Effect of Mobiles on Socio-economic Life of Urban Poor

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Abstract

Using a survey of 1774 users and non-users in 84 slums in three metropolitan cities (Delhi, Ahmedabad and Kolkata), we try to understand the impact of mobiles on their social and economic lives. Urban slum dwellers spend significant amounts on communications, both for a first time acquisition of handset and SIM (nearly 40% of the average household earnings per month), as well as on going expenditure. However, a majority of respondents believe that the use of mobiles has led to an improvement in their economic situation and that these benefits are greater than ownership and usage costs. Mobile also appears to change how slum residents interact with each other. Despite reducing face-to-face interactions, mobile usage is associated with stronger social relationships. In comparing users and non-users, we find differences between users and non-users in terms of income, education and other social characteristics. We also find evidence of hierarchies within households, with women far more likely than men to be only infrequent mobile users or not to have access at all. While cost of a handset is the primary barrier to owning a mobile, non-owners report difficulty in using a mobile, clarity of charges for call-plans and information dissemination as other barriers to ownership.

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EFFECT OF MOBILES ON SOCIOECONOMIC LIFE OF URBAN POOR[1]

Ankur Sarin and Rekha Jain

Introduction

Few innovations in recent history have become as pervasive as rapidly as the mobile phone. Not surprisingly, it has become a symbol of the use of new information and communication technologies (or ICTs) in the developing world. The small mobile phone now also carries the hope that it will unleash the potential of ICTs to dramatically alter lives beyond economically advantaged groups. While there is much anecdotal evidence about the ability of mobiles to improve the social and economic status among the poor, there is little systematic evidence that the benefits of mobiles are generalizable to a larger population among the poor. We take a step in that direction by conducting a large survey in urban slums in three metropolitan cities to understand the social and economic impacts of mobiles on the poor living in urban slums in three large cities in India.

The primary research question we seek to answer is: *What has been the impact of mobiles on users living in urban slums?* The study focuses on the social and economic impacts of mobiles on the lives of poor urban dwellers and in particular, the study seeks to understand how mobiles affect the way slum residents conduct their social and economic lives and the returns that they derive from their economic activities.

Using survey data from 1774 households living in 84 slums in three large metropolitan cities of India-- Delhi, Ahmedabad and Kolkata, we try to

- Understand determinants of usage and ownership
- Measure the perceived impact of mobiles
- Understand the process by which an impact is created

Results from the study suggest that mobile users in slums by and large view them positively and evaluate the benefits they derive from them more than the amount they have spent on them. A majority of respondents believe that the of use mobiles has led to improvement in their economic status. Not surprisingly, transaction intensive activities that

[1] Although we use the term "impact" in the title and rest of the proposal, we recognize limitations in our ability to strictly attribute causality of any measured effects only to mobiles i.e. to claim that any observed changes we find to be correlated with mobile usage *would* not have occurred in the absence of mobiles.

require communication, gathering of information are most impacted by mobiles. For example, nearly 60 percent of all self-employed activities engaged in by users are reported to be positively impacted in terms of earnings from the activity.[2] Users report a positive effect of mobiles not only on reduced costs associated with doing work – like travel, discovering prices etc. but also on their ability to co-ordinate with the people they work with, working over larger geographical areas and avoiding the use of intermediaries in their transactions. In addition to economic status, results suggest that mobiles have a positive effect on social ties and relationships. Most users report that mobiles allow them to remain in touch and have improved their knowledge about the welfare and whereabouts of their friends and relatives. Interestingly, users also report that mobile usage has led to a decrease in the frequency with which they physically meet their friends and relatives. Therefore, while mobiles strengthen social relationships they also transform how slum residents interact with each other.

While the positive economic and social impacts of mobiles among residents in urban slums are indeed promising, they also open up the issue of whether in bridging some divides, mobiles also open up new ones either between or within households. Our survey suggests that "user" and "non-user" households are different from each other along multiple dimensions including their education level, the kind of economic activities they engage in, earnings from them and the nature of social and economic networks they inhabit. Given that the average household earning per month among users is Rs. 6436 and that among non-users in our sample, it is Rs.4373, it is not a surprise that despite rapid reduction in the cost of possessing and using mobiles, the primary barrier to mobile usage among the slum population still remains financial. However, given the existing differences between "user" and "non-user" households, we would need to be cautious in assuming that mere reductions in the financial costs of owning a mobile will translate to positive impacts for households currently not owning or using a mobile.

Secondly, the survey points to the need to understand the effect of mobiles on relationships and their hierarchy within households. While mobiles have broken down class and economic barriers to accessing benefits from rapidly developing information and

[2] To understand their economic lives, we asked respondents to classify their economic activities into three categories – self-employed, regular wage and daily/ casual labour. Self-employed refers to activities like owning and running a shop, operating a rickshaw, providing a service (e.g. Plumbers, Carpenters). Regular wage refers to activities for which they are compensated on a regular basis while working for others. Daily or casual labour refers to activities which are done on temporary contracts and include manual labor and construction work

communication technologies, it also seems to reinforce some existing ones. For instance, men are predominantly the primary users of mobiles within households in urban slums with women far more likely to be occasional users or not use the mobile at all. The more educated and higher earning members within a household are similarly more likely to use the mobile. This is of course not an argument against encouraging the use of mobiles, but one in favor of the need to understand household dynamics in enabling further access to mobiles.

Why study slums in urban India?

Not withstanding the literature on urban bias (Lipton, 1977; Varshney, 1998) the rural sector has for most part been the focus of most policies targeted at reducing vulnerabilities and poverty – if not in practice but at least in rhetoric. This has been the case because a significantly large proportion of India's population lives in villages and a higher proportion of them are below the poverty line. However, the importance of the urban sector has been rapidly growing and despite the fact that only 28 percent of India's 1.2 billion people currently live in cities, the urban sector contributes to more than 60 percent to India's GDP – a far greater than the 29% share contributed in 1950-51.

Since the creation of wealth is concentrated in certain regions and sectors, this has naturally led to large-scale migration to Indian cities. Therefore, while India's urbanization rate is far lower than that of other countries like China (40 percent), the rate at which it has been urbanizing has been increasing and by 2025, 40 percent of India is projected to be urban as well (National Institute of Urban Affairs, 2000) . Further, between 1983 and 2004-05, the total number of rural poor declined by 12.31 percent while the total number of urban poor increased by 13.89 percent (Chandrasekhar and Mukhopadhyay, 2008). India has not been alone in this rapid transformation with 60 percent of world's population expected to be living in cities by 2030 (The Economist, 2007). And like other developing countries, India has largely been unprepared for this influx. Consistent with the poor planning and development of civic amenities and infrastructure, there have been few low cost housing facilities available for migrant workers who come to cities in search of better economic opportunities. As a consequence, there has been a proliferation of slums and of the nearly 300 million inhabitants that live in India's cities, 55 percent live in settlements that can be characterized as slums (UN-Habitat 2008).

Understanding the context – slums in urban India

The living conditions and extent of poverty that characterize slums varies dramatically between and within cities. In general, the "notified" or authorized slums (the type of slums we collected data from in our survey) have significantly better living conditions and lesser poverty than non-notified or non-authorized slums. For example, in 2002, estimates of the proportion of total population living below the poverty line were 34 percent in the notified slums versus 41 percent in non-notified slums and 21 percent in non-slum area (Chandrasekhar and Mukhopadhyay, 2008). Similarly, 84 percent of people living in notified slums were estimated to have access to a tap in contrast to 71 percent in non-notified slums. However, while the "notified" authorized slums are more likely to have some basic amenities such as water and electricity – the provision is meager and usually inadequate with respect to the demand. For example, there could be one tap in the locality serving the community, whereas in unauthorized slums, residents may have to walk some distance to get water. Residents in the "non-notified" slums are typically unlikely to benefit from public utilities, since these settlements are unrecognized by the civic authorities and provision of these utilities would imply formal recognition.

The tenements in the notified and non-notified slums also typically vary, with those in the former more likely to be "pucca" i.e. built out of more permanent material like bricks, concrete, asbestos while those in notified slums built out more of temporary materials like unburnt bricks, bamboo, mud, reeds, thatch, etc. Regardless of the type of structure, usually a large number of people, a family or even an extended family live in a small room. Several families may live in verandas of such houses. In both cases the common space is heavily used. There is no or little personal space and household assets (TV, radio) are shared in a family.

Given the harsh living conditions, it is not surprising that the poor among urban residents are much more likely to inhabit urban slums. Many of the slum dwellers, lacking the skills and capabilities required in the new growth areas, are usually absorbed in the low paying informal sectors. Such jobs are not regular, offer little security, and are often exploitative. Most people have few assets and therefore rely on labor markets. As is the case in most Indian labour markets gender, caste, training education are usually the determinants of access to jobs. The types of jobs available to them may be irregular, be dependent on the type of neighborhood (construction site, industrial area), and the availability of capital among

the self-employed. Often people living in such areas may have to commute long distances for work, as several slums are on the periphery of cities.

