Mobile Telecommunications for Poverty Alleviation in Sub-Saharan Africa

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On my honor, I have neither given nor received any unacknowledged aid on this capstone.
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Abstract

Mobile telecommunications or mobile telephony is the enormous network of telephone services for portable phones, ranging from smartphones with monthly subscriptions and full Internet capabilities to pre-paid low-end phones with no Internet capabilities. Traditionally used as a one-to-one voice communication device, mobile phones have been developed and refashioned for multifunctional, innovative purposes all across the world and especially so in developing regions. In particular, the simple pre-paid cell phone has been praised as an affordable innovative tool in improving the quality of life. The world is enamored by the explosive growth in the use of mobile telecommunications, especially so in sub-Saharan Africa. Perhaps there is intrigue because the media has never pegged the region as an innovator of modern technology; hence, any progress is sensationalized and viewed as a miracle. From a differing perspective, the continent has successfully harnessed the more economical commodities of the mobile telecommunications industry to include members of all socioeconomic levels in the advancement. The majority of sub-Saharan African countries have taken advantage of pre-paid low-end phones to construct a non-traditional network of communication penetrating urban cities and beyond to rural areas, a type of area where approximately 75% of the world's impoverished population live on less than $2 a day.[1] While this is a widely accepted notion, the point of contention is the extent to

[1] World Bank, *Agriculture for Development. World Development Report 2008*, Washington DC: World Bank, 2007. http://siteresources.worldbank.org/INTWDR2008/Resources/WDR_00_book.pdf, accessed March 23, 2013, pg. 1.

which mobile telecommunications growth has actually made an impact on the reduction of poverty on both a macro regional or national level and a micro community level. The overwhelming majority of sub-Saharan mobile telephony is composed of affordable pre-paid services, the choice of mobile phone service for many rural poor. Thus, it is worthy to explore the impact the mobile telephony growth in sub-Saharan Africa on the multiple facets of poverty, especially rural poverty.

This paper analyzes the impact of mobile telecommunications growth in five countries considered to be key mobile markets in sub-Saharan Africa: Kenya, Tanzania, Ghana, Nigeria, and South Africa. All countries have liberalized their mobile telephony industry, ultimately driving down the cost of mobile phones and services to achieve affordability and accessibility, and have experienced the highest rates of investment to expand their markets.[2] The overall impacts of mobile telephony growth on poverty reduction will be examined on the five national economies as a whole as well as on the micro community level. The effects of mobile growth on GDP and employment are vital to understand its relationship with overall national poverty; however, a micro-perspective can lend more specific information that can incite more or better poverty-alleviation programs. A discussion on the areas of banking and business practices, health care and access, and political society will be used to discover the potential of the mobile telephony expansion to promote income earnings as well as human capability to ultimately alleviate poverty in sub-Saharan Africa.

[2] Deloitte, "Sub-Saharan Africa Mobile Observatory 2012," November 13, 2012, http://www.gsma.com/publicpolicy/wp-content/uploads/2012/03/SSA_FullReport_v6.1_clean.pdf, accessed February 18, 2013, pg. 3-6.

SECTION ONE: INTRODUCTION

Background of Mobile Telecommunications in Sub-Saharan Africa

Expansion

Due to market liberalization in the 1990s and early 2000s, the level of investment in mobile technology and subsequently the number of mobile phone users grew rapidly. From 2007 to 2012, the five key mobile markets of sub-Saharan Africa collectively invested US16.5 billion.[3] The aggregation of mobile connections, or the number of mobile devices connected to a wireless communications network, in sub-Saharan Africa rose from 16 million in 2000 to 376 million in 2008, or one-third of the region's population.[4] Today, there are approximately 454 million connections.[5] Another facet of mobile technology indicative of its current growth is the sales of mobile devices. Between 2009 and 2012, the top five mobile technology markets in sub-Saharan Africa experienced a collective 80% growth in mobile device sales that began with 35.3 million devices to 62.8 million.[6] A longitudinal, continentally bound comparison will clearly demonstrate the immense propagation of mobile technology for the duration of the twenty-first century. Even through a global comparison it is evident that sub-Saharan growth was exceptional and exceeding the growth rates of other regions in the world. For example, from 2002 to 2007 mobile phone subscriptions increased by 49% annually

[3] Deloitte, "Sub-Saharan Africa Mobile Observatory 2012," pg. 3.
[4] Jenny C. Aker and Isaac M. Mbiti, "Mobile Phones and Economic Development in Africa," *The Journal of Economic Perspectives* 24.3 (2010): 207-232. Accessed February 15, 2013. http://www.jstor.org/stable/20799163, pg. 210.
[5] Deloitte, "Sub-Saharan Africa Mobile Observatory 2012," pg. 10.
[6] Ibid pg. 14.

while Europe experienced a much lower annual rate of 17%.[7] So while the proportion of mobile connections in Sub-Saharan Africa represent a mere 8% of worldwide mobile connections, it still exhibits the highest rates of growth.[8] Such rapid progress suggests a continuation of growth in the next several years to come.

