

# Has Mobile Phone Technology Had an Impact on the Quality of Life in the Developing World?

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## **Abstract**

Mobile phone technology has become increasingly pervasive in our modern world. Although it is something of a convenience in the developed world, it has the potential to serve as a means to improvement in quality of life in the developing world due to the scarcity of land lines and the prohibitive cost involved in the acquisition of this form of communication. This study will examine the possible effect of mobile phone technology in areas of Latin America, Asia, and Africa to determine a possible correlation between mobile phone usage, density and other secondary factors with quality of life as measured by the Human Development Index.

**Keywords:** Latin America, Africa, Asia, Mobile Phones, Quality of Life

## **1- Introduction**

The proliferation of mobile phone technology has the potential to help alleviate the massive poverty of developing countries and help those countries' economies converge with those of the rest of the world. Millions of inhabitants are now able to conduct business, search for jobs, send money, find buyers for their goods, and generally raise their standards of living. However, the mere presence of this technology does not automatically ensure economic growth. Cellular phone technology could be one of the major catalysts in bringing the developing world into the modern age. Although mobile phones have been vastly present in the developed world for several decades now, they are a relatively new phenomenon in the developing world. Although in absolute terms, the number of subscribers seems large, only a minute portion of the developing country's citizens has owned or had access to a cell phone until a proliferation occurred several years ago.

The purpose of this paper is to examine the relationship between this quickly spreading form of communication technology the quality of life. Although studies have been conducted examining a possible linkage between mobile phones and economic growth, the potential effects on a wider-encompassing quality of life are not as readily apparent. This paper will attempt to bridge that gap by examining developing countries from different regions to pinpoint any possible correlation between mobile phone usage and quality of life as measured by the United Nation's Human Development Index.

## **2- Literature Review**

### **2.1- Economic Benefits**

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

-- Professor Muhammad Yunus, 2006 Nobel Peace Prize for Poverty Alleviation (Nair, et al, 2012).

The sheer number of mobile phones in usage today is astounding. There were an estimated 5.3 billion mobile phone subscriptions worldwide at the end of 2010 with approximately 90% of the world's population having access to mobile networks (Maceli, 2011). However, according to Ilahiane, “While there is a burgeoning literature on the effects of mobile telephony in the developing world, most studies on mobile phones are mostly centered on its social dimensions in affluent regions such as Scandinavia, North America, and Japan” (2011).

The potential benefits of mobile phone technology as it pertains to an increase in the quality of life are numerous and far-reaching. According to Duncombe and Boateng, “Belief in the potential of mobile phones to help meet the financial service needs of the poor has been driven by rapid expansion of networks into previously unserved regions and communities of developing countries during the past decade. The impact has been most noticeable in the least developed countries of sub-Saharan Africa and South Asia” (2009). Sridhar & Sridhar find positive impacts of mobile and landline phones on national output (2007). Waverman, et al, find that mobile phones in less developed economies are playing the same crucial role that fixed telephony played in the richer economies in previous decades (2005). In quantitative terms, the gains could be very significant-- for every one cell phone used in an underdeveloped region as much as \$5000 could be added to GNP (“Bridging the Gap: Towards Sustainable Growth”). In another study, it was determined that for every 1% increase in cell phone penetration in developing countries, there is a 7% increase in national output (Sridhar, 2004).

One economic benefit that the proliferation of cell phone technology could offer is that of transferring funds. For example, only a miniscule percentage of Africans currently have access to modern forms of monetary technology-- bank accounts, credit cards, etc. This means that the vast majority of the continent’s inhabitants are living outside the official economy. In order to fully modernize, it is essential that these millions of people are included in the official economy, versus the black market economy. This is only possible with the access to modern banking services. According to Herman Singh, director of technology engineering at Standard Bank, which collaborated with the cell phone company MTN Group in Africa, “There’s a large number of individuals who are unable to access banking services because conventional banking is expensive, relative to their income. And physically, we don’t have banking facilities in remote areas.” He goes on to say, “We believe that this very simple but well designed product has the potential to revolutionize banking on the African continent” (Itano, 2005). Modern banking services would allow people to save, borrow at reasonable rates of interest (versus borrowing at usurious rates from local lenders), and send money to family members in need.

However, the mere presence of mobile phone technology does not automatically guarantee economic growth in a region. How can this potential be realized? The first part of the answer is the role of government in the process. At present, far from being catalysts, the governments of many African countries act as hindrances to the growth and development

process. Although the London Business School states that Africa has seen faster cell phone subscription growth than any other region in the world, and in 2001, Africa became the first region where the number of mobile subscribers exceeded those using landlines (Butler, 2005), government taxes and other impediments to growth still abound. In many countries, these taxes range from 10-20% of the mobile phone monthly bill as well as a special tax on the purchase of the handset. According to Charles Kenny, a World Bank economist, "It does seem strange for countries to say that telephone access is a public-policy goal, and then put special or punitive taxes on telecom operators and users." In addition, a reduction in government taxes could encourage users to buy the handset by legal means, versus the black market, thus actually increasing government revenue ("Calling an End to Poverty").