Social Life in Slums

Slum dwellers face a difficult social life, not only because of overcrowding but also possibly because of the high competition for shared resources (such as water), threat of eviction, insecure or non existent job tenures, and the need to re-establish social linkages in a new environment as they move away from their roots. Options of support from family and community based networks and safety net systems (developed over generations in rural villages) may be limited and the precarious nature of their existence makes them even more vulnerable. Although some slum residents live in clearly defined occupational or caste based groupings, others do not. (Loughhead and Mittal, 2001)

For slum dwellers, it is often not only education, skills and health that determines their ability to cope with vulnerabilities, but also their own capacity to deal with emergent situations. For example, they may not be in a position to take a risk such as to forego present income earning opportunities in order to enhance skills for a potentially higher earning job in the future. This mind set also determines whether they can exploit new business opportunities. For example, their decisions regarding who to sell their services or goods to may be determined by the trust they share (hence low risk, rather than to new supplier who may be far away who they do not know and who may be willing to pay a higher price). A person who has a better provision for finances could take that risk.

Due to the vulnerabilities that the urban poor face, especially those living in slums, it is important to address the developmental needs of this segment of the population. It is not only from an equity and developmental needs perspective that the needs of this segment need to be examined, but also from the perspective that any economic benefits available to the people in urban slums will drive the growth of the urban economy, furthering national GDP growth as identified above.

The Socio-Economic Context of Mobile Usage in Urban Slums

The social and economic context of slums would drive the adoption and usage of mobiles in ways that are different from other sections of the population. Due to the fact that there is so much sharing of space and other assets, we may expect that mobile may be used as a shared

service, especially since the handset costs may be a deterrent to acquisition of a self owned service. We could expect that the communication patterns would be determined by migration as one of the factors. For example, where male migrants have moved to cities, there would be a need to communicate with their immediate families they may have left behind. There would be a need to communicate not only about their welfare, but also about the status of any remittances they may have made. Even when families migrate to cities, they may have roots in rural areas or smaller towns. They may also be involved in supporting the larger family at home.

Further, we expect that the type of economic activity they may be engaged in would determine the adoption and usage. Since many of them are involved in informal activities, the ability to be in touch with sources of job opportunities is critical. Competition for such activities (such as casual labor) is high. This further puts pressure on those seeking jobs to be in touch with the source of the opportunity. If they are self employed, or work as sub contractors, then the ability to coordinate with their suppliers and customers is important, as there may be no formal contracts to ensure service or payment, making them extremely vulnerable to competition. Further, since residents of slums may commute for their work, coordination could help them reduce transportation costs.

Overview of Some Key Studies on Ownership, Use and Impacts of Mobiles

The rapidity with which the usage and ownership of mobile phones has spread in developing counties like India is a well documented story (Telecom Regulatory Authority of India, 2008). The primary explanations for this rapid adoption of mobile services have been: technological developments that drove down the costs of owning and using a mobile; a favorable policy and regulatory environment that encouraged competition between service providers resulting in reduced tariffs, thus facilitating increased usage. In addition, the significant low levels of investment in fixed line networks and accompanying economic growth in countries like India, accelerated the adoption and usage of mobiles. However, while the uptake of mobiles in urban areas and among the people in the higher economic groups has been significant, there are no reliable estimates of mobile adoption and usage among urban poor to our knowledge.

The existing literature on the impact of mobile phones has largely focused on macro level questions like the impact of mobiles on overall economic growth and development.

Appendix 1 provides information on the essential features of some of the notable studies examining the impact of mobiles. The literature review showed that there have only been a few systematic, survey-based studies providing insights on factors that drive adoption, usage and social impact of mobiles in developing countries.

The countries in which these studies have been carried out include: Mozambique, South Africa, Tanzania, Egypt, and several countries in Africa, Peru, India, Thailand, Pakistan, Sri Lanka, Philippines (Zainudeen et.al., 2007, Souter et al, 2005, Vodafone, 2005). While the common theme across these studies is to assess the social and economic impact of mobile telephony, they have differed in the issues emphasized and methods used. Some studies have focused on the use of mobiles alone. Others like Barrantes (2008), Forestier et.al. (2002), Goodman (2005), Souter et.al. (2005) have focused on the relative use of telephones vis-à-vis other communication media and the different functions for which people prefer the phone, specifically the mobiles over other ICTs. For example, in Africa, mobiles were cited as the most frequently used means of communication in relation to post offices, internet, fixed lines etc, both for voice and text (Goodman, 2005). Relevant findings from these and other studies are discussed later when we discuss findings from survey.

METHODOLOGY

Research Design

To assess the impact of mobile phone in users' lives, an obvious strategy is to measure the socioeconomic impact and behavioral changes that occur before and after this use. But such research is also fraught with potential pit-falls. First, in the absence of baseline data i.e. information about the users measured prior to ownership, we have to rely on the respondent's memory – therefore any findings would need to qualified by the possibility of a recall bias. Second, even in the presence of baseline data, before-after comparisons do not allow us to isolate the impacts of mobiles from other changes affecting the outcomes being considered that have occurred simultaneously during the same time period.

Therefore, to asses the impact of mobile phones, we would ideally like to be able to measure changes in relevant outcomes for the same households with and without a mobile keeping all the other variables including the period of observation constant– a logically impossible ideal. Our choice of a comparison group that would provide the counterfactual: what would have happened without mobiles is therefore restricted to households that have not

used mobile phones with the assumption being that experiences and outcomes of non-users serve as a proxy for those of the users had they not used mobile phones.

Using this framework to asses impacts, the ideal comparison group should on average be identical to the intervention group (i.e. group using mobile phones) with the usage of mobile phones being the only difference between them. Since chance would be the determining factor, a prospective study that uses the luck of draw to decide which households use or have access to mobile phones and which ones don't would ensure comparable intervention and comparison groups. However among other reasons, the rapidity with which mobile phone usage has been increasing makes such a study hard to implement in practice. Short of restricting ourselves to a very selected and isolated population – very much unlike an urban slum, ensuring that the group of people assigned not to use a mobile do not in fact use one over a period long enough for us to observe impact would not only be impossible but perhaps also unethical. Instead, we compare the experiences and contemporaneous status of a group of self-selected users and non-users living in slums in the three cities.

Households in which there is at least one member who uses mobiles regularly – defined as using a mobile at least once a week—were classified as "user" households and other households were classified as "non-user" households.[3] However, we need to be extremely cautious in using non-users as a comparison group and treat the estimated differences between users and non-users as an estimate of the impact of mobiles. Since the use of mobile phones is a choice that individuals make, the group of users and non-users could systematically differ from each other in more ways than just mobile usage. While some of these, like earnings and education can be controlled and accounted for; others, that are difficult to measure and observe, cannot. For example, people using mobiles are likely to have chosen to use them because of higher perceived or real impacts. Similarly people using

[3] Since users in developing countries are likely to share mobile phones within and between households, one of the complexities that researchers in the developing world have had to grapple with is defining and distinguishing between ownership and usage. Unfortunately, there has been no consistent definition of what constitutes a "user" in the existing literature. For example, (Zainudeen et.al., 2007) defines a "user" to be someone who has had used either their own phone or someone else's -- paid for or free of charge-- during the preceding three months. So, even if a user had made a single call, then he/she would qualify to be a user. In contrast, the study by Chabossou et.al.(2008) considers anyone above the age of 16, who owns a phone or has an active SIM card as a user regardless of whether s/he has been using the phone and all others as non users.. Samuel et.al. (2005) defines anyone who has never owned or used a phone to be a non-user, unlike the other two studies.

a mobile phone might simply be more motivated to improve their life-conditions or be informed about how to do so than non-users. Therefore, attributing any observed difference in outcomes between users and non-users to just mobile use becomes problematic in the presence of other (possibly unobservable and immeasurable) attributes that are correlated both with mobile use and the outcomes being considered.

Given the constraints outlined above and acknowledging that our estimates of the impacts are descriptive and suggestive, we try to tease out potential impacts not only by comparing users and non-users and before-after comparisons but also by collecting detailed measures tracking the hypothesized pathways by which mobiles can have an impact as well as the outcomes indicating an impact.

Using existing literature, as a starting point we identified several socio-economic dimensions that have either been empirically shown or conceptually believed to be determinants of mobile usage or be impacted by mobiles. We chose dimensions that tried to assess both intermediate as well as more long term outcomes to understand the mechanisms by which the use of mobiles might create an impact. For example, we asked users to report on changes in the amount of inventory they hold, not because we care about it per se but because it might indicate how mobiles have an impact.

