfer money to others, location-shift one's own money. A common cited example being urban males sending money to rural female recipients - mostly recurring transfers for the purpose of income support and larger transfers used to address lump sum needs (Morawzynski & Pickens, 2009b, Nandhi, 2009).

Spend: To have sufficient money (or credit) available in the right format or currency when it is required. To have control over the transparency, and persistent knowledge of any transaction.

Save: To save money for future needs and larger purchases. Typical motivations for savings include: assets such as livestock; grain; land; school fees; wheel barrow; motorcycle; birthdays; religious festivals; funerals; and weddings.

The unbanked poor face practical issues that might not be obvious to the reader. For example money may be stored: in and about the home; about the person; using formal or informal micro-savings schemes; with relatives or trusted peers such as employers or with local traders, often with whom they can also extend a credit line. Given the home contexts described earlier it is no surprise that 'storing money in the home' is relatively insecure: under the mattress; hidden in a pot; buried in the ground it can be discovered by idle hands, forgotten, swept away by a flood. Because of its scarcity of money family members tend to maintain a good awareness of who in the household is working and when money is coming in.

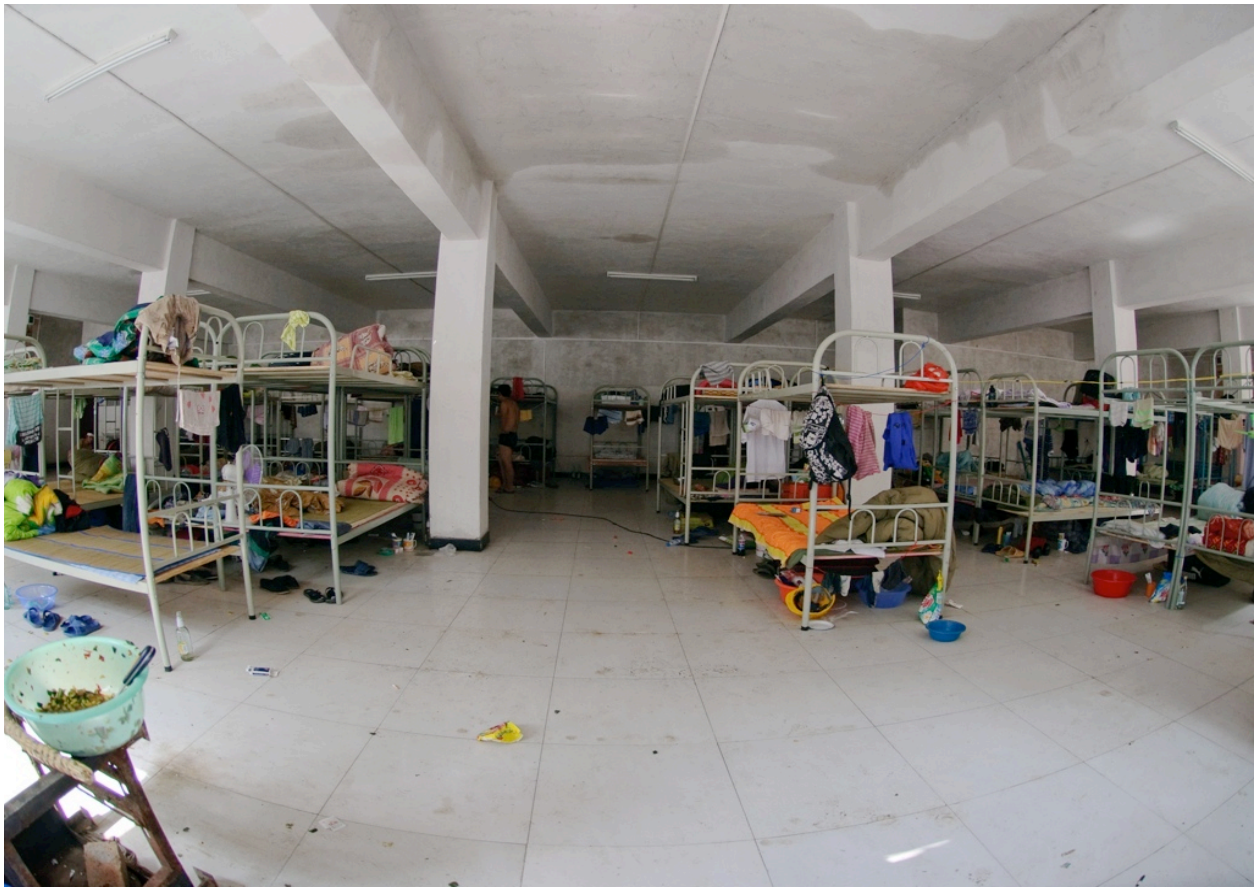

Figure 15 Where would you hide your money? Dorm life in Xi'an, China.

People that share their living space with strangers are far more likely to carry their 'most important objects' - typically some form of identity, cash in pockets, sewn or tucked into clothing. There are gender differences in carrying strategies – women are far more likely to use a (form of) handbag and as a consequence are more likely to miss incoming communication (Chipchase et al., 2005; Ichikawa et al, 2006). When an important communication or a transaction is expected the phone is then carried in the hand.