Death of the Landline

Because of such sustained growth, the construction of new landlines is close to obsolete. In 2010, there were ten times as many mobile phones as landlines and 60% of sub-Saharan Africans had mobile coverage.[9] By 2012, there were twenty-eight times as many mobile subscriptions than fixed landlines and about 76% of the sub-Saharan population had mobile coverage.[10] In 2010, approximately half of the 12.3 million fixed landlines in sub-Saharan Africa were situated in South Africa, thus indicating mobile telephony as the primary provider of telecommunications.[11] While some media groups call the expansion of mobile technology somewhat arbitrary or the result of accidental forces, in actuality, it is a manifestation of what some scholars call "leapfrogging conventional development processes" in avoidance of the costly and laborious erection of fixed landline infrastructure.[12] The basic portable cell phone and cell towers are now the emblem of modern development rather than the clunky chain of landline cable poles. Pre-paid services make up an overwhelming 95% or more of every sub-Saharan

[7] Aker and Mbiti, "Mobile Phones and Economic Development in Africa," pg. 207.
[8] Deloitte, "Sub-Saharan Africa Mobile Observatory 2012," pg. 9.
[9] Aker and Mbiti, "Mobile Phones and Economic Development in Africa," pg. 207.
[10] Deloitte, "Sub-Saharan Africa Mobile Observatory 2012," pg. 15.
[11] Ibid, pg. 10.
[12] Sebastiana Etzo and Guy Collender, "The Mobile Phone 'Revolution' in Africa: Rhetoric or Reality?" *African Affairs* 109.437 (2010): 659-68, Accessed January 8, 2013, doi: 10.1093/afraf/adq045, pg. 662.

country's mobile contracts, excluding Lesotho, Zimbabwe, Namibia, Mauritius, Botswana, and South Africa.[13]

Why Sub-Saharan Africa and Why Rural Poverty?

Currently, there are about 874.8 million people living in sub-Saharan Africa.[14] The projected population of sub-Saharan Africa for 2030 is 1.1 billion and up to an overwhelming 1.5 billion by 2050.[15] In the developing world, the region of sub-Saharan Africa boasts the highest population after Asia/Pacific, East Asia, and South Asia but not before South East Asia, Latin America/the Caribbean, and the Middle East/North Africa.[16] With such forecasted growth, it is imperative to develop a set of plans in anticipation especially for the purposes of combatting poverty in developing countries and especially so in rural areas where the majority of the world's poor live. Of the world's 49 top poorest nations, 34 are located in sub-Saharan Africa.[17] According to the IFAD (International Fund for Agricultural Development) 2011 report on rural poverty, sub-Saharan Africa's incidence of rural poverty, or the percentage of rural people continuously at risk of living on less than $2 a day, is the highest among all developing regions with an alarming 87.2 percent while the lowest incidence of rural poverty is in

[13] Deloitte, "Sub-Saharan Africa Mobile Observatory 2012," pg.18.
[14] World Bank, "Sub-Saharan Africa," Last modified 2013, http://data.worldbank.org/region/sub-saharan-africa, accessed April 9, 2013.
[15] FAO. *Water and the Rural Poor: Interventions for Improving Livelihoods in Sub-Saharan Africa*. Rome: FAO, 2008. ftp://ftp.fao.org/docrep/fao/010/i0132e/i0132e.pdf. Accessed April 3, 2013, pg. 15.
[16] IFAD. *Rural Poverty Report 2011*. (Rome: Quintily, 2010). http://www.ifad.org/rpr2011/report/e/rpr2011.pdf. Accessed April 4, pg. 233.
[17] FAO. *Water and the Rural Poor: Interventions for Improving Livelihoods in Sub-Saharan Africa*, pg. 18.

the Middle East/North Africa of 11.7 percent.[18] Sub-Saharan Africa also exhibits the highest incidence of extreme rural poverty, or the percentage of rural people continuously at risk of living on less than $1.25 a day, of 61.6% compared to the lowest in the Middle East/North Africa of a mere 3.6%.[19] Clearly, there is a need to recognize and analyze the pervasive causes and implications of poverty, especially rural poverty, in sub-Saharan Africa more so than any other developing region in the world. But it is crucial that the discussion incorporates the concerns of the mobile telephony and ICT (Information and Communication Technologies) as a whole because of the affordability, accessibility, and flexibility the industry offers for those in rural poverty. Mobile telephony is affordable – or more so than other forms of communication - to rural poor consumers due to cheap handsets and airtime costs, but it is also affordable in the sense that suppliers can serve vast remote areas with less mobile satellite towers that are cheaper to construct compared to fixed landlines.[20] Mobile telephony also demonstrates low barriers to entry, financially with low-costing devices and services and physically with wide mobile coverage.[21] It is also flexible in that those in rural poverty can connect in multiple ways – text, calling, Internet – and thereby expanding communication to two-way contact.[22] The nature of the mobile telephony expansion