To asses change, we ask users about changes in their social and economic status since they started using mobiles. We asked non-users to use the last year as the reference period to answer questions on changes that could occur even without mobiles. The time period of comparison chosen for non-users was driven by the expectation that on an average, users in our sample are likely to have been using mobiles for a year.

The dimensions on which respondents were asked questions included

- Determinants and nature of ownership
- Determinants of usage between households, i.e. which households are more likely to be using mobile
- Usage within households, i.e. which members of the household are more likely to use mobiles

- Nature and pattern of usage
  - Expenditure
  - Purpose of usage
  - Calling patterns
  - Use of Services
- Change in nature and patterns of economic activity
- Change in returns to economic activity
- Change in work practices and behavior
- Social Impact: Change in mode and intensity of contact
- Pervasiveness of mobile ownership in a) social network and b) economic network
- Barriers to mobile ownership

Data and Sample Design

Given the focus of the study on urban slums, we restricted attention to three large metropolitan cities: Delhi, Ahmedabad and Kolkata, located in the northern, western and southern parts of the country, respectively. Between them the three cities provide some degree of regional diversity and represent a population of approximately 21 million. Within each city, we stratified the slums into different geographic regions and used the method of probability proportional to size to select slums to survey. To the extent that slums differ from each other, we tried to get as many different slums as possible to ensure our sample is representative of the city slum population. However, the gain in statistical efficiency has to be balanced against the increased time and monetary costs of data collection.

From available lists of formalized slums, we selected slums in each city stratifying them by location – in Delhi and Ahmedabad this referred to the zone and ward in which the slums are located and in Kolkata this referred to the borough. The probability that a slum was selected was proportional to the reported number of households in the slums with some slums being selected more than once.

There were 29 slums selected in Kolkata, 25 in Delhi and 30 in Ahmedabad. Twenty households were interviewed in most slums, with 40 interviewed in 4 slums and 60 in one. Within each slum, 70 percent of the interviewed households were to be “user” households and 30 percent were “non-user” households. The households within each slum were chosen

purposively based on availability and willingness to participate. The number of user households was over sampled since that is the group we are more interested in and from whom detailed questions about how mobiles have impacted their lives were asked. The total number of households that we tried to interview was 1800 – 600 in each city. Of the 1800, 1260 were to be users and 540 non-users.

We collected data from both the primary user of the mobile phone as well as the person most knowledgeable about the household socio-economic status and practices, in case the two were different. The determinations of who were the primary and secondary users were left to the households and were not based on any pre-defined criteria.

Description of Sample

Using the sampling methodology described, we were successful in surveying 1774 households, of which 1235 were "users" and 539 were "non-users".[4] Table 1 provides further details of the sample. The average size of the household in our sample was 4.37 members with households in Ahmedabad and Delhi being larger than the Kolkata sample. Members belonging to the Scheduled Castes (SC) make up nearly 28 percent of our sample, while those from Scheduled Tribes (ST) and Other Backward Classes make up six and 16 percent, respectively of our samples[5]. Compared to the larger population, we have a disproportionate number of SCs and STs in our sample. For instance, the 2001 Census suggests that SCs made up around 20, 26 and 6 percent of the respective slum population in slums in Ahmedabad, Delhi and Kolkata respectively. Similary, STs constituted only around 1 percent of the slum population in these cities during the 2001 census but constitute 6 percent of our sample.

FINDINGS FROM SURVEY

Users' are better-off compared to non-users

As Table 2 illustrates, the survey corroborates the general perception and existing literature that user households are economically advantaged and more educated compared to non-user households (Souter et al., 2005; Samuel et.al., 2005; Zainudeen et.al., 2007;

[4] Rather surprisingly, most respondents who owned a mobile in our sample -- own one exclusively. Only in Kolkata, did 17 percent of "users" not own a mobile but reported using one. However, this might have also been a consequence of the way data investigators screened households. Therefore, we might instead be looking at a comparison between owners and non-owners.

[5] The Indian constitution explicitly defines and makes provision for historically disadvantaged groups labeled as Scheduled Castes (SC), Scheduled Tribes (ST) and Other Backward Classes (OBC).

Barrantes, 2008; Chabossou et.al., 2008). While some of the advantage in economic status could be a result of owning or using a mobile, it is more likely that pre-existing economic status is a strong predictor of usage with more economically better-off households likely to use mobiles. The total household earnings for users are Rs. 6436 per month on average while that for non-users is Rs.4377 – a difference of more than Rs.2000. While users might be relatively better off financially than non-users, the per capita per day income among users, is around Rs.49 or approximately one dollar (US). To put this in some context, the monthly per capita poverty line for Delhi in 2004-05 was Rs. 612, in West Bengal (the state where Kolkata is located) was Rs. 449 and Gujarat (the state where Ahmedabad is located) was Rs.541. Using these poverty lines – which are controversial and generally believed to understate poverty considerably and adjusting for inflation, around 20 percent of non-user households and 15 percent user households would be below the official poverty line.

It should also be noted the difference between the average earnings of the highest earning members of user and non-user households is around Rs.1000 per month – half the difference between total earnings. This suggests that the differences in households' size and earnings per member might also explain some of the disparities in household earning. In fact, the per-capita earnings between users and non-users differ by Rs. 317 per month.

Consistent with the differential earnings, literacy status among users is higher than that of non-users. While 33 percent of non-user households did not have a single member who was literate, only 23 percent of user households were completely illiterate.

Users more likely to be involved in Self-Employed and Regular Wage Activities

Households living in urban slums are typically engaged in multiple economic activities and we find evidence of this in our sample as well (Table 3). Among users, 42 percent of the total activities that households were involved in provided them with regular wages while 36 percent were self-employed activities and the rest were largely engaged in activities categorized as daily or casual labor (21 percent). On the other hand, non-users were more likely to be engaged in daily or casual labor (33 percent) and less likely to be engaged in self-employed activities with only 27 percent engaged in self-employed activities. The proportion of regular wage activities carried out by users and non-users did not vary a lot.

By their nature, self-employed activities, which include work like running a shop, operating a public transportation vehicle like a taxi or auto-rickshaw or being a self-employed professional like plumber or electrician, are ones where mobile usage might be more productive and essential. Therefore, in contrast to Barrantes (2008) who argues that condition of employment (whether employed previous week) was much more critical in determining mobile usage than type of worker, it is not surprising that we find households pursuing self-employed activities are more likely to own and use mobile phones.

Users and non-users live in different networks

Despite the rise in gaming and other forms of entertainment and recreation in mobiles, the primary use of a mobile still remains a device to connect with others. Therefore, both the decision to invest in a mobile and the value derived from it are likely to depend on the behavior of others in the economic and social networks around the respondents. Survey results reported in Table 4 suggest that users and non-users in some sense inhabit different networks with users much more likely to be in networks with higher mobile usage. While 63 percent of users said that most or all of the people who they usually need to talk for work related purposes owned a mobile, the number was only 39 percent for non-users. The difference was even higher when it came to personal or social networks. 59 percent of users reported that most or all of the people who they needed to talk to for personal reasons owned a mobile, while only 33 percent of non-users reported the same.

Within household disparities evident in mobile usage

To get a sense of how mobile usage varies within a household, we asked respondents to classify each member of the household as either a "primary", "occasional" or a "non-user". Perhaps not surprisingly, the gender divide that characterizes most aspects of Indian society is starkly evident in the usage of mobiles as well. As Table 5 reports, an overwhelming 89 percent of all primary users of mobiles within a household were male. Primary users were also more likely to literate and have attained higher formal education. The average age of primary users was 32 years, while occasional and non-users were likely to be slightly younger at 28 years. Primary users on average earned over three times than secondary users and nearly 8 times than non-users.

Our finding is consistent with that of Sood (2006) who also identified far lower levels of ownership amongst women than men in India. However, the evidence is mixed across and

within countries. For instance, although Samuel et.al. (2005) finds men more likely to own and use a mobile in Tanzania, the difference is small. In contrast, he reports higher ownership and usage by women in the South Africa. Zainudeen et.al. (2007) found that women's use at the Bottom of the Pyramid in India, Sri Lanka, Philippines and Thailand (number of calls and duration) was similar to men. The usage pattern appears counterintuitive, given the culture in several of the Asian countries studied and our own findings.

How much do the poor spend on mobiles?

