

# **Effect of Mobile Telephony on Empowering Rural Communities in Developing Countries**

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## **ABSTRACT**

Several studies have documented the increased proliferation of mobile handsets among poorer communities in developing countries. This paper discusses the motivation and nature of this trend, as well as its effect on enabling marginalized communities to realize opportunities, be they social, economic, or political. The potential empowering effects of mobile phone penetration is shown through a nuanced picture of both the benefits and challenges mobile phones can bring to individuals, groups and communities in poor developing country communities. It begins by providing a brief outline of the communication challenges that are present in developing countries; then moves on to analysing general mobile penetration trends, innovative approaches to mobile use, the positive and negative effects of mobiles on social networks and the creation of social capital, and finally considers how mobiles can be leveraged to generate economic opportunities and political mobilization. Through a succinct examination of both the positive and negative aspects of mobile telephony adoption, this paper argues that mobile phones are quickly becoming an affordable, germane, and accessible tool to many poor communities around the world to create economic opportunities and strengthen social networks.

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## 1.0 Introduction

*“The quickest way to get out of poverty right now is to have one mobile telephone.”*

- Muhammad Yunus

Several studies have documented the increased proliferation of mobile handsets among poor communities in developing countries. In the above quote, Muhammad Yunus, the founder and director of the Grameen Bank in Bangladesh, makes a simple, yet powerful statement about the causal link between mobile phones and poverty alleviation. What is the nature of this relationship? Under what circumstances does it thrive? How strong is the alleged causality? Each one of these questions is vast and complex, meriting detailed research and exploration onto itself. Although this paper cannot delve into such depth, it does endeavour to address them in examining if and how mobile phones are enabling marginalized communities in developing countries to realize opportunities, be they social, economic, or political.

Much anecdotal proof of mobile phone adoption leading to poverty alleviation has surfaced over the past couple of years. Recently there have been a handful of studies placing an emphasis on more systemic findings to substantiate such claims. In spite of this, there remains a relative dearth of evidence-based research in this area. This paper draws on both statistical and anecdotal research to formulate its argument. In doing so, it finds that mobile phones are quickly becoming an affordable, germane, and accessible tool to improve the livelihoods of individuals and groups in developing countries. Interestingly, some facets of this argument are based on a few rather counterintuitive findings. Contrary to earlier studies that linked increases in income to increases in information and communication technologies (ICTs<sup>1</sup>) adoption<sup>2</sup>, other studies how show that high levels of income inequality can be associated with a greater propensity to adopt

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1 According to the United Nations Development Programme (UNDP), “ICTs are basically information-handling tools - a varied set of goods, applications and services that are used to produce, store, process, distribute and exchange information. They include the "old" ICTs of radio, television and telephone, and the "new" ICTs of computers, satellite and wireless technology and the Internet.” (UNDP 2001).

2 Norris 2000, and Kiiski and Pohjola 2002.

mobile phones<sup>3</sup>. The introduction of unconventional ownership models and decentralized payment plans are facilitating the spread of mobile phone access, despite income restrictions.

A number of case studies in Sub-Saharan Africa and Asia are used to illustrate how mobiles can be leveraged to generate social capital, which in turn can create economic opportunities, strengthened social networks, and organized political mobilization. The remainder of the paper specifically discusses communication challenges in poor rural communities; general mobile penetration trends; innovative approaches to mobile use, and the effect of mobiles on social networks and social capital creation.

## **2.0 Communications Challenges in the Developing Context**

Rural teledensity in developing countries is very low. Scarcity of communications infrastructure in such areas is exacerbated as a result of limited electricity, few fixed-line telephones, and low income levels. That being the case, half of the world's population (3 billion people) lives in rural areas, with substantial overlap between rural dwelling and poverty<sup>4</sup>. Examining country data reveals a global digital divide<sup>5</sup> and indicates that the emerging knowledge-based economy will reinforce the gap between rich and poor nations, and increase income and spatial inequalities within countries<sup>6</sup>. This growing level of inequity necessitates a communication tool and subsequent ownership and payment model that acknowledge this challenge and seek to overcome it. However, not all ICTs can be leveraged equally by the "have-nots". According to Samaan<sup>7</sup>, mobile phones can in fact thrive in such income disparity and actually work towards creating opportunities and greater equality.