[18] IFAD, *Rural Poverty Report 2011*, pg. 233.
[19] Ibid.
[20] Asheeta Bhavnani, et al, "The Role of Mobile Phones in Sustainable Rural Poverty Reduction," June 15, 2008, Accessed January 6, 2013. http://siteresources.worldbank.org/EXTINFORMATIONANDCOMMUNICATIONANDTECHNOLOGIES/Resources/The_Role_of_Mobile_Phones_in_Sustainable_Rural_Poverty_Reduction_June_2008.pdf, pg. 5.
[21] Ibid.
[22] Ibid.

encourages the participation of the rural poor more so than any other technological advancement. Hence, there is potential in the integration of mobile telephony in sub-Saharan poverty reduction.

Case Studies Under Examination

Sub-Saharan Africa

The countries under analysis were chosen because of their status as a key mobile market in sub-Saharan Africa, making up 47% of the total mobile connections in the region.[23] Furthermore, all countries share important homogenous denominators, with the exception of South Africa whose inclusion in this analysis will be explained. First, Nigeria, Ghana, Tanzania, and Kenya are all located in sub-Saharan Africa. This limitation allows us to exclude North Africa, which has predominantly experienced a distinct and superior trend of development unlike that of sub-Saharan Africa.[24] Second, all countries under question share similar colonial histories and thus, are all English-speaking and share various cultural aspects. Third, these nations are some of the more developed of the African continent as a whole. Therefore, they all have had the financial ability to attract foreign investment as well as generate their own funds to encourage mobile telecommunications development. Ultimately, all of these advantages have compelled research to be conducted on these specific countries. For that reason, they have also been chosen because of the wealth of information and data available on each of these countries and their mobile telephony industry.

[23] Deloitte, "Sub-Saharan Africa Mobile Observatory 2012," pg.12.
[24] Aker and Mbiti, "Mobile Phones and Economic Development in Africa," pg. 4.

South Africa

South Africa is distinctly bigger in population, territorial size, level of development, and economy. Thus, South Africa has had the financial means to dedicate sizable investments to mobile telecommunications that has resulted in its mobile penetration rate of 123% (the rate at which mobile coverage grows), well over 50 million mobile connections, and 100% in coverage levels.[25] Despite the seemingly large gap between the sub-Saharan countries and South Africa, all are the five leading nations in mobile telecommunications development that are not part of North Africa. Collectively, these countries have invested an enormous US$16 billion in the time span between 2007 and 2012 to increase network capacity by expanding to uncovered regions.[26] Because these five nations are some of the most dominating forces in the growth of African mobile telecommunications, most of the general research conducted on this topic incorporates all of them.

SECTION TWO: IMPACT OF MOBILE TELECOMMUNICATIONS ON POVERTY REDUCTION

Scope of Analysis

There are potentially countless ways for mobile technology to improve societies as well as individual lives. Three categories can describe the general types of benefits that mobile phones provide in everyday activities: the incremental advantage which refers to increased speed and efficiency, the transformational advantage which involves

[25] Deloitte, "Sub-Saharan Africa Mobile Observatory 2012," pg. 11.
[26] Deloitte, "Sub-Saharan Africa Mobile Observatory 2012," pg. 3.

innovation, and the production-related advantage in generating an ancillary economy based on mobile service sales.[27] The most significant part of this expansion in mobile telephony is that these benefits are inclusionary in terms of socioeconomic status, as explained earlier (rural poor). But the magnitude and verity of these research claims is debated. By focusing on three prevalent fields of mobile telecommunications-based initiatives, banking and business practices, health promotion, and political freedom, the paper will provide evidence of the extent to which such programs alleviate poverty and in what ways they promote human capability. But first, the impact of the mobile telephony on the economies of the countries and overall conditions of poverty will be evaluated.

Impact of Mobile Market Expansion on Regional and National Economies

Sub-Saharan Africa: Regional

The expansion of mobile telephony has positively impacted the regional economy of sub-Saharan Africa, specifically on GDP activity, employment, and enhancing technological development. In 2011, the mobile telephony sector contributed a direct economic impact of US$32 billion in the region, made up 4.4% of its GDP when encompassing worker's productivity, created more than 3.5 million full-time equivalent jobs in both informal and formal sectors, and fostered the development of more than 50 tech hubs, labs, incubators, and accelerators.[28] The mobile telephony industry has supported and augmented the sub-Saharan economy as a whole. Expectedly, the

[27] Etzo and Collender, "The Mobile Phone 'Revolution' in Africa: Rhetoric or Reality?" pg. 662.
[28] Deloitte, "Sub-Saharan Africa Mobile Observatory 2012," pg. 4.