Despite the growing spread of mobiles, a question that policy makers and researchers seek to answer is to what extent is mobile telephony affordable for the poor? A number of studies in developing countries indicate that the poor in developing countries spend a greater percentage of their income on telecommunications than poor in developed countries (Barrantes and Galperin, 2008). Souter et.al., (2005) found the expenditure range to be 10-14% in Tanzania while Zainudeen et.al. 2007 found this to be in the range of 4-8%. However, it is possible that since such surveys are conducted at a particular point in time, and may overestimate expenditure, as those in the informal economy tend to underreport their incomes or have fluctuating earnings. Some studies indicate that price and income elasticities of demand are high (Coyle, 2005; Samuel et.al., 2005) – suggesting that mobiles are perceived to be "luxury" items and not necessities. However, other studies (De Melo (2000) cited by Forestier (2003) have indicated that costs for telecom use have been higher than what households have spent on essential services such as electricity and water. For example, the poorest households in Chile spent a little less than 4% on telecom, a little more than 2% on water and a little less than 4% on electricity. The study hypothesized that since the poor saw the benefits and saw telecommunication as a basic need, they were willing to incur high costs.

Table 6 shows that on an average, respondents reported spending around Rs. 2700 to start using a mobile-- with Rs. 2385 being the average expenditure on a handset and Rs. 285 on talk time -- this is nearly forty percent of the average household earnings per month. However, more than 70 percent of households spend less than Rs.200 on their mobile per month – around 3 percent of their total monthly household earnings-- and nearly 57 percent are likely to top-up or recharge their "talk time" at least once a week.

Usage of Mobiles

This section refers to Table 7 to Table 13.

Mobiles Used Primarily for Work

Mobiles are primarily used for work and social purposes and to some extent for emergencies; respondents found little use of them for entertainment, playing games or as an information device. Nearly 60 percent of the user household reported highest or high use for work related use, while nearly 51 percent reported highest or high use for social interaction (talking to friends relatives in a non-work related context). The primacy of the use of mobile for work over social interaction is also reflected in the usage score that gives the weighted average over a 6 point scale (0-5), though the difference is small. Further, 24 percent of user households reported highest use of mobile for work, while only 19 percent have rated social interaction as the primary use.

These findings differ from those reported by Souter et al., (2005) and de Silva et al. (2007), where both studies report social purpose as the primary reason for calls. Further, the difference in number of social and business calls as a percentage of total calls is significant. For example, de Silva et al. (2007) report this difference to be 58% in the case of India and report 40-64% difference across Pakistan, India, Sri Lanka, Philippines and Thailand. One possible explanation for the variation between our findings and theirs is that as people have started recognizing the benefits of mobiles for work and organizing themselves to exploit it as mobile usage has become more pervasive. Another explanation might lie in the way we have defined a "user". Unlike de Silva et al, where a user was defined as someone who had made even a single call in the last three months, we defined a user household as one where a member has used a mobile within the last week. If people who use a mobile primarily for work purposes are more likely to use it regularly (at least once a week), our stricter definition could result in disproportionately classifying those who are more likely to use a mobile for work purposes as a "user" than those who use it primarily for social purposes..

Mobiles used to maintain both strong and weak ties

Table 23 shows the usage patterns of user households in terms of frequency of use, calls to household members when at work, friends and relatives living in the same city, friends and relatives living in a different city, acquaintances, work related and emergencies. This data was gathered to understand the primary driver of usage and the possible

consequences on communication patterns. Reflecting the relatively higher focus on work related use of mobiles, 38% percent of user households used the mobiles for work everyday, followed by calls to household members at work (21 percent), relatives and friends staying in the same city (11 percent). A small percentage (6 percent) called their friends and relatives living in different city daily. A large percentage (80 percent) called their friends and relatives living in the same city once or twice a week (46 percent) or once or twice a month (34 percent), with a weekly frequency being lower for those friends and relatives living in different city (35 percent for once or twice a week and 42 percent for once or twice a month). The frequency of calling acquaintances once or twice a week (35 percent) compared significantly with the calling pattern for friends and relatives living in different cities. The usage patterns indicate that while work related calls are significant, a significant percentage of user households (35%) make calls once or twice a month to their friends and relatives living in different cities, towns, villages and acquaintances.

This concurs with earlier studies, which indicate that mobiles are extensively used to maintain social networks, especially contact within the family. In addition, some studies find evidence that mobile phones are used to maintain both strong and weak ties (those related to outside the immediate family and immediate social groups, for example, officials and acquaintances (example: Samuel et.al.,2005; Goodman, 2005; Sood, 2006). However, while both Samuel et.al. (2005) and Sood (2006), identify the strengthening of weak ties and consequent lower dependence on the immediate contacts for economic outcomes such as job searches, Goodman (2005) does not find evidence that mobiles alone were being used to meet an unmet demand in the context of weak ties. This indicates that people possibly used other channels (such as fixed line networks), for maintaining weak ties while relying more on mobiles to manage the strong ties. This could indicate that mobiles were preferred to fulfill a demand for maintaining strong ties. It is quite plausible that with greater passage of time with respect to the introduction and usage of mobiles, people have started using mobiles for maintaining weak links too.

Mobiles and Use in Emergencies

Only 20 percent of the user households rated highest or high use of mobiles for emergencies, reflected in relatively low usage score for emergency (1.82), as is the percentage score for highest or high use for emergencies. This could be because emergencies do not occur as often leading to low usage for emergencies. Nearly 11 percent of user

households reported using the mobile for emergencies on a daily basis. Although this number appears to be high, we feel it could also be because respondents could have interpreted it to mean something important or to be done quickly.

Most People Use Mobiles for "Productive Purposes"

A very small percentage of user households have rated highest or high use for entertainment, information, news and playing games (6 percent, 5 percent and 3 percent). In line with this trend, we find that only 2 percent of the user households have used the mobile for participating in contests on television or radio. Only 25 percent of user households had subscribed to any additional service. Of those that had subscribed, nearly 94 percent subscribe to caller tunes/ring tones, with the next highest usage being for Sports (12 percent), followed by Jokes, News and Horoscope updates at (8 percent, 6 percent and 2 percent).

Nearly 29 percent of user households have used mobiles for contacting doctors and 21 percent for contacting a person working in the government or a government office. The relatively higher percentage use for contacting doctors possibly reflects the fact that calling a doctor is seldom discretionary.

SMS is a Low Usage Service

The usage of SMS may partly be driven by the level of comfort people have in sending and receiving SMS. Other factors that drive usage may be the relative cost vis-à-vis voice call and nature of communication supported by SMS (asynchronous, number of messages required for confirmation). In order to assess one dimension of usage drivers, respondents were asked their relative comfort in sending and receiving SMS (Table 21). A large percentage (45 percent) of user households were not comfortable in either receiving or sending SMS, while 36 percent were comfortable in both receiving or sending SMS and 19 percent were comfortable in receiving but not in sending SMS.

Nearly 96 percent of user households indicated they never used SMS for emergency, 91 percent never sent SMS to household members when at work and 89 percent never used SMS for work. However, 19 percent of user households had used SMS once or twice a month or more for contacting relatives and friends staying in the same city, and 14 percent had done the same for friends and relatives living in different city. For acquaintances, the number was 12 percent. This indicates that SMS is used more to keep in touch with the not so immediate

circle of relationships. For the immediate family, SMS is rarely used. This could also be as the richness of experience in using SMS is far lower than in using voice.

Mobiles change how people conduct economic activities

Several studies have documented the role of mobiles in reducing the search costs for information on prices and availability of produce (Jensen, 2007; Aker, 2008; Donner, 2005), transaction costs in business (either due to reduced need to travel or/and better information), increase in productivity (Donner, 2005), especially for high mobility workers (such as cab drivers) (McKinsey, 2006). While there are cost savings established for a number of groups in various studies, evidence on the usage of mobiles for new income generation is limited (Zainudeen et.al., 2007).

Responses reported in Table 14 suggest that mobiles change how people conduct their economic activities and do so in ways that are likely to increase the economic value of their work. We find rather strong evidence that mobiles improve the ability of people to plan, co-ordinate and search for better prices or lower costs. Over 70 percent of users for whom the question was applicable report that mobiles have improved their ability to plan and co-ordinate with people they work with. Similarly, while 43 percent of "non-user" households rarely or never plan and co-ordinate with their customers and suppliers, around 80 percent of "user" households use their mobiles for such planning and co-ordination at least sometimes. The fact that mobiles confer a distinct advantage over public telephone booths is evident from the fact that while 35 percent of users report using the mobile to find new or better work either most of the times or always, and 26 percent of non-users report using telephone booths to do the same.

Mobiles also seem to enable the poor to do their work over a larger geographical area. For example, while 40 percent of users state that there has been no change in the geographical area (as measured by distance from home) over which they do work, 46 percent report that their mobile usage has either increased the area somewhat or a lot. The contrast with non-users, among whom only 18 percent report an increase over the prior year provide suggestive evidence for the hypothesis that mobiles help the poor over come or lower the transaction costs of doing business beyond their immediate vicinity.