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<sup>3</sup> Samaan 2003.

<sup>4</sup> Coyle 2005.

<sup>5</sup> The oft-used term "digital divide" occurs when there are gaps between people who have access to and have the capability to use information and communications technologies<sup>5</sup> (ICTs), and those who do not (Bridges.org 2001s, Rice and Katz 2003)

<sup>6</sup> Balamoune 2002.

<sup>7</sup> 2003.

Low literacy rates, diverse indigenous languages, limited electricity, strong oral traditions, and nomadic lifestyles or livelihoods are some of the contributing factors that make it difficult for communities in developing countries to adopt certain ICT tools<sup>8</sup>. One of the major impacts mobile phones have in less developed countries in the southern hemisphere is its capacity to include partly illiterate mass populations, who will never have the means to buy a computer and who hitherto were not even connected to the traditional networks of landline phones<sup>9</sup>. As such, mobile telephony presents itself as a relevant means of two-way communication for a vast number of marginalized communities in the world.

Recent studies emphasize a “leapfrogging”<sup>10</sup> element in using Information and Communication Technologies (ICTs) in developing country contexts<sup>11</sup>, whereby ICTs are shown to enhance public administration efficiency, increase access to information and knowledge and reduce bureaucracy by bypassing older, less appropriate and less affordable forms of ICTs. Jain and Sridhar<sup>12</sup> recommend improving rural teledensity in developing countries by reducing the cost of the access loop for providing telecom services using technologies such as wireless local loop – including mobile telephony. The high cost of providing wired communication facilities, coupled with relatively low levels of purchasing power, is tantamount to high levels of demand being underserved with low levels of telecommunications service. As a result, rural areas that are often ill-equipped to handle wired communication tools can benefit by ‘leapfrogging’ to wireless tools. Over time, a new equilibrium between communications demand and its supply is emerging, which is at price affordable to even the poor.

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8 Including landline telephones, computers, television, radio

9 Townsend 2000.

10 ‘Leapfrogging’ refers to skipping obsolete technologies altogether and allowing the development of advanced technologies at lower costs (ITU 2004a, Kauffman & Techatassanasoontorn 2005).

11 World Bank 1998; and Kenny 1995 and 2000.

12 2003

## 3.0 Mobile Penetration Trends

Mobile phone penetration has begun to eclipse that of landline phones, particularly in Sub-Saharan Africa and Asia. In 2000, access to mobile phones surpassed fixed line phone access in Sub-Saharan Africa. A similar story unfolded in Asia in early 2002<sup>13</sup>. These numbers imply that *mobile* is the preferred means of telephony in these regions. Moreover, lower absolute rates of mobile penetration can underestimate the real impact they are having through the innovative and entrepreneurial ways in which the technology has been extended beyond the model of individual ownership<sup>14</sup>. The portable nature of mobile telephony lends itself to being shared, both in terms of access and payment.

### 3.1 Why Mobile?

Most regions in Asia and Sub-Saharan Africa show varying levels of mobile telephony, due in part to different government policies, industry structure, and level of development. Unfortunately, this paper will not be able to drill down to this level of detail; however the author has taken this element into consideration when choosing the case studies to discuss. Digital wireless phones have great potential to bridge the gap between the “haves” and the “have-nots”, given their accessibility, affordability, and fast infrastructure implementation<sup>15</sup>. A study done in a Tanzanian community found that 28% of people said they could access a fixed line in the community, compared to 97% who could access a mobile one<sup>16</sup>. The same study concluded that income was an important but not limiting factor to ownership and use of mobiles. Ownership was shown to be less skewed towards the sections that have higher income levels. These findings point towards a need for greater understanding with regards to why more poor people are using mobiles, how they are using them, and what they are using them for.