regional market is looking to expand even further in the form of mobile wireless broadband to enable sufficient and region-wide 3G Internet capabilities.[29] A collaborative study between Deloitte, GSMA, and Cisco Systems showed how doubling the mobile data use of a sub-Saharan country increases GDP per capita by 0.51 percent on average, forecasting a growth of US$40 billion for the next four years.[30] Broadband expansion will effectively contribute more growth to the economies and technologies of sub-Saharan countries. While it seems as though a 3G connection has little to do with poverty, the enlargement of broadband network capacities will penetrate rural areas and bring even more communication modes to the rural poor. This is true as long as their mobile devices are made for broadband usage. As the industry continues to develop, it will produce mobile devices to include such capabilities. Furthermore, developing countries could benefit even more from mobile telephony than developed countries since developing countries with 10 mobile phones or more per 100 experienced higher GDP growth by about 0.59% than other comparable developing countries without such mobile penetration.[31] In all, mobile telephony nourishes the economies of sub-Saharan Africa and increases living standards.

National Economies

Specifically, the developing countries of Ghana, Nigeria, Kenya, Tanzania, and developed country of South Africa can expect across-the-board increases in mobile broadband subscribers, broadband penetration, GDP, tax revenues, and job creation

[29] Deloitte, "Sub-Saharan Africa Mobile Observatory 2012," pg. 26.
[30] Deloitte, "Sub-Saharan Africa Mobile Observatory 2012," pg. 6.
[31] Etzo and Collender, "The Mobile Phone 'Revolution' in Africa: Rhetoric or Reality?" pg. 662.

because of the sub-Saharan plan to expand broadband capabilities via increase in spectrum release (see table below).[32] For instance, it is estimated that increased wireless broadband will have an impact of US$5.3 billion, or 1.2% of GDP, on Nigeria's total GDP and US $8.7 billion, or 1.8% of GDP, on South Africa's total GDP by 2015.[33] From an economic perspective, the growing mobile telephony market has and will continue to positively contribute to national economies.

	Increase in mobile Broadband subscribers	Increase in mobile Broadband penetration	GDP increase	Additional tax revenues	Additional job creation
Ghana	+3.6 million	+11.9%	+US$ 979 m	+US$ 138 m	+930 k
Kenya	+6.4 million	+12.1%	+US$ 1 bn	+US$ 213 m	+1.3 m
Nigeria	+49.4 million	+24.1%	+US$ 8.5 bn	+US$ 2.1 bn	+6.3 m
South Africa	+7.6 million	+14.3%	+US$ 10.7 bn	+US$ 2.2 bn	+1 m
Tanzania	+11.1 million	+18.1%	+US$ 1.1 bn	+US$ 141 m	+216 k

Source: GSMA, "The benefits of releasing spectrum for mobile broadband in Sub-Saharan Africa", 2011

Impact of Mobile Expansion on Human Capability

Much of this analysis will use human capability as the quantitative measurement of poverty reduction. According to Amartya Sen, human capability is essentially an individual's ability to function normally and participate in society so that they can pursue opportunities of their choice.[34] Much of this capability is linked to the freedoms that one possesses: economic, political, social, transparency, and protective security.[35] The projects and initiatives under investigation are centered around banking and business practices, health promotion, and political freedom, reflecting the kinds of

[32] Deloitte, "Sub-Saharan Africa Mobile Observatory 2012," pg. 36.
[33] Ibid, pg. 71.
[34] Amartya Sen, *Capability and Well-Being*, (Oxford University Press: 1993), pg. 33.
[35] Ibid.

liberties an individual must have to reach the full potential of their human capability and live free from poverty. While all of the projects promote human capability in one way or another, the crucial question is whether these programs work to promote the human capability of the very poor. However, some of these projects also function as preventative measures to avoid slipping into poverty and equal opportunity.

Banking and Business Practices

Due to the growth of mobile telephony and its subsequent expansion of information and communication, local business practices in both rural and metropolitan areas have been able to streamline operations to reduce costs, enhance competition, and encourage business expansion. Enhancement of business practices not only advances human capabilities but also the ability to earn an adequate income. First, the proliferation of mobile telephony has lowered costs in local business operations. Though mobile phones entail an initial fixed cost for the device, the accessory costs of mobile service such as subscriptions are relatively cheaper than the travel and opportunity costs a business would incur without access to the mobile network.[36] In the long run, mobile telephony minimizes operation expenses.

Mobile phones also give businesses the potential to improve their competitive edge because of the ability to surpass distance challenges and access market information. With immense mobile coverage, small business owners or merchants can contact other businesspersons of the same industry located in proximate regions to

[36] Aker and Mbiti, "Mobile Phones and Economic Development in Africa," pg. 215.

determine the market prices for goods and exchange other useful information.[37] Before the ubiquity of mobile phones, businesspersons needed to spend hours or days traveling to neighboring areas to verify market prices. For the past decade, mobile telecommunication networks have allowed small business owners to communicate with those far away not only to find out market prices but also to negotiate transactions, discuss collaborations, and just do business. In addition to easing travel and opportunity costs that are accumulated by small business owners, mobile telecommunications also provide owners the acquisition of real-time information on market prices to invest in arbitrage activities and generate higher profits.[38] Mobile telecommunications creates opportunities for small businesses to obtain information pertinent to their business, reduce existing costs, and generate additional profits to ultimately strengthen financial standing.