One of the striking ways in which mobiles appear to influence work practices is the ability of users to find work or jobs directly and without intermediaries. While only 39 percent of respondents say that their primary source of finding jobs or work was direct contact with the customer prior to using a mobile, 62 percent of respondents are now able to avoid the use of contractors or middlemen and no longer depend on personal friends and relatives. The finding is significant given that a third party intermediary still forms the primary source for 42 percent of non-users compared to 15 percent of users.

Mobiles decrease monetary costs of doing work and increase efficiency

For use of mobiles to actually translate to higher earnings or income, the change in practices documented above should translate into either higher productivity, lower costs or higher returns or some combination of all three. We find some evidence for all three and report these in Table 15. Around 65 percent of users report that their travel costs have decreased as a result of owning a mobile.[6] A similar proportion of users for whom the question was relevant report a reduction in wastage of unsold stock and a decrease in the money tied up in stocks/inventories as a result of using a mobile. Assuming that easier access to credit translates into reduction in costs, around 57 percent of users also associate their usage of mobiles with increased access to sources of credit. Although much larger than the proportion (15 percent) of non-users who report a similar decrease in the year gone by, only about half the users report that there has been a decrease in the time it takes to procure goods or provide services. Most of the rest of the users reported no change

Mobiles increase prices or wages and number of new customers/suppliers

Accompanying the reduction in costs, around 58 percent of users state that their wages or prices for the products of services they sell have increased because of mobiles. Mobiles have not only increased access to existing suppliers/services/customers/place of work, with 60 percent of respondents reporting an improvement, but also enabled a proportion of users to find new ones.

[6] We acknowledge that whether or not a change qualified by the word "somewhat" is large enough to be meaningful is debatable. However, since respondents were given the option of "No Change", we conjecture that even when respondents pick a response such as "Increased Somewhat", they are probably reporting small but meaningful changes. While we often club all changes in the same direction together in the text, we distinguish between the magnitude of the perceived changes in the tables.

Mobiles associated with improved economic status for the poor

Given the changes in economic practices, increased efficiencies, lowered costs and higher returns reported above, it is not surprising that a majority of users believe that their economic status has improved because of owning a mobile (Table 16). Around 60 percent of users state that mobiles have made things either somewhat (48 percent) or a lot better (12 percent). Given the complex constraints that bind the upward economic mobility of the poor, we feel that this should not be underestimated. To get a sense of these constraints, we also asked non-users how their economic status has changed over the last year and report these in 19.

Only 28 percent report that it had improved somewhat 4 percent state that it has improved or a lot. When asked the same question, 60 percent of users report an improvement, of which 13 percent sad that their economic status had improved a lot over the last year. Further to get a sense of who is impacted and what type of activities are likely to be affected more by mobiles, we asked users to report their perceptions of how different economic activities they engage in were affected by mobiles (Table 18). Self-employed activities were also the most likely to be positively impacted by mobiles, with nearly 61 percent of self-employed activities positively impacted as opposed to 45 percent of daily/casual labor activities. The least impacted were regular wage activities with only 36 percent being reported to be positively impacted.

As described earlier, it is possible that some of this difference in the change of economic status might be attributable to other characteristics that distinguish users and non-users. Indeed, since 36 percent of users started using a mobile within the last year, it is possible that mobile usage could be a result of improved economic status and not a cause for it. While acknowledging the possibility of the evidence being just correlational in nature, we believe the evidence of a positive association between improved economic status and mobile usage has to be interpreted along with the other findings described above that demonstrate how mobiles affect the way people do their work, where they do it, at what cost and the economic returns from it..

Our findings of a positive economic impact of mobiles is in correspondence with that of other studies where respondents claimed that use of mobiles increased their profits or productivity (Souter et.al., 2005, Samuel et.al., 2005, Zainudeen et.al., 2007). For example,

Samuel et. al., (2005) indicated that the percentage of respondents who said that mobiles increased their profits was 59% in Egypt and 62% in South Africa

Mobiles change the level and nature of social interaction

Prior work on the social impact of mobiles has tried to investigate not only the impact of mobiles on social relationships but also the way mobiles transform how people interact with each other and institutions like the family and government. Although many conceptual pathways have been hypothesized, few have been empirically investigated.

Users in our survey, were asked how mobiles have affected their knowledge of the welfare and whereabouts of the people they interact with socially. As a source of comparison, non-users were asked to evaluate the same over the last year and the average of their responses are reported in Table 19. Around 75 percent of mobile users report that they believe the mobile has increased their knowledge of welfare and whereabouts of friends and relatives. And this was true for friends and relatives living both in the same city as well as those living outside it. In contrast, only around 35 percent of non-users reported that they were more aware in comparison to a year ago.

Interestingly this rise in knowledge of the welfare of friends and relatives among users seems to be accompanied by a slight decrease in the frequency with which they actually meet. Forty-three percent of users reported a decrease in the frequency with which they met acquaintances and distant relatives as a result of owning a mobile while 25 percent of nonusers reported a similar decline over the previous year. Similarly, 42 percent of users reported a decrease in the frequency of meeting immediate friends and family and attribute this change to using mobiles and only 31 percent reported an increase. On the other hand, 24 percent of non-users reported a decrease in the frequency of their meeting while 26 reported an increase.

What are the barriers to usage of mobiles?

Despite the rapid fall in handset prices, more than 50 percent of respondents who do not currently use a mobile identify the cost of a handset as the primary barrier to owning a mobile in the urban slums and nearly 90 percent state it as one of the top three reasons in Table 20. While 67 percent of non-users also report the cost of calls among the top three reasons, only 15 percent state that it is the primary reason why they do not use a mobile.

Interestingly, about the same number report difficulty in using a mobile as the primary reason why they do not use a mobile and nearly half the non-users identify it among the top three reasons. The need for improvement in the design of handsets, clarity of charges for call-plans and information dissemination is evident from the fact that more than one in four "non-user" households were likely to report difficulty in understanding charges or call plans and not enough knowledge about value of mobiles were important barriers to their usage of mobiles.

We also asked users to describe the two most important factors that would enable them to derive more value from mobiles and report these in Table 21. Not too surprising reduction in call charges – local (59 percent) and long distance (40 percent) figured most often. Interestingly, nearly 40 percent of respondents reported that reduction in handset costs as among the top two reasons that would increase the benefit they get from mobile phones. Only two percent of respondents described the provision of increased services like mobile banking, accessing government information. We believe this has to be interpreted carefully since the question was open ended and given the near absence of such services in India, users are unlikely to know of the potential of such services.

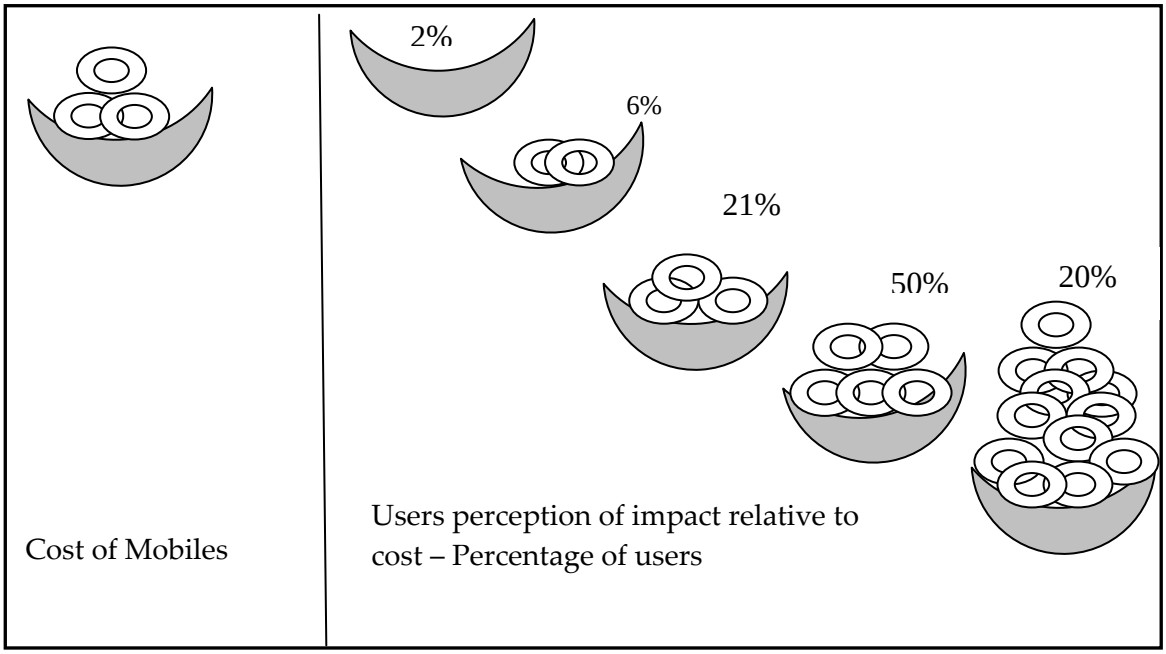
How has value derived changed over time?