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<sup>13</sup> ITU 2004a.

<sup>14</sup> Gough, Grezo 2005.

<sup>15</sup> Kauffman & Techatassanasoontorn 2005.

<sup>16</sup> Samuel et al. 2005.

In comparison to many other ICTs, mobile phone adoption trends have evolved in a unique fashion – especially in developing countries. There is distinct separation in mobile penetration rates between and among different countries in Sub-Saharan Africa and Asia. In 2004, Singapore had a mobile penetration rate of 89%, while the rate in India was only at 4%<sup>17</sup>. A similar range of mobile penetration rates can be found in Africa. In 2004, seven countries had greater than 20 mobile phones per 100 inhabitants, 17 countries between 6 and 20, and all other countries had mobile teledensities lower than 6.<sup>18</sup> South Africa and Seychelles account for the majority of subscribers in Sub-Saharan Africa, while South Korea, Japan and Hong Kong account for the lion's share of subscribers in Asia. By and large, these countries reside at the high-income end of their respective regions. However, mobile phone adoption has not kept strictly to the income curve. Many lower-income countries such as the Philippines and Uganda are increasing their respective mobile teledensity rates at a fierce rate.

According to the International Telecommunications Union (ITU), there were less than half a million mobile subscribers in the Philippines in 1996. This number sharply increased to six million in 2000, and then to nearly 33 million in 2004<sup>19</sup>. With the use of competitive handset and service pricing models, the Philippines experienced extremely rapid mobile phone adoption over the past 10 years. Before large-scale introduction of mobile telephony, Uganda had one of the lowest fixed line growth rates in Africa<sup>20</sup>. In 1999, it became the first country to experience the phenomenon where mobile phones exceeded fixed line connections. Government policy decisions in Uganda were instrumental in shaping this outcome, as they placed a strong focus on cellular technology.

Both the Philippines and Uganda represent clear examples where factors other than income greatly influence the rate and magnitude of mobile phone adoption. In general, the

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17 ITU (2004c.)

18 ITU (2004d).

19 Friginal (2003).

20 Castells, Qiu, Fernández-Ardèvol, Sey (2005)

differential rate and level of diffusion in different areas of the world, as well as in different regions of countries, results from the interaction between multifarious factors. Given this caveat, the extraordinary growth of mobile telephony around the globe has been especially significant in developing countries<sup>21</sup>.

## **4.0 Innovative Ownership and Payment Models**

In contrast to most developed countries where mobile phones complement fixed lines, in developing countries most mobiles are used as a substitute for fixed lines<sup>22</sup>. Earlier studies have drawn a positive correlation between income and ICT adoption<sup>23</sup>; however, mobile phones seem to be a different beast altogether. Although traditional economic factors are found to explain demand patterns for main land phones, this is not the case for mobile phones<sup>24</sup>. Mireille Samaan's research on income inequality and mobile phone adoption in developing countries finds that the higher the level of income inequality, the more likely an individual living there is to own a mobile phone. This counterintuitive finding is accounted for by the fact that unequal countries are likely to be late-adopters of ICTs and as such, these countries often experience a 'leapfrog' effect and achieve faster initial growth in the penetration rate<sup>25</sup>. In addition, the emergence of innovative ownership and payment models has helped pave the way for such a phenomenon.

### **4.1 Ownership Models**

A mobile phone nominally belongs to a single person; however it is often informally shared between several people in the community, due to a strong culture of sharing communication tools<sup>26</sup>. This gives way to a multiplier effect, as the impact of a single phone is

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<sup>21</sup> Castells, Qiu, Fernández-Ardèvol, Sey (2005)

<sup>22</sup> Waverman, Meschi, Fuss 2005.