The purpose of many mobile-based business services is not specifically poverty reduction but is inherently poverty prevention to facilitate and sustain business growth and the owner's ability to make sufficient profits. For example, there is a successful for-profit social business called Farmerline that sends rural Ghanaian farmers, private and public, text alerts with applicable agriculture consultation as well as an Internet forum where farmers can post inquiries regarding their farms.[39] Farmerline gives counsel regarding issues such as the extermination of vegetation diseases, farming methods, ideal planting timetables, availability of subsidies, weather forecasts, local crop prices,

[37] Ibid.
[38] Ibid.
[39] Deloitte, "Sub-Saharan Africa Mobile Observatory 2012," pg. 39.

etc.[40] The service offers farmers a wide array of practical information as well as a source of guidance – perhaps even a sense of encouragement and emotional support from the question forum - that they would otherwise not receive without their mobile connection. In Tamale, Ghana, a community of corn and tomato farmers use mobile phones to text farmers 1,000 kilometers away in the capital, Accra, to find out market prices.[41] Farmerline functions in a bilateral nature and also caters to the needs of stakeholders by providing them information on the agriculture industry to assist in making financially sound investments.[42]

Ghana's Farmerline is exemplary of the innovative ways mobile telecommunications can improve the efficiency and quality of business operations. It provides essential information so that businesses can make well-informed decisions, increase competitive edge, and keep up with the developments of their industry. Simple and accessible, Farmerline promotes incremental accrual of information, and in turn businesses refine their practices and learn how to manage operations. Ultimately, it aims to cultivate human capital through knowledge. The circulation of information and making it accessible is essential in empowering poor communities, especially rural ones where information and communication technologies is lacking.[43] As a crucial determinant of production possibilities, or the ability of a person to run a factory or business to produce goods, knowledge provides the human capital to implement

[40] Deloitte, "Sub-Saharan Africa Mobile Observatory 2012," pg. 39.
[41] Ibid.
[42] Ibid.
[43] Bhavnani, "The Role of Mobile Phones in Sustainable Rural Poverty Reduction," pg. 4.

business plans.[44]

Although knowledge does impart a handful of benefits to the recipient, those benefits cannot be put to use if the technological resources, infrastructure, skill-building centers, and financial capital are missing. Then, the value of mobile-based services in boosting human capital and reducing the risks of poverty is moot. Farmerline is also for-profit and delivers its services in exchange for monetary payments.[45] It can be argued that Farmerline clients are already well-established businesspersons who are not at the risk of poverty and that such knowledge distribution mobile-based services only serve to refine the operations of relatively successful businesses rather than assist poor persons. If clients are required to pay for services, that indicates the preference for businesses at a certain level of prosperity. These Ghanaian entrepreneurs who employ such information mobile-based services reside in one of the most developed countries in West Africa where technology, infrastructure, skills-building centers, and financial capital – the ease of obtaining loans is currently debatable – are well established. Thus, the expansion of mobile telephony is benefiting those who are not already impoverished and potentially severing social mobility channels between the poor and the lower-middle class.

However, there are other organizations that are more poverty reduction oriented such as SEND. SEND, or the Social Enterprise Development Foundation, is a farmer co-operative in Ghana that has distributed 200 mobile phones to struggling

[44] Sen, *Development as Freedom,* pg. 162.
[45] Farmerline, "Overview of Farmerline," http://farmerline.org/.

farmers and partnered with TradeNet to deploy a text messaging platform for rural farmers to connect through.[46] This initiative has given farmers the ability to obtain the market price information they need to avoid using a middleman and losing profits in the trade surplus.[47] Again, these struggling farmers report that while mobile phones are essential in providing information and communication accessibility and human capability, the deficiencies in infrastructure like low quality roads prevent the actual trip required to trade at markets and lack of electricity prevents the charging of phones.[48]

From a broader scope, it is more evident that the expansion of mobile telecommunications has made a positive contribution in instigating the creation of employment opportunities that mirror the growth of the industry. The industry expansion created formal jobs in the private corporate sphere as well as informal jobs that were taken up by the once unemployed. Informal employment predominantly occurs on the streets where people either sell mobile phone credit in small roadside shops or on the streets.[49] There are also small informal businesses with a few workers that provide a variety of products such as mobile devices and accessory merchandise as well as services like charging mobile handsets and repairing products.[50] This was apparent during my stay in Ghana, Tanzania, and Kenya. For example, during an interview survey in Ghana, I spoke with informal sector employees who sold airtime cards on the streets and learned that many had lost their jobs in economic crisis