Most readers would assume that money and identity card would be clustered, contained and protected in a wallet or purse – by doing so the user is able to reduce the number of discreet things that they need to maintain an awareness of. However, the use of a wallet or purse assumes the user has a sufficient number of 'walletable' objects: cash; 2 or 3 'cards'[5]; and adoption is all the more pertinent in cultures or contexts where it is necessary to keep receipts. A study of carrying behaviours in three Chinese cities revealed stark differences in wallet use: Beijing with its well developed urban infrastructure 54%, Ji Lin - a 3rd tier

[5] ISO/ IEC 7810 defines the size often used in ATM and idenity cards as 85.60 × 53.98 mm, ISO/IEC 7810 puts the thickness of the ID-1 card at 0.76mm, and corners rounded with a radius of 3.18 mm (ISO, 2003, 2006).

Chinese city with 35% of wallet use. As one of our Ji Lin participants pointed out 'only an idiot would put everything of value in one place' (Chipchase & Ichikawa, 2006f).

The value of the mobile phone as a tool to stay connected assumes that users are aware of incoming communication and highlights the classic conundrum of carried objects – the need for *convenience of access* versus *the need to keep secure from damage, loss or theft*. Every interaction with one of these objects generates a risk, no-matter how small of theft/loss/damage not just of itself but also of other objects that are stored in the same space.

6.1 Temptation Management

Many people feel the urge to spend cash when it is considered available. It is unsurprising then to find people in their more rational moments adopt *temptation management* strategies – from avoiding taking cash and credit cards when out shopping; to storing money in hard to reach places to taking out high interest loans when cheaper alternatives are available in the knowledge that the cost of not-repaying is sufficiently high as to spur discipline. The safe storage of money is as much about hiding money from ourselves as it is hiding money from others.