<sup>23</sup> see Hargittai 1999, Norris 2000, and Kiiski and Pohjola 2002.

<sup>24</sup> Sridhar & Sridhar 2005.

<sup>25</sup> Salmaan 2003.

<sup>26</sup> Lopez 2000.

spread out across several individuals, or even an entire community<sup>27</sup>. Moreover, the actual mobile phone penetration statistics can be misleadingly low, as the impact of mobiles extends well beyond what the number of subscriptions suggests alone<sup>28</sup>. Although increased technology diffusion will most probably have a downward effect on this trend, many researchers believe the underlying social norms in these regions make them inherently more conducive to such a collectivist ownership model.

Konkka's research on mobile phone adoption in India found that the strong collectivist sense of group communication, trust, and emotional bonding plays a strong role in how mobile phones are used.<sup>29</sup> The research allows one to conclude that mobile telephony in India is seen more as a collective means of communication, rather than a personal communication device – as is the case in most developed economies. Collectivist norms are exhibited when, for example, sons and daughters ask to borrow their father's mobile when going out, or when it is considered unfriendly to deny a friend or colleague the use of your mobile phone<sup>30</sup>. Similar norms can be identified in a number of African countries. In Kenya, for example, individuals who own a mobile phone become a commercial node for friends and family to communicate with one another.<sup>31</sup> Will these norms change as income levels rise? It is hard to make a definitive statement. However, extrapolating from existing research, it can be suggested that the changes in behaviour would be minimal. As many individuals are currently managing to stay connected without purchasing their own handset, there is a strong probability that additional income would be spent on other expenses.

Sharing the physical handset is not the only way in which the collectivist norm is exhibited. Alternate payment models help address the issue of exactly how many minutes are

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27 Coyle 2005.

28 Castells, Qiu, Fernández-Ardévol, Sey (2005)

29 Konkka (2003)

30 Ibid.

31 Wachira 2003.

used by each user and help facilitate accounting for expenses accrued with shared mobile handsets.

## 4.2 Payment Models

According to Waverman, Meschi and Fuss<sup>32</sup>, mobile phones are moving the developing economies closer to universal service because pre-pay contracts allow exact monitoring of use, which is something very difficult to manage with fixed-line phones. Prepaid service is viewed by some as “arguably the most important form of appropriation that caters to the needs of those with lower income and education,” because it allows those without “credit history, a permanent address, or a stable source of income to purchase cell phones”<sup>33</sup>. One such example of this flexible payment option is the use of a pre-paid chip or phone card, which can be used with a handset belonging to someone else. This arrangement allows the user to place a call using someone else’s hardware and battery power, but with their respective pre-paid mobile phone chip or card. Pre-paid contracts and reselling of services is another, often more sophisticated model of payment.

The Grameen Phone experience in Bangladesh is a successful example of pre-paid mobile phone contracts in low-income communities. In 1993, Bangladesh had less than two phones per thousand people and more than 100 million rural Bangladeshis had virtually no phones<sup>34</sup>. Micro-credit loans were given primarily to Bangladeshi women, with the average loan being US \$24<sup>35</sup>. The “telephone ladies” create a business by essentially becoming a mobile phone booth. Grameen’s calculations show that each phone can make a profit of US \$2 a day, which is significantly higher than the country’s average per capita income of US \$0.60 a day<sup>36</sup>.

Despite being several times more costly than mobile contracts and fixed telephone line systems, prepaid services are the preferred payment models in many of the poorer developing

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32 2005

33 Castells, Qiu, Fernández-Ardèvol, Sey (2005)

34 Dholakia & Kshetri 2002.

35 Schwartz 2001

36 Dholakia & Kshetri 2002.

county communities. This is partly attributed to the fact that these modes of payment are often the only viable ones for these individuals or groups. According to ITU statistics from 2003, prepaid systems constitute over 80 percent of mobile subscriptions in most African countries<sup>37</sup>. These cards have become tantamount to cash in many scenarios, which allow individuals to use the pre-paid cards to barter for goods and services.<sup>38</sup> Pre-paid phone cards and chips are becoming a new form of currency in some areas – where communication capacity is a commodity that is in high demand. When it comes to innovation, the “ball” doesn’t stop at ownership and payment models, but rather continues with full force into how mobile phones are used in poorer developing country communities.