[46] Kutsoati Bartlett, "Texting TradeNet: What's the Price of Soya Beans?"
[47] Ibid.
[48] Ibid.
[49] Deloitte, "Sub-Saharan Africa Mobile Observatory 2012," pg. 46.
[50] Aker and Mbiti, "Mobile Phones and Economic Development in Africa," pg. 210.

previous to selling airtime. For a region in which informal employment constitutes 72% of non-agriculture employment, the creation of mobile telephony informal employment is a positive contribution to unemployment and poverty prevention.[51] There is also formal employment where workers are directly hired by mobile operators or outsourced venues. Because of the various niches in the mobile telecommunications industry and the fact that mobile telephony is in high demand, there are several sub-sectors of employment to choose from. And so, this phenomenon appeals to poverty reduction in the sense that the opportunity of employment gives people the means to earn wages for their livelihood, provide for their families, and in all, better their living conditions. Even in rural Tanzania, people have found informal employment in the mobile telephony industry. During my international Shepherd poverty internship in remote Ntagatcha, Tanzania, I observed a cell phone tower in the middle of the mountainous terrain that provided mobile coverage, a charging shop for villagers to power their flip phones not only in Ntagatcha but also in the small community 45 minutes away by foot. Most of the villagers were aware and accustomed to mobile telephony and its uses to better their lives.

Finally, nation-wide mobile coverage prompted the creation of an alternative system of banking to address the need for quick, secure money transfers for people without bank accounts and has demonstrated its bolstering effects on human capability.

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[51] IIED and UNFPA. *Urbanization, Gender and Urban Poverty: Paid Work and Unpaid Carework in the City*, Cecilia Tacoli. (UK: IIED and UNFPA, 2012). http://www.unfpa.org/webdav/site/global/shared/documents/publications/2012/UEPI%207%20Tacoli%20Mar%202012.pdf, accessed April 11, 2013, pg. 17.

In 2007, Kenya introduced M-Pesa, a mobile-based service application to enable fast and safe financial transactions – airtime purchases, bill payments, etc. – between mobile phone users.[52] Since then, mobile banking has expanded in scope to extend access to financial and trade systems to poor rural and urban residents, exposing them to transactional customs and perhaps even formal financial services.[53] It has made headway in cultivating an egalitarian point of penetration into financial practices so that the once-excluded poor can participate without pecuniary and legal barriers.[54] A Bill and Melinda Gates Foundation project that surveyed three major communities in Kenya with varying levels of rural and urban poor (urban slum Kibera and agricultural districts Murang'a and Kitui) found that M-Pesa produced several direct benefits on local economies across all surveyed areas (though not equally distributed among all communities).[55] First, participants reported that M-Pesa fosters more money circulation to increase local consumption and induce local economic activity. Second, it facilitates business expansion by lowering transaction costs and providing market price information to farmers and reduces community food insecurity.[56] Third, M-Pesa is viewed as a job creation tool as it is evident in the mushrooming of kiosks and shops.[57] Fourth, M-Pesa provides physical security by warding off theft and mugging as well as

[52] Etzo and Collender, "The Mobile Phone 'Revolution' in Africa: Rhetoric or Reality?" pg. 663.
[53] Aker and Mbiti, "Mobile Phones and Economic Development in Africa," pg. 213.
[54] Ibid, pg. 215.
[55] Megan Plyler et al, "Community Level Economic Effects of M-PESA in Kenya: Initial Findings," *Financial Services Assessment*, (2010): i-4, accessed April 10, 2013, pg. 2.
[56] Ibid, pg. 3.
[57] Ibid.

money security by maintaining personal cash electronically.[58] Fifth, M-Pesa stimulates human capital accumulation by giving people knowledge of financial structures, however informal, as well as a sense of social and market contribution and participation.[59] Finally, many participants in Kibera reported that M-Pesa fosters financial capital accumulation to support business expansion and improved business environments.[60] Furthermore, airtime cards have also become a form of de facto currency used to barter for goods and services or exchange for cash especially in Ghana and Nigeria.[61] Ultimately, mobile telephony has created an informal financial system that includes any person owning a mobile phone or any person that knows someone with a phone.

The benefits of access and inclusion in financial activity can be identified as potential influences on the amelioration of poverty. Human capability is bolstered by financial capital which can be used to reinvest in one's business to generate more wealth, pay for living expenses to sustain livelihood, and transfer money to safeguard from financial emergencies. Physical distances are also cut to allow for transactions to take place in the comfort of one's own mobile device, diminishing travel and opportunity costs. However, there is the counterargument that the advantages of mobile banking are exaggerated because the system is informal and incomplete.