As reported in Table 22, nearly 50 percent of respondents have used a mobile for around a year or less and around 27 percent had been using it for more than two years. When asked to compare how the value they derive from mobile has changed over time, most respondents said that the value derived had either increased a little or a lot. Users who had used a mobile for the longest were the most likely to report that the value they derive had increased a lot, with one out of every four respondent who had owned a mobile for more than two years reporting the same.

Benefits from mobiles greater than their costs

Given that the other pieces of evidence emerging from the survey point to a positive influence of mobiles, the natural question that emerges is whether or not the benefits outweigh the costs? The question is relevant not only to understand the impact of mobiles, which is the primary question of this study, but also to evaluate the case for publicly funded interventions to encourage the usage of mobiles. To answer this question, users were shown the picture below and asked to compare the benefits they have derived from mobiles with how much they paid for them.

Figure I: Benefit from mobiles in comparison to cost



As an investment, mobiles are clearly perceived to be generate significant positive returns by a majority of users. Despite spending a significant fraction of their income on it, around 70 percent the respondents perceive they derive more value from mobile than what they spent to acquire them. Given that the choice to spend on a mobile is largely a personal one based on some calculus of costs and benefits that individuals and households make, the finding that very few users perceive the benefits to be the same or less than the costs should not come as a surprise. But to the extent that users face either credit constraints to purchase and use a mobile or are not fully informed on the value that they might be able to derive from them, there is definitely a case for public intervention to encourage the usage of mobiles.

DISCUSSION AND LIMITATIONS

The differences between users and non-users detailed in the beginning of the section is important not only to understand what drives mobile usage but also to get a sense of the extent to which the experiences of users can be generalized to non-users. The differences also reinforce the caution expressed earlier about using the non-users as a comparison group to proxy for the counterfactual: what would have happened to the user group had they not used mobiles.

Since literacy and educational status are unlikely to be impacted by the use of mobile phones in the short time period during which they have become pervasive, the difference

between users and non-users on these attributes is perhaps the most credible evidence of difference in socio-economic status. The difference in financial and human capital combined with the nature of activities they engage in, the kind of social and economic networks they are embedded in suggests that as a group, users might also be more capable of deriving benefits from a mobile than non-users with lower levels of capital as well as other disadvantages. Therefore, the extent to which the positive experiences of the users can be replicated by non-users if they were to start using mobiles and in the absence of other changes is questionable. Our concerns are consistent with findings from previous studies that suggest mobiles are valued by the more educated and those belonging to middle or higher socioeconomic groups because of the economic benefits they provide. This might also be because these groups are able to link the efficiency gains for greater income generation or exploit new information to generate new opportunities or save expenditure. On the other hand, it may be difficult for the people who are not so well off or educated to understand how these linkages work or exploit them. If individuals do not perceive economic benefits, they are less likely to adopt and use mobile services, as for them the cost of service may outweigh the perceived economic benefits (Zainudeen et.al., 2007; Souter et.al., 2005).

To understand how mobile usage has spread across economic groups over time, in Table 24 we looked at the relationship between duration of ownership and total household earnings. As is perhaps expected, households with higher earnings are more likely to have started using mobiles earlier. The group that has been using a mobile for the longest duration, (around or more than two years) has the highest earnings on average while the group that has been using mobiles for less than or around a year has the lowest earnings on average. However, the average earnings of the latter group are higher on average than of “non-user” households.

Not discounting the fact causation could run either way with increased mobile usage contributing to higher earnings, along with other pieces of evidence that point to a positive association between socio-economic status and mobile usage, Table 24 does corroborate the popular perception that while using mobiles is becoming increasingly affordable, affordability still remains an important determinant of usage.

A possible limitation in the study is that we do not try to quantify the magnitude of impacts. For example, we do not try to put a number on the cost reductions or earnings

improvement because of mobiles. Instead we leave it to the respondent to report their perceptions of changes either as a result of mobiles (users) or over the last year (non-users). By eschewing an attempt to quantify the costs and benefits we are consistent with most of the other work estimating the impact of mobiles. We do recognize that having a more precise measure of the economic benefit of owning a mobile would indeed be useful for policy makers to evaluate the benefits of programs or policies that promote mobile use and ownership vis-à-vis both the costs of the program and in comparison to other comparable interventions, we are skeptical about the ability to do this accurately with a retrospective study. Instead we believe that studies like that of Sood (2006) which uses in-depth case study to develop a quantitative business cost model for the group under study (16 interviewees) and then identifies where in the business process the use of a mobile could have brought in more efficiency (say in coordination for selling in the market) are better suited for the task. Nevertheless, reports of perceived (as opposed to actual) changes are important in their own right. The decision of whether a change is big, small or non-existent is left best to individuals since their welfare is our ultimate outcome of interest.

CONCLUSION

To conclude, using self-reports from mobile users in urban slums in India and interpreting them with the experience of non-users as a source of comparison, among other things we find that

- Mobile users in urban slums experience positive changes in both their economic status and their ability maintain social ties and in their self-reports attribute these to the use of mobile phones
- Mobiles appear to decrease monetary costs of doing work and increase efficiency. In particular, they are able to benefit users engaged in self-employed activities.
- Mobiles are changing how residents in the slum socially interact with each other and in particular might decrease physical contact and substitute it with more “virtual” contact
- Mobiles are much more likely to be used by males than by females within households. Therefore, there is a reinforcement of intra-household disparities that characterize many other resource allocation decisions within and outside households.
- Households that use mobiles differ from those that do not in significant ways including earnings, household size, education and literacy status as well as the economic and social networks in which they are embedded in

Given these findings, it is encouraging that governments/policy makers have focused on how to accelerate the adoption and usage of mobiles for the poor. Not surprisingly the focus of such policies has been on rural areas as a large percentage of the population, especially in developing countries, is rural and poor. The need for government intervention in rural areas is reinforced by the fact that cost of service provision is high due to the low population densities, leading to higher costs of equipment deployment. Since population densities are low, there are fewer potential customers per unit area raising the costs of service provision further. The lower average ability to pay vis-à-vis urban areas makes the commercial viability of such services difficult. These factors have contributed to several national policy makers and regulators to provide mechanisms that support service provision in rural areas with a view to provide poor people availability of mobile coverage. For example, governments in India and Chile have created Universal Service Obligation Fund (Chile ref, www.dot.gov.in accessed on 4th November, 2008) that has been used for providing mobile coverage in rural areas.

We do not question the need for intervention in the rural sector. But by demonstrating the positive and social effects of mobiles among the urban poor, our study points to the advantages of intervening in the urban sector, albeit in different ways. For example, while we do not try to measure penetration in a formal way as part of this study, we did face difficulty in locating users within slums especially since we desired that 70 percent of our total sample be from "user" households. Although only anecdotal, this could indicate that mobile penetration in slums is possibly far lower than the average urban penetration of 72.5% as of September 2008 (TRAI, 2008).

That the poor in cities are vulnerable is not in doubt, but a large number of them are also in a position to take advantage of the benefits of ICTs like mobiles. To the extent that experiences of current users can be generalized to non-users, the benefits of mobiles are likely to be greater than their costs. This suggests that policies like: Intervention in the credit market like subsidized loans; reduction in duties and taxes for handsets and SIM cards; providing incentives for companies to further reduce costs of handsets or design handsets friendly to the needs of the poor; bundling of handsets and services- a factor that could convert a one time fixed fee to a recurring cost; disseminating information on the value of mobiles and other such interventions that remove the barriers to usage that we have identified above are likely to result in tangible improvements in the lives of the poor.