## **5.0 Innovative Ways to Use Mobile Phones**

The function of a mobile phone in many developing countries extends past its functionality as a personal communication device, into a source of economic growth potential, social networking, and heightened political awareness. Mobiles allow communities to bridge the digital divide by ‘leapfrogging’ and breaking the “hierarchical pattern” of technology diffusion<sup>39</sup>. Greater connectivity among individuals and groups leads to an increase in voice and data communications over mobile networks. In order to examine the real impact of the mobile revolution in many developing countries, the marked differences between how mobiles are valued and used in the developing versus developed countries must be understood.

### **5.1 Text Messaging**

Short Message Service (SMS)<sup>40</sup> (also known as text messaging) is a text-based system, which is gaining popularity due to its convenience and affordability. SMS can be used to deliver a wide range of information to mobile phone users from crop prices, weather patterns, remittance

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<sup>37</sup> Uganda, Rwanda, Namibia or Botswana. ITU 2004d.

<sup>38</sup> Wright (2004).

<sup>39</sup> Gatignon & Robertson 1985.

<sup>40</sup> SMS is a service which allows GSM mobile phone users to send text messages and is most popular in Europe and Asia.

information, and messages to incite political mobilization. In January 2001, thousands of Filipinos took part in demonstrations to remove President Estrada from office. During this week of demonstrations, the two main text message operators in the Philippines transmitted an average of 115 million text messages per day – in contrast with the regular daily average of 24.7 million.<sup>41</sup> SMS usage in the Philippines already dominates mobile phone traffic by a factor of 10 to 1 (text to voice calls) and will continue down this path in the future<sup>42</sup>. With the average user sending over 2000 messages a year, the Philippines is reportedly the world’s highest texting nation<sup>43</sup>. Attractive pricing packages, which can include hundreds of free text messages a month have facilitated the popularity of text messaging in Asia. Voice is still the dominant form of communication in most poor developing country communities. In rural South African communities, the ratio of inbound texts to outbound texts is approximately 8:1<sup>44</sup>. Such an imbalanced ratio is explained by an entrepreneurial phenomenon that finds more literate individuals with cell phones relaying text messages to those without cell phone or those who cannot read or write for a marginal fee. The advantages of text messaging is its lower cost, relative to voice calls, as well as the fact that the receiving party does not have to immediately acknowledge the message and/or respond to it.

## **5.2 Beeping**

Certain aspects of face-to-face communication are lost when using ICTs to connect with one another. This can include facial expressions, body language and tapping someone on the shoulder. “Beeping” or “flashing”, which occurs when a caller dials but hangs up before the call is connected, is an innovative way some mobile users are virtually, and affordably, “tapping someone on the shoulder”<sup>45</sup>. This method is popular not only because it avoids a call charge, but also because it can be used discreetly, almost as a code language. A system can be devised to use

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41 Bagalawis (2001)

42 APRG 2005.

43 Castells, Qiu, Fernández-Ardèvol, Sey (2005).

44 Gough & Grezo 2005.

45 In this sense, “tapping on the shoulder” refers to simply getting someone’s attention without actually saying anything.

sequential or sporadic beeping to communicate simple messages. The rationale behind beeping is to allow the recipient to call back at a later time.