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[58] Ibid.
[59] Ibid.
[60] Ibid.
[61] The Economist "The Other Type of Mobile Money: Airtime Money." January 19, 2013. http://www.economist.com/news/finance-and-economics/21569744-use-pre-paid-mobile-phone-minutes-currency-airtime-money. Accessed March 15, 2013.

Compared to the services provided by an authorized banking institution, "mobile banking" becomes a sort of misnomer considering its failure to offer legitimate financial services like insuring the contents of the mobile banking account, tagging interest rates on savings, and obtaining credit.[62] The argument has a valid point. But to discredit the direct improvements of the mobile transaction system on the inclusion of impoverished communities in financial activity and addition of employment recourses on the basis that is does not provide for the full range of conventional bank services undermines the need for incremental advancements to ensure a simple, easy to understand transactional process for the poor and maintain that portal of access.

Health Promotion

Mobile telecommunications growth has especially appealed to the health care sector due to the speed and ease in broadcasting information through texts. There are many mobile projects dedicated to the prevention and treatment of numerous diseases. AIDS is an endemic health risk and is the number one cause of death in sub-Saharan Africa.[63] In 2008, three quarters of all worldwide AIDS deaths, constituting about 1.4 million people, happened in the sub-Saharan region.[64] Ninety-one percent of new HIV infections resulting from, in large part, mother-to-child-transmission occurred while two-thirds of all worldwide HIV positive patients lived in the region.[65] The statistics allude to the disproportionate number of HIV and AIDS cases. In response, various sub-

[62] Aker and Mbiti, "Mobile Phones and Economic Development in Africa," pg. 220.
[63] Axel Salomonsson, "Mobile Phones in HIV Prevention in Uganda." Diss, Orebro University, 2010, pg. 7.
[64] Ibid.
[65] Ibid.

Saharan countries have taken up mobile-health projects to reach a massive number of patients in an easier and faster way. Kenya and South Africa, have started organizations that send texts to remind HIV-positive patients of their anti-retroviral therapy schedule and update them with the status of their health.[66] In South Africa, the Praekelt Foundation utilizes a mobile phone-based text alert system to remind HIV patients of their appointments and medication pick ups.[67] These types of local projects are simple in the fact that their content is a single one-way text. Their objective is reactive: to contact individuals to maintain their health and assist in the treatment process. There are also projects with preventative aims: to educate and raise awareness of diseases and prevention methods. One such project is an online mobile application called Bozza that has a transnational scope and multifaceted goal in raising awareness of AIDS, promoting prevention education on condom use, and stimulating job creation for people at risk in South Africa, Nigeria, Kenya, and Tanzania.[68] This organization strives to fulfill preventative and proactive goals in creating employment opportunities for communities so that people can afford to take care of their health.

Another area of concern in sub-Saharan health is maternal health care. The mobile app Mobile Baby, winner of 2012 GMSA award for Best Mobile Product or Service for Women in Emerging Markets, targets mothers in rural communities of Tanzania at risk of pregnancy complications because of their lack of access to skilled

[66] Aker and Mbiti, "Mobile Phones and Economic Development in Africa," pg. 207.
[67] Deloitte, "Sub-Saharan Africa Mobile Observatory 2012," pg. 40.
[68] Ibid.

care.[69] Mobile Baby provides a set of five services to ensure comprehensive maternal health care and to specifically reduce maternal mortality. First, it sends midwives and mothers step-by-step instructions to help identify and cater to early warning signs of dangerous effects during labor and delivery.[70] Second, it distributes phone numbers of nearby community members who own a vehicle and can transport mothers to clinics in cases of emergencies.[71] Third, it sets up an account for mothers to be able to pay vehicle owners for the transportation.[72] Fourth, the mobile phone itself allows health providers to receive permission from family to transport mothers to other facilities.[73] Finally, Mobile Baby contacts referral facilities to prepare for the mother's arrival.[74] Overall, Mobile Baby provides women the access to vital information as well as transportation to obtain the skilled care they need to lower the risk of maternal mortality. In Zanzibar, Tanzania where mothers are put at risk because half of births happen at homes far away from skilled care and only a third of mothers and newborns go in for post-natal checkups, such a service is greatly needed.[75] Ultimately, the promotion of health enhances human capability by decreasing vulnerability to disease or other health dangers, increasing social inclusion, and ultimately giving individuals the capability to go to school or work and earn a living.

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[69] Justice, Joan. "Mobile Health Around the Globe: mHealth and Social Networking in Rural Tanzania." *Health Works Collective*. April 16, 2012. http://healthworkscollective.com/joan-justice/31134/mobile-health-around-globe-tanzania-and-d-tree.
[70] Ibid.
[71] Ibid.
[72] Ibid.
[73] Ibid.
[74] Ibid.
[75] Ibid.