Table 1: Description of the Sample

	All	Ahmedabad	Delhi	Kolkata
No. of Households Surveyed	1774	597	575	602
No. of User Households Surveyed	1235	418	395	422
No. of Non-User Households Surveyed	539	179	180	180
Average Size of Households	4.32	4.51	4.50	3.96
Percentage of Households that were				
SC	28%	35%	31%	17%
ST	6%	11%	6%	1%
OBC	16%	25%	20%	2%
Others	51%	29%	43%	79%

Table 2: Comparison of Socio-Economic Status between Users and Non-Users

	Percentage of "User" Households that are	Percentage of "Non User" Households that are
Highest level of Education in Household		
Not Literate	23%	33%
Literate without formal schooling	2%	3%
Literate but below Primary	4%	7%
Primary	15%	18%
Middle	24%	20%
Secondary	19%	14%
Higher Secondary	8%	4%
Diploma/Certificate course	1%	0%
Graduate	3%	1%
Post Graduate and above	0.1%	0.0%
Total Household Earning(from Roster)	6436	4377
Highest Earning Member of the Household	4283	3204
Average Size of Household	4.32	3.73
Caste		
SC	28%	27%
ST	6%	9%
OBC	16%	17%
Others	51%	47%

Table 3: Percentage of Activities Engaged in by Activity Type

	Users	Non Users
Self-Employed	36%	27%
Regular Wage	42%	39%
Casual Labor	21%	33%

Table 4: Ownership of Mobile in Network

What proportion of people who you need to usually talk for work related purpose have a mobile?	**User**	**Non User**
1-10% - Very Few of Them	2%	8%
2-25% - Some of them	10%	24%
3-50% - Around half of them	25%	29%
4-75% - Most of them	45%	31%
5-100% - All of them	17%	7%
	1220	**532**
What proportion of your friends/relatives have a mobile phone?		
1-10% - Very Few of Them	2%	7%
2-25% - Some of them	8%	23%
3-50% - Around half of them	31%	37%
4-75% - Most of them	45%	27%
5-100% - All of them	15%	6%
	1230	**538**

Table 5: Characteristics of Primary User

	Percentage of Primary Users that are	**Percentage of Secondary Users**	**Percentage of Non Users that are**
Male	87%	44%	42%
Literacy level			
Not Literate	16%	28%	43%
Can Read and Write Local Language	81%	69%	56%
Can Read Local Language only	3%	3%	3%
Highest level Of Education			
Not Literate	12%	25%	38%
Literate Without Formal Schooling	2%	2%	3%
Literate Below Primary	3%	4%	7%
Primary	13%	14%	18%
Middle	25%	27%	19%
Secondary	25%	19%	11%
Higher Secondary	12%	7%	3%
Diploma/Certificate course	2%	1%	0%
Graduate	5%	2%	1%
Post Graduate and above	0%	0%	0%
Average Age	32.14	28.65	29.46
Average Earnings	3359.97	870.6	427.13

Table 6: Expenditure on Mobile

Expenditure when started using a mobile	**All**
Average Cost of Handset	2384.16
Average Cost of SIM/Talk time	285.56
Expenditure per Month on Mobile	**Percentage of Households picking this option**
<50	11%
50-100	24%
100-150	20%
150-200	17%
200-250	11%
250-300	9%
>300	9%
Frequency of Topping Up	
Once a week	59%
Once a month	37%
Once in 2 months	2%
Once in 3-6 months	1%
Once in 6 months or more	0%

Table 7: Primacy of Use

1-Social (Talking to friends and relatives for non-work)	**All**
Not used	5%
Lowest	5%
Low	7%
Neither low nor high	31%
High	32%
Highest	19%
2 - Work-related	
Not used	8%
Lowest	6%
Low	6%
Neither low nor high	20%
High	36%
Highest	24%
3 - Entertainment	
Not used	50%
Lowest	17%
Low	15%
Neither low nor high	12%
High	5%
Highest	1%
4 - Information/News	
Not used	64%

1-Social (Talking to friends and relatives for non-work)	All
Lowest	14%
Low	9%
Neither low nor high	8%
High	5%
Highest	0%
5 - Playing games	
Not used	54%
Lowest	18%
Low	17%
Neither low nor high	8%
High	3%
Highest	0%
6 - Emergency	
Not used	18%
Lowest	39%
Low	10%
Neither low nor high	13%
High	14%
Highest	6%
7 - Others	
Not used	60%
Lowest	7%
Low	9%
Neither low nor high	15%
High	8%
Highest	1%
	1230

Table 8: Primary Use of Mobile

	Highest use
Social (Talking to friends and relatives for non-work)	19%
Work-related	24%
Entertainment	1%
Information/News	0%
Playing games	0%
Emergency	6%
Others	1%

Table 9: Average Usage Score

Purpose of Use:	
Social (Talking to friends and relatives for non-work)	3.37
Work-related	3.42
Entertainment	1.07
Information/News	0.76
Playing games	0.89
Emergency	1.82
Others	1.06

Note: Average usage score is calculated by giving a score of "0" if the user stated that s/he did not use the mobile at all for the identified purpose and a score of "5" if the user stated that it was the most important use of the mobile for him or her.

Table 10: Used Mobile to Contact/Participate

Doctor	29%
Government person/office	21%
Contests on Television/Radio	2%
	1217

Table 11: SMS Usage

1-Not comfortable with either sending or receiving SMS	45%
2-Comfortable with both sending and receiving SMS	36%
3-Comfortable with receiving SMS but not comfortable sending SMS	19%
	1234

Table 12: Usage of Subscription Services

Subscription to any service	**All**
Ring tones/ Caller tunes	94%
News updates	6%
Jokes	8%
Sports updates	12%
Horoscope updates	2%
	309

Table 13: Regular Usage

Valid Responses = 1234		Never	Everyday	Once or twice a week	Once or twice a month	Once or twice in every few months	5-Once a year
1 - Household members when at work	Calls	18%	21%	36%	22%	4%	0%
	Missed Calls	62%	7%	16%	13%	1%	0%
	SMS	91%	1%	3%	5%	0%	0%
2 - Relatives/friends living in the same city	Calls	2%	11%	46%	34%	7%	0%
	Missed Calls	34%	13%	29%	19%	4%	0%
	SMS	76%	3%	10%	9%	2%	0%
3 - Relatives/friends living in different city/town/village	Calls	4%	6%	35%	42%	12%	1%
	Missed Calls	42%	7%	23%	22%	5%	0%
	SMS	82%	1%	6%	8%	3%	0%
4 - Acquaintances	Calls	12%	9%	35%	29%	14%	1%
	Missed Calls	49%	5%	23%	19%	4%	0%
	SMS	82%	2%	4%	8%	4%	0%
5 - Work related	Calls	8%	38%	32%	16%	6%	0%
	Missed Calls	57%	11%	19%	12%	2%	0%
	SMS	89%	2%	4%	3%	1%	0%
6 - Emergency	Calls	12%	11%	10%	14%	26%	28%
	Missed Calls	89%	0%	3%	5%	2%	1%
	SMS	96%	0%	1%	1%	1%	0%

Table 14: Affect on Work Practices

Check/Confirm, Prices of Various Materials from Suppliers	**Users**	**Non Users**
Never	11%	25%
Rarely	10%	10%
Sometimes	44%	44%
Most of the Times	29%	18%
Always	6%	4%
N	384	108
Plan and Coordinate with Customers & Suppliers		
Never	8%	23%
Rarely	12%	20%
Sometimes	42%	35%
Most of the Times	30%	20%
Always	7%	2%
N	433	120
Trying to find work/improve work		
Never	15%	22%
Rarely	15%	19%
Sometimes	35%	34%
Most of the Times	29%	23%
Always	6%	3%
N	889	355
Geographical area (distance from home) where you do work		
Decreased a lot	-	1%
Decreased somewhat	-	9%
No Change	46%	67%
Increased somewhat	37%	21%
Increased a lot	17%	1%
N	1065	434
Ability to plan and co-ordinate with people you work with		
Decreased a lot	-	2%
Decreased somewhat	-	8%
No Change	28%	52%
Increased somewhat	51%	36%
Increased a lot	20%	2%
N	1025	414

Table 15: Affect on intermediate economic outcomes

	Users	**Non Users**
Travel related expenditure		
Decreased a lot	14%	3%
Decreased somewhat	51%	24%
No Change	35%	53%
Increased somewhat	-	19%
Increased a lot	-	2%
N	**1208**	512
Time taken to do work		
Decreased a lot	15%	2%
Decreased somewhat	37%	14%
No Change	48%	66%
Increased somewhat	-	15%
Increased a lot	-	2%
N	**1163**	499
Wastage of unsold stock		
Decreased a lot	17%	2%
Decreased somewhat	52%	18%
No Change	31%	66%
Increased somewhat	-	15%
Increased a lot	-	0%
N	326	164
Money tied up in stocks/inventory		
Decreased a lot	15%	1%
Decreased somewhat	52%	16%
No Change	33%	69%
Increased somewhat	-	14%
Increased a lot	-	1%
N	317	154
Time to procure materials/provide services		
Decreased a lot	13%	2%
Decreased somewhat	38%	13%
No Change	48%	73%
Increased somewhat	-	11%
Increased a lot	-	0%