“Beeping” or “flashing” is very popular in sub-Saharan Africa,<sup>46</sup> as well as in parts of Asia such as in Indonesia, where this practice is also known as “menacing” or “fishing”<sup>47</sup> The terms “menacing” and “fishing” are coined in a way to indicate the disadvantages and disruptive aspects of this mode of use. Answering phone calls on one’s mobile can signal that those in their company are not significant enough to deserve exclusive attention, or that the meeting is not considered important enough to shield oneself from incoming calls (Geser 2004). The provision of affordable and relevant means to communicate with one another creates social capital. The concept of social capital illustrates the blurring lines of distinction between “what” one knows and “who” one knows.

## **6.0 Social Capital: Not what you know, but who you know**

Social Capital is the capital of the poor<sup>48</sup>. Social capital theory can be applied in showing that the nature and extent to which social interaction between communities and institutions shape economic performance. It represents the intangible value of the social group, on whatever scale, above and beyond the value of its individual members alone, with “social networks” as its structural element<sup>49</sup>. In the case of mobile telephony in developing countries, social capital can be created through exchanges of voice and/or data, which strengthen existing social networks, or help forge new ones.

Goodman<sup>50</sup> asserts that social capital may be an even more important concept for developing countries than developed, as in many cases, people in the former have less access to formalized structure of support, and may rely on informal networks instead. Voice or data

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46 McKemey, Scott, Souter, Afullo, Kimbombo & Sakyi-Dawson (2003).

47 Castells, Qiu, Fernández-Ardévol, Sey (2005).

48 Woolcock & Narayan 2000

49 Goodman 2005.

50 2005.

exchanges using a mobile phone can be entirely social, entirely economic, or a combination of the two. Regardless of the motive behind communicating with mobile handsets, social capital is created as more individuals are able to communicate more freely across greater distances and with greater frequency. Migrant workers often make use of mobile phones to keep in contact with their families and friends back home. In Singapore, migrant workers from Indonesia, the Philippines, Sri Lanka, Thailand, India and China are frequent users of prepaid mobile phone cards and chips to call home. These phone calls reinforce social networks, and in turn generate social capital – be it positive or negative in nature.

### **6.1 Social Capital Cuts Both Ways**

Social networks and the resulting social capital are neither positive nor negative by nature, but rather a neutral social resource. A study done by Moser and Narayan<sup>51</sup> finds that communities endowed with a diverse stock of social networks and civic associations are in a stronger position to confront poverty and vulnerability. In spite of the benefits strong social capital brings to communities, it can also exert a negative influence<sup>52</sup>. Cohesive communities with high levels of social capital may exclude others from entering into the communities, and in essence further exacerbate inequalities.

The ability to connect with others is a double-edged sword. There are freedoms gained by being able to connect to others for economic or social reasons, but there is also an increased level of duty to answer unwanted incoming calls and to inform kin and friends of your whereabouts and business. Increased access to individuals can also lead to the exacerbation of traditional asymmetries in social power and control. Examples of this include the authority that parents exercise over their children or the vulnerability of women to the dominance of males. Regardless of the nature of exchanges, interaction among members of a social network creates some form of social capital. This network can be used to create economic opportunities, strengthen social ties

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<sup>51</sup> 1995

<sup>52</sup> Daniel et al. 2003.

between migrant workers and their families, or organize political demonstrations. However, these networks and social capital can equally be used to coordinate illegal activities and exclude others from a group.

## **7.0 Conclusion**

Muhammad Yunus's statement from the beginning of this paper alluded to a direct correlation between mobile phones and poverty alleviation. Mobile phones, like other ICTs, are merely tools used to help connect individuals. However in the process of doing so, these individuals can get empowered to strengthen their respective social networks and leverage them to create economic opportunities, strengthen social and cultural ties, and become more politically aware. This paper does not argue by any means, that mobile telephony is the only answer to reduce the digital divide. On the contrary, there are several combinations and permutations of technologies, business models and regulatory frameworks, which can provide affordable and appropriate means for communication in developing countries. Mobile telephony offers an attractive solution to many rural poor individuals and communities, due to its general accessibility, collective ownership models, and flexible payment options.

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