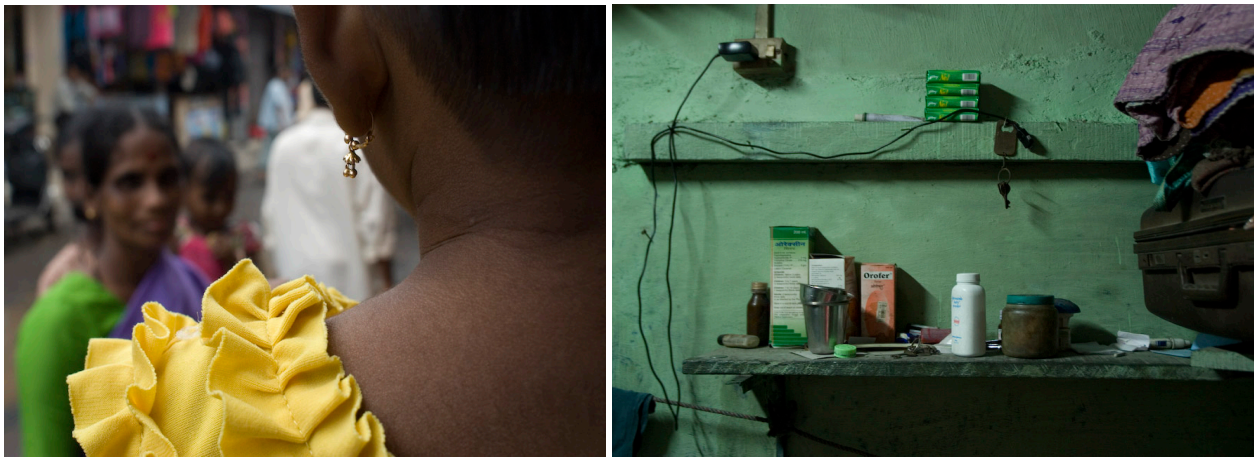

Figure 16 The traditional use of gold as a way of storing value in India (left) Can you spot the money store in this shanty town home in Mumbai, India? (right).

Which creates a conundrum for the designer of a comprehensive mobile money service: on the one hand we strive to give people timely and convenient access to their money but on the other hand we recognise the need to keep some or all of that money at arms length. The challenge is in understanding the context where each is appropriate. The issue becomes more complex/interesting when there is easy access to credit – one of the most extreme examples being instant loans via SMS, with cash being immediately deposited in the phone owner's bank account[6].

Many of the typical contexts in which the poor borrow – through relatives with social strings attached; high interest neighbourhood money lenders, gold merchants that double up as pawn brokers people's negative attitude to borrowing money on credit should not have been a surprise.

[6] There are many players in this field, one example being Ferratum, www.ferratum.nl. The legislation in Finland triggered by high levels of debt default is also instructive – with loans being made unavailable at times when large volumes of alcohol are likely to be consumed.

6.2 Risk Aversion Strategies

We also documented ample evidence of *risk aversion strategies*: which typically amounted to storing money in different physical locations, with different levels of access, including keeping money with trusted peers when formal banking alternatives are not available. Social investments such as inviting much of the neighbourhood to one's wedding can also be seen as a form of *risk aversion*.

6.3 Grassroots Practices: Sente

Every locale has its own grassroots money practices the example of *sente* from Uganda highlights the porous nature of service design boundaries (Chipchase & Tulusan, 2006a).

Sente is the informal practices of sending and receiving money that leverages public phone kiosks and trusted networks. In Uganda the word Sente has two meanings the first being 'money' and the second 'the sending of money as airtime'. It works like this: *Joe lives in Kampala and wants to send his sister Vicky 10,000 Ugandan Shillings - about 4 Euros. He buys a pre-paid top up card for that amount but instead of topping up his own phone calls the local phone kiosk operator in Vicky's village. The phone kiosk operator uses the credit to top up his own phone, takes a commission of anywhere between 10 and 30% and passes the rest onto Vicky in cash. The kiosk operator then resells the airtime at a profit (it is after all his business).*

Sente is particularly relevant in a country where there is limited access to formal banking infrastructure and is largely driven by necessity and convenience. The receiver doesn't need a bank account, merely access to a friendly phone kiosk, and the risk of theft is reduced because there is no need to carry cash. The Sente process can take as little as 5 minutes whereas using regular banking infrastructure can absorb a full day's time with additional travel costs.

There are a number of ways that Sente could be improved: it is not always clear to whom the cash should be passed onto; there is no receipt mechanism - so the sender doesn't know if and when the money has arrived though the level of trust is high enough for the sender to assume the money will be passed on; the phone kiosk operator may not immediately have enough cash to pay the recipient in which case a payment schedule needs to be agreed for example 2,000 Ugandan Shillings a day is paid out for 4 days (the remaining 20% being the kiosk operator's commission). As with all money transfer mechanisms there is potential for laundering (relatively small sums of money), and to some extent a pre-paid mobile phone is the equivalent of an off-shore bank account - largely untraceable.