	Users	Non Users
N	600	230
Cost of procurement/providing the service		
Decreased a lot	9%	3%
Decreased somewhat	35%	13%
No Change	56%	66%
Increased somewhat	-	17%
Increased a lot	-	1%
N	611	247
Wages for your self, prices for the products or services you sell		
Decreased a lot	-	3%
Decreased somewhat	-	12%
No Change	42%	52%
Increased somewhat	48%	30%
Increased a lot	10%	2%
N	867	315
Access to existing suppliers/service users/customers/place of work		
Decreased a lot	-	1%
Decreased somewhat	-	12%
No Change	40%	65%
Increased somewhat	45%	22%
Increased a lot	15%	1%
N	850	340
Finding new suppliers/service users/customers/place of work		
Decreased a lot	-	2%
Decreased somewhat	-	10%
No Change	40%	66%
Increased somewhat	45%	20%
Increased a lot	15%	2%
N	847	353
Access to sources of credit		
Decreased a lot	-	1%
Decreased somewhat	-	11%
No Change	43%	59%
Increased somewhat	45%	29%
Increased a lot	12%	0%
N	844	350

Table 16: Effect of mobile on overall economic status

Overall, how has the mobile affected your economic status?	**All**
Made things worse	0%
No effect	40%
Made things somewhat better	48%
Made things a lot better	12%
	1233

Table 17: Change in economic status over the last year

Overall, how has economic status of your household changed over the last year?	**Users**	**Non users**
Worsened a lot	0%	2%
Worsened somewhat	3%	8%
No change	37%	59%
Improved somewhat	47%	28%
Improved it a lot	13%	4%
	1234	**538**

Table 18: Economic activities and impacts of mobiles

	Percentage of Total Activities	**Percentage of Households stating it to be primary activity**	**Percentage of Households stating activity impacted positively by mobile**	**Percentage of Households stating activity impacted negatively by mobile**	**Percentage of Households stating activity was not impacted by mobile**
Self Employed	36%	42%	60%	3%	37%
Regular wage	42%	39%	34%	2%	64%
Daily/Casual Labor	21%	19%	44%	1%	55%
Other	0.40%	0.08%	11%	0%	89%

Table 19: Social Impact of Mobiles

	Users	Non Users
1 - Your knowledge of welfare and whereabouts of friends & relatives in same city?		
Decreased a lot	1%	1%
Decreased somewhat	4%	5%
No change	19%	58%
Increased somewhat	61%	34%
Increased a lot	14%	3%
2 - Your knowledge of welfare and whereabouts of friends & relatives outside city?		
Decreased a lot	1%	1%
Decreased somewhat	4%	14%
No change	20%	54%
Increased somewhat	56%	26%
Increased a lot	19%	5%
3 - The frequency of meeting your acquaintances/distant relatives?		
Decreased a lot	10%	4%
Decreased somewhat	31%	21%
No change	33%	54%
Increased somewhat	22%	18%
Increased a lot	4%	4%
4 - The frequency of meeting your immediate family/friends?		
Decreased a lot	6%	5%
Decreased somewhat	34%	19%
No change	27%	51%
Increased somewhat	26%	19%
Increased a lot	6%	5%
5 - Number of people who you can turn to in case of emergency?		
Decreased a lot	1%	3%
Decreased somewhat	4%	9%
No change	34%	58%
Increased somewhat	47%	24%
Increased a lot	14%	6%
6 - Number of people who can help in improving your current ability to earn?		
Decreased a lot	1%	2%
Decreased somewhat	3%	7%
No change	37%	58%
Increased somewhat	50%	26%
Increased a lot	9%	7%
	1232	**539**

Table 20: Barriers to Owning a Mobile

	Percentage of Non-Users Picking it Among Top Three Reasons	Percentage of Non Users Picking it as Primary Reason
1- Cost of handset	87.3%	53.2%
2- Cost of calls	68.9%	15.5%
3- Difficulty in using mobile	53.8%	13.8%
4- Difficulty in understanding charges/call plans	26.0%	3.1%
5- Not enough knowledge about value of mobile	28.8%	4.9%
6- Others, describe	5.6%	3.0%

Table 21: Primary Factors that would promote value from Mobiles

	Percentage of Users Picking Among Top Two Factors
Reduction in handset cost	38%
Increased affordability for handsets with advanced features	15%
Reduction in local call charges	59%
Reduction in long distance charges	38%
Reduction in SMS charges	6%
Ability to SMS in languages other than English	3%
Increased services like mobile banking, accessing government information	2%
Better coverage	19%
	1366

Table 22: Value from Mobile Phones

Value derived from mobile phone compared to payment for it	Users
1- A lot less	2%
2- A little less	6%
3- Same	21%
4- A little more	50%
5- A lot more	20%
	1233

Table 23: Change in Value from Mobile Phones

Value derived from mobile phones now compared to when started using it	For last month	For few months	For around a year	For more than one year and less than 2 years	For around 2 years	For more than 2 years
Decreased a lot	0%	4%	2%	4%	2%	1%
Decreased a little	24%	6%	3%	8%	9%	8%
Remained the same	24%	29%	18%	18%	30%	21%
Increased a little	52%	44%	59%	53%	45%	44%
Increased a lot	0%	18%	18%	18%	14%	27%
1234	**21**	**167**	**369**	**208**	**128**	**341**

Table 24: Relationship between Earnings and Duration of Ownership

Duration of Ownership	N	Average Household Earnings per month	Standard Deviation (Household Earnings)
Around a year or less	557	5566	3749
Between 1 and 2 years	208	6853	4387
Around 2 years or more	469	7289	5658

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Appendix 1: Essential Features of some of the Notable Studies Examining the Impact of Mobiles

No	Reference	Countries Covered	Methodology	Population Covered	Unit of Analysis
1	Abraham, J., Dean, D. & Subramanian, A. (2007). Ringing in the Next Billion Mobile Consumers, A Roadmap for Accelerating Telecom Growth in India, A BCG Report.	India	Varying number of respondents in different parts of the report ranging 1285-9174.	Urban, Rural	Individual
2	Barrantes, R. (2008). Substitution and Complementarities in Telecom Services Use: A Case Study of the Peruvian Urban Poor, 17th Biennial Conference of the International Telecommunications Society, Montreal.	Peru	1249 respondents	Urban (SEC D, E)	Household + Individual
3	De Silva, H., Zainudeen, A. & Ratnadiwakara D. (2008). Perceived economic benefits of telecom access at the Bottom of the Pyramid in emerging Asia, LIRNEasia.	Pakistan, India, Sri Lanka, Philippines, Thailand	8662 respondents	(Urban, Rural (SEC D, E)) *	Individual
4	Goodman, J. (2005). Linking mobile phone ownership and use to social capital in rural South Africa and Tanzania, The Vodafone Policy Paper Series, Number 3.	South Africa, Tanzania	South Africa 252 respondents, Tanzania 223 respondents	Rural	Individual
5	McKinsey Report, Wireless Unbound, The Surprising Economic Value and Untapped Potential of the Mobile Phone, McKinsey & Company, December 2006	India, China, Philippines	618 respondents	(Urban, Rural) *	Individual

No	Reference	Countries Covered	Methodology	Population Covered	Unit of Analysis
6	Samuel, J., Shah, N. & Hadingham, W. (2005). Mobile Communications in South Africa, Tanzania and Egypt: Results from Community and Business Surveys, Africa: The Impact of Mobile Phones, The Vodafone Policy Paper Series, Number 3.	South Africa, Tanzania, Egypt	South Africa 252, Tanzania 223, Egypt 150	Rural	Individuals and Small Businesses
7	Sood A. (2006). The Mobile Development Report, The Socio-Economic Dynamics of Mobile Communications in Rural Areas and their. Consequences for Development.	India	80 spot interviews + Focus Group Discussions + 40 depth interviews	Small town, Urban Slum, Village, Remote village (SEC B, C, D, R1, R2, R3)	Individual
8	Souter, D., Scott, N., Garforth, C., Jain, R., Mascarenhas, O. & McKemey, K. (2005). The Economic Impact of Telecommunications on Rural Livelihoods and Poverty Reduction, A study of rural communities in India (Gujarat), Mozambique and Tanzania, Report of DFID KaR Project 8347.	Mozambique, Tanzania, India (Gujarat)	Focus Group Discussions+ 2292 respondents	Rural *	Household (to a small extent) + Individual +small businesses
9	Chabossou, A., Stork, C., Stork, M. & Zahonogo, P. Mobile Telephony Access & Usage in Africa Retrieved December 9, 2008 from www.researchICTafrica.net	17 African countries	Survey	Rural	Individual

* In India the study was done on fixed lines.
* The results of urban slums and rural are not separately available, unless one examines the raw data. The raw data is publicly available.