Another catalyst in the further proliferation of cell phone technology is the reduction in the price of the handsets themselves. Presently, only approximately 5% of the inhabitants of the African continent own their own phones. However, Vodacom estimates that the number of users would double if the cheapest handsets were reduced from \$60 to \$30 ("Calling an End to Poverty"). At the moment, many Africans instead of owning their own phone pay local cell phone entrepreneurs by the call. While this level of ownership has produced some benefit (even creating a new genre of village entrepreneurs), in order to reach the next level of development and technology diffusion, more individuals must own their own phones. Another way to encourage personal cell phone ownership is through the further implementation of pre-paid calling plans. This would allow participants to buy small, affordable increments of minutes and also eliminate the need for a credit check or income verification (which can be a barrier for many would-be customers).

## 2.2- Other Quality of Life Benefits

Although the economic benefits are fairly clear, benefits involving other quality of life measures are less so. Kaplan found evidence to both support and refute the proposition the fixed and mobile telephones could be an effective healthcare intervention tool in developing countries (2006). Chigona, et al, found that the usage of mobile Internet among the "socially excluded" is beyond the reach of most people in this social category, partly because of limited awareness of mobile Internet and what it can achieve (2009).

Developing countries face a steady growth of chronic disease as well as the constant threat of communicable disease. "Mobile" health—the use of mobile technologies to support public health and clinical care—offers promise in responding to both of these health burdens (Kahn, et al, 2010). Along the same lines, in Peru, an application of "telehealth"—using cell phones and the Internet to collect, transmit and monitor data in real-time from female sex workers—has been undertaken in an effort to reduce sexually transmitted diseases (Curioso, 2006). Nair, et al, find that access, education, gender, encouragement, and age are key determinants for mobile phone use in the rural areas of Malaysia (2012). In another study, food security in developing countries was linked to insufficient investment in agricultural research and modern technology, inadequate extension services and weak linkages between researchers, middle-men, and farmers (Bolarinwa & Oyeyinka, 2011).

Most cell phones on the market today allow the user to have Internet and email access. This could aid development by increasing the transparency of government, granting the poor

access to information, and by allowing citizens to obtain mundane yet essential items like identity cards. This could help the African continent, for example, to “leapfrog” over an entire generation of technology and converge with developed countries more quickly. To illustrate, while 97% of Tanzanians have access to a mobile phone, only 28% can access a landline for PC-based Internet access (“Cell Phones May Help ‘Save’ Africa”). According to Waverman, of the London Business School, “The digital divide is really diminishing, and it’s the mobile phones doing it, not the PC.” He goes on to say, “It really is a tool for business development, and it’s moving across population segments that we really did not before believe would be accessible by these companies” (Hancock, 2005).

### **3- Research Methodology:**

This paper will employ regression methodology of different sorts to determine a possible correlation between the Human Development Index and such variables as Mobile phone subscribers per 100 inhabitants, Mobile phone subscribers total, Electricity Consumption (kw/hr per capita), Landlines per 100 inhabitants, and Internet Users per 100 inhabitants. The sample countries under consideration are the following ten developing nations: Brazil, Mexico, Colombia, South Africa, Egypt, Morocco, Thailand, Vietnam, Indonesia, and the Philippines. All data was retrieved from the World Bank archives. Data is taken on an annual basis from 1991 to 2010.

The specific regression is the following

Equation 1:

$$HDI = \alpha + \beta_1 \text{ Mobile Phones per 100 inhabitants} + \beta_2 \text{ Mobile Phone Subscriptions Total} + \beta_3 \text{ Electricity Consumption (kw/hr per capita)} + \beta_4 \text{ Landlines per 100 inhabitants} + \beta_5 \text{ Internet Users per 100 inhabitants} + \epsilon$$

The specific hypotheses are the following:

(H1a)- There is no correlation between the prevalence of mobile phones and the Human Development Index.

(H1b)- There is a positive correlation between the prevalence of mobile phones and the Human Development Index.

(H2a)- This positive correlation is no more pronounced among the poorest nations.

(H2b)- This positive correlation is more pronounced among the poorest nations.

#### **3.1- What is the Human Development Index?**

The Human Development Index (HDI) is a composite index used by the United Nations Development Project in order to more accurately assess the quality of life of the inhabitants of a particular nation. It accounts for the following aspects-- a.) a long and healthy life (as measured by life expectancy at birth, b.) knowledge (as measured by adult literacy rates and combined primary, secondary, and tertiary school enrollment), and c.) a decent standard of living (as measured by GDP per capita in US\$, adjusted for Purchasing Power Parity) (Human Development Report 2007/2008).

#### 4- Results

The following are results for all countries (Overall), Africa, Latin America, and Asia. Only statistically significant coefficients (at the 10% level) are listed.