The major difference between Sente and more formal banking services is that the driver for innovation is coming from the street and the degree to which trusted relationships are leveraged. It challenges our assumptions of what we are designing and equally pushes us to understand why, given the availability of similar practical and social 'infrastructure', the practice is relatively limited.

7. DISCUSSION

7.1 What Are We Designing?

As much as service providers like to think of their service as having clearly defined boundaries, the high levels of mediated use found in emerging markets suggests they are better thought of as malleable - ultimately responsive to the agents context, customers needs and commercial opportunities.

Service providers will do well to understand the motivations of agents and customers, track and anticipate how these are likely to change over time; explore ways to absorb best practice and look for opportunities to amplify positive effects. If properly understood and developed these may end up as commercially branded

service differentiators. The flexibility that mediation introduces to any given system may generate an unnecessary level of risk terms of potential fraud or because of variations in its service offering, to the brand. However, any negative externalities are mitigated by the opt-in nature of these informal service extensions and generally speaking consumers are wary when it comes to matters of money. For many of the poor when things go wrong it is 'just the way it is'.

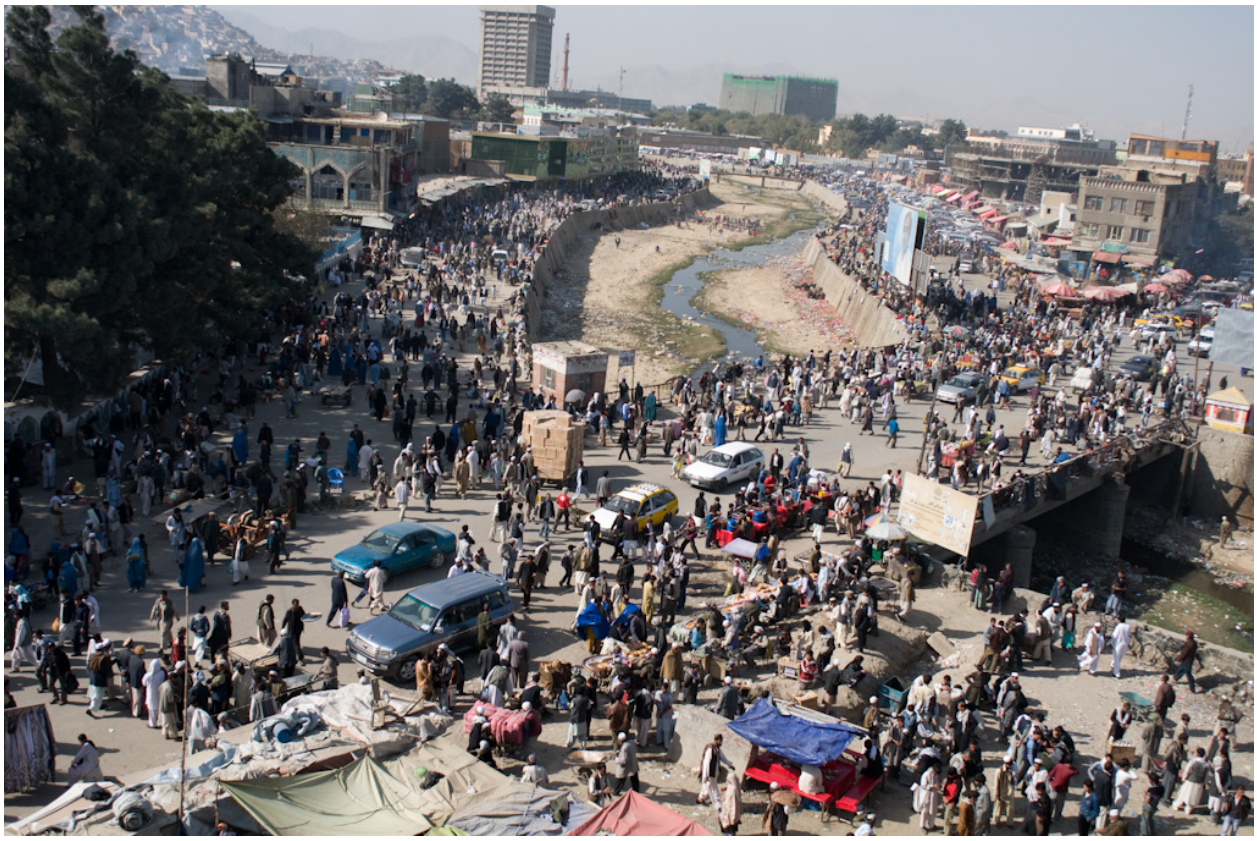

Figure 17 How does the context of use affect user service expectations? Kabul, Afghanistan (2009).

The symbiotic relationship between consumers, agents and the service provider is not static - customer service literacy and the service ecosystem will evolve over time and the relative importance or otherwise of each of the factors discussed above will change. There is considerable opportunity to be had from anticipating and leveraging this change.

Just because the service provider possesses the knowledge and skills to design an optimal service doesn't mean that it will be optimal for the benefit of the user. As many service providers know confusion can be highly profitable – whether it's for the late return of a DVD, an unauthorised overdraft or lack of awareness of how many text messages have been sent. Any industry that requires trust to grow must first earn it.

7.2 Practices & Opportunities

As consumer understanding of mobile banking services mature, to what extent will they make sophisticated use of multiple accounts/wallets for temptation management, risk aversion, sophisticated savings strategies? Whether and how mobile money services should inherently be designed to support this? And how this will affect the regulatory environment? Change can also occur on the service side: is there a point when network operators embrace the use of multiple (and competing) SIM cards on one device - any offset in revenue offset by network effects and a growing culture of communication, trust and financial literacy?

Looking ahead - how is the charging landscape for the poor likely to change over time? Solar charging is only likely to present a viable option for off-grid consumers when it matches the flexibility and cost of local alternatives – typically a car battery. The global standardisation of micro-USB for charging mobile phones will increase the commercial viability of kiosk content providers using laptops and netbooks, which will considerably increase the number of charging hubs that lie in proximity to the user which should decrease the cost of charging. The availability of charging hubs will increase with the price erosion of laptops and netbooks. It will be interesting to see whether there are sufficient volumes of super-cheap, used netbooks shipped over to emerging markets - a three year old netbook might be able to adequately function as a mobile phone charging hub.

Mobile phone features that make heavy use of the network that are targeted squarely at emerging markets such as Samsung's Advance Mobile Tracker, Ovi Mail and increasingly mobile money services will shift mainstream consumer expectations on issues such as: expectation of service availability; physical versus digital backups; attitudes to data loss; ease of recovery; and practices to secure online accounts. (Samsung, 2006; Nokia, 2008).

Given that extent to which usage of service is mediated through others - what analytical clues suggest widespread secondary and tertiary use? How to measure secondary and tertiary users? And what steps can a service provider take to connect with these users? Over time it will be possible to automate more of the transaction process – it will be more appropriate to describe primary users as 'passive users' or perhaps 'constituents'.