Table 1- Overall

<b>Variable</b>	<b>Coefficient</b>	<b>T-Stat</b>	<b>Probability</b>
Mobile Subs./100 people	.0028	1.74	.0821
Electricity Consumption	.0001	2.76	.0062
Landlines	.0538	11.98	.0000

Table 2- Africa

<b>Variable</b>	<b>Coefficient</b>	<b>T-Stat</b>	<b>Probability</b>
Mobile Subs/100 people	.0081	2.43	.0180
Electricity Consumption	.0001	2.95	.0046
Landlines	.0124	3.97	.0002

Table 3- Latin America

<b>Variable</b>	<b>Coefficient</b>	<b>T-Stat</b>	<b>Probability</b>
Electricity Consumption	.0003	9.27	.0000
Landlines	.0244	5.92	.0000

Table 4- Asia

<b>Variable</b>	<b>Coefficient</b>	<b>T-Stat</b>	<b>Probability</b>
Electricity Consumption	.0001	2.59	.0115
Landlines	.0705	2.84	.0058

Now, the same analysis will be run, with sample countries divided into categories based on Gross National Income per capita. These categories will be labeled “Higher Income”, “Medium Income”, and “Lower Income”. The following figure illustrates this on an individual country basis (in descending order):

Figure 1- GNI per capita (PPP 2008 \$)

Mexico	13,971
Brazil	10,607
South Africa	9,812
Colombia	8,589
Thailand	8,001
Egypt	5,889
Philippines	4,002
Indonesia	3,957
Vietnam	2,995
Morocco	2,567

Source: Human Development Index Report 2010

Table 5- Higher Income (Mexico, Brazil, South Africa)

Variable	Coefficient	T-Stat	Probability
Landlines	.0538	11.08	.0000
Internet Users	.0051	3.27	.0018

Table 6- Medium Income (Colombia, Thailand, Egypt)

Variable	Coefficient	T-Stat	Probability
Mobile Subs/100 people	.0070	3.05	.0035
Landlines	.0225	6.59	.0000

Table 7- Lower Income (Philippines, Indonesia, Vietnam, Morocco)

Variable	Coefficient	T-Stat	Probability
Electricity Consumption	.0017	20.67	.0000

## 5- Interpretation

Overall, it seems that there is a strong positive correlation between the number of mobile phone subscribers and quality of life (as expressed by the Human Development Index). On a geographic level, however, most of this correlation is derived from the African subset of countries, with no such correlation occurring in Latin America or Asia. One possible explanation for this is due to the extreme lack of infrastructure in Africa, mobile phones have been able to play an exponentially important role in the development of the continent since approximately the early 2000s. Latin America and Asia have relatively developed infrastructures in comparison and perhaps would not have benefited to such a degree. However, it is interesting to note that landlines seem to have had a more positive impact on the quality of life in these two regions of

the world. In addition, electricity consumption has also played an important role in all three regions.

On an income based level, interestingly, there is a correlation with countries of the sample in the “Medium Income” range. Perhaps there is an economic “sweet spot” in which the widespread use of mobile phone technology in these countries may be able to positively impact the quality of life, as expressed by the Human Development Index. However, the development and dispersion of landlines has seemingly had a stronger correlation with quality of life, both on a geographic and income-based level, up until this point in time. It remains to be seen if this will always remain the case.

Therefore, regarding the two hypotheses put forth earlier, for (H1), the alternative may be accepted. In other words, there is some evidence, found in the Overall sample as well as the African sub-sample, to support the view that mobile phone technology is correlated with an increase in the Human Development Index, although to a relatively small degree. However, for (H2), the null hypothesis will remain intact. There is no evidence indicating that in Lower Income nations there is a stronger correlation between the pervasiveness of mobile phone technology and the HDI.

## **6- Conclusion**

As stated in the Introduction, mobile phone technology has the potential to be one of the major drivers in bringing the developing world into the modern age. The purpose of this paper has been to begin to initially assess whether or not this technology has had any positive impact on the quality of life of inhabitants of a sample group of developing world countries.

In this author’s opinion, to fully maximize this phenomenon to achieve the most good for the greatest number of people, several factors must be in place. The governments of these countries must focus on providing an environment conducive to business, without excessive interference. In addition, private companies must consider the business climate in these respective countries to be adequate for further investment. They must also be innovative in their approach, perhaps cutting prices and thus profit margins while at the same time maintaining profitability through volume. Although government is responsible for creating an environment conducive to business, it is through private investment that such ills as poverty and unemployment are best eradicated, and human dignity and entrepreneurship are encouraged.

## **7- Future Area of Research**

One possible future area of research is to further investigate the role of government and its effects of the quality of life benefits as they pertain to mobile phone proliferation. Although it was mentioned here, further study on the qualitative effects of government intervention (or lack of intervention) may be warranted.

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