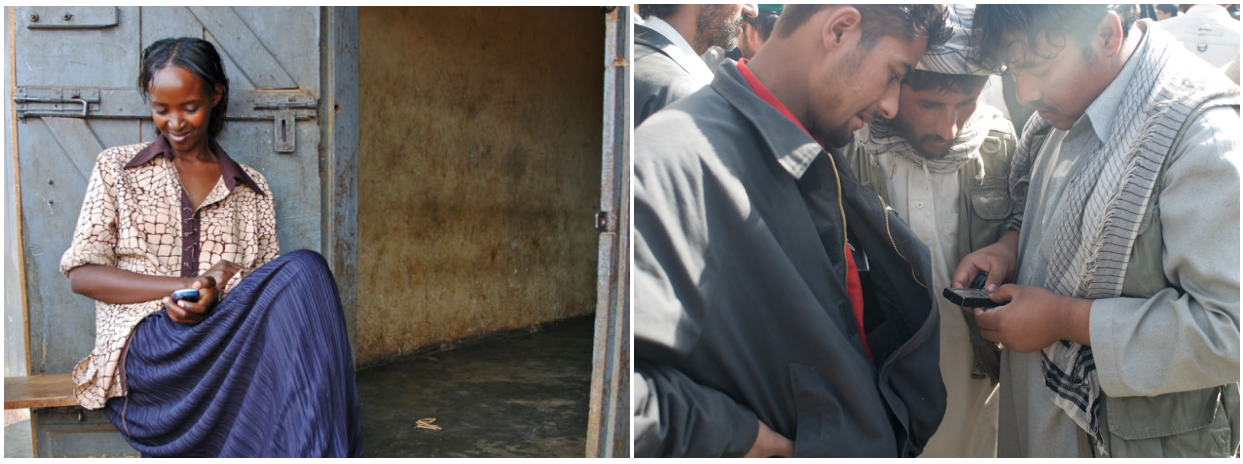

Figure 18 To what extent can we assume that agents, such as this Ugandan village phone kiosk operator (left) will extend the formal service offering with informal mediation for textually, technically or financially illiterate consumers Kabul, Afghanistan (right) .

There are a number of ways that these informal mobile phone markets and clusters of expertise can affect the development of mobile money services: neighbourhood agents looking to expand their service offering might start out purchasing phone covers from the wholesaler and move onto profitable repair services – generally raising the level of 'mobile literacy'; when locally relevant hacks appear on the market e.g. converting multiple SIM cards into one it doesn't take long for this knowledge to spread through the agent network.

Instead of marveling at the richness of the informal repair culture it is more instructive to ask why low income consumers use formal customer care centers when they are generally more expensive and less convenient than the informal repair? That they do points to both the power and reassurance of trusted brands. Given that many unbanked consumers do not yet have loyalty to existing banking brands, which brands to they trust? And would they trust those brands to deliver banking services?

8. CONCLUSIONS

The four main user needs when it comes to money: storing; sending and receiving; spending; and saving - are universal and simple enough for anyone to appreciate from an illiterate rural housewife in Tanzania to an unbanked white collar worker in living in a Rio de Janeiro favela. The market for services that meet these needs stretches across cultures, gender, race to at least every adult on the planet and the steady adoption of mobile phones creates the obvious technological delivery platform particularly. But whether consumers see these needs being met through 'banking' services is up for debate, and is largely dependent on regulations on what services can be offered and by whom, and how the brands themselves position their service offering. Financial literacy is not a reasonable aim, but rather a positive by-product of the use of services that meet base user needs.

Whilst the market potential has created an environment where services pilots are being rolled out at breakneck speed, players in this space are advised to look at the edges of the systems – in particular the role of agents in mediating mobile money transactions. The careful use of real-world analytics combined with contextual qualitative understanding has the opportunity to reveal not only *what* people are doing, but also the nuances of *how* and *why*. The author believes that this in turn will lead to the next round of service innovation insights.

In the past 2 years an additional billion new mobile phone subscribers have added their voice to the global conversation – building both a vibrant, robust and responsive ecosystem that has in turn created a new culture of communication. The evolution of a global culture of baseline financial literacy is not a given, but it's ours to lose.

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10. PHOTO CREDITS

All photo are by the author except:

Figure 3: Boda Boda motorcycle taxi driver, *Indri Tulusan*, Kansensero, Uganda, 2005.

Figure 11 right: Passbook of rural farmer, *John Evans*, Dali, China, 2009.

Figure 16: Dorm life, *John Evans*, Xi'an, China, 2009.

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