While sometimes the effectiveness of mobile-based services on poverty reduction is questioned, a study on the efficacy of HIV mobile voluntary counseling and testing (MVCT) in targeting the rural poor shows how four remote poor villages in Tanzania were positively impacted by mobile-based health promotion and services.[76] The study concludes that MVCT actually attracts people with higher HIV exposure risk and fewer economic resources.[77] Mobile-based services do appeal to the poor in terms of health care, and the potential to prevent disease and other human capability hindering conditions among the poor is there. The study does report two major barriers, HIV stigma and fear of testing; if those obstacles are overcome with more educational programming and campaigning, the poor can be assisted with adequate counseling and testing.[78]

Political Freedom

The increased usage of mobile telephony has also generated changes in the way communities engage in politics. The vastness of mobile coverage naturally inspires the use of mass communications to reach and involve significant proportions of the citizenry for various political activities. Some civil societies use mobile connectivity to collect data from the public. For example, during the observance of Nigeria's 2007 presidential election, people could send text message reports on quality of their local polling processions to a database where they would be passed on to major international

[76] Jan Ostermann, et al."Who Tests, Who Doesn't, and Why? Uptake of Mobile HIV Counseling and Testing in the Kilimanjaro Region of Tanzania." PLOS. January 31, 2011. http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0016488#close.

[77] Ibid.

[78] Ibid.

entities such as the European Union.[79] Because many people have mobile phones, civil society outreach like that of Nigeria is effective in compiling a diverse pool of public opinions to achieve as comprehensive of an outlook as possible on polling experiences nation-wide. Mobile applications can also boost efficiency in information sharing. Mobile telephony captures qualitative as well as quantitative advantages for data collection. Though this minimal form of political participation does not elicit direct financial benefits for the contributor, it rewards people with a sense of social-political freedom because it empowers citizens to voice their concerns and observations straight to the monitoring groups. Collection of public opinion via mobile telephony gives the citizen virtual but direct access to influential observance groups.[80] If these monitoring groups are legitimate and trusted, then civil society has the power to influence political arrangements, elicit good governance, and perhaps advance human capability.[81]

While the expansion of mobile telecommunications has been maneuvered for the collection of national data and has granted human capability to previously marginalized people in the form of political freedom, it has also been utilized to encourage citizen participation in political activities which ultimately increases political freedom as well. In the wake of Kenya's violently disputed 2007 elections, non-profit software company Ushahidi (which means testimony in Swahili) was launched to collect

[79] Etzo and Collender, "The Mobile Phone 'Revolution' in Africa: Rhetoric or Reality?" pg. 664.

[80] Hellstrom, Johan. "Mobile Phones for Good governance – Challenges and Way Forward." Drafted discussion paper, Stockholm University, pg. 2.

[81] Sen, *Development as Freedom,* pg. 53.

and document eyewitness reports of violence submitted by the people.[82] Ushahidi receives and maps out reports of election or other politically related violence on a website that is also available through a mobile application.[83] Ushahidi encourages political engagement among the people, brings attention to stories of violence and injustice, and provides the opportunity for once marginalized members of society to become involved in political activities. Such social activism organizations enhance the political freedoms of citizens by giving them a voice in public life where they can demand their civil rights and advance their human capability.[84]

Another way in which mobile telephony is used to encourage political participation among the people is to send texts to remind them of voting regulations, election dates, polling hours, and other relevant news.[85] As a result, the 2007 Kenyan election boasted better voter registration while the 2005 Ugandan election experienced better voter turn out.[86] Consequently, people feel empowered by participating in political activity, especially if others are encouraging them to do so. Access to information can heighten an individual's sense of political freedom and capability in the world.

[82] Etzo and Collender, "The Mobile Phone 'Revolution' in Africa: Rhetoric or Reality?" pg. 664.
[83] Ibid.
[84] Sen, *Development as Freedom,* pg. 77.
[85] Hellstrom, Johan. "Mobile Phones for Good governance – Challenges and Way Forward." Drafted discussion paper, Stockholm University, pg. 4.
[86] Ibid.

Broad Negative Impacts

As it has been discussed, the effects of mobile telephony are not all positive. There are broad negative and unintended consequences of the proliferation of mobile phone use. One way that the growth of mobile telecommunications has produced detrimental effects is the heightened marginalization of the rural "poorest of the poor," or otherwise known as the "fourth world."[87] This population is still excluded from the benefits of mobile telephony due to the barriers of cost and regulatory policy; thus, because of mobile telephony expansion, the gap between the poor and the poorest is wider than ever.[88] Neglecting to address the alienation of this group will only sustain their positions as non-consuming, unproductive, extraneous beings and perpetuate gaping inequality within countries.[89] Not only does this abandon any potential of the marginalized group to build their individual human capability, but it also impedes the nation as a whole from utilizing all of its capable workers to contribute economically. In one perspective, the expansion of mobile telephony is casting off a proportion of the population evermore. However, there is some hope in the fact that many mobile phone owners in sub-Saharan Africa share their devices and services with friends and family who free ride. For example, in Kenya it has been found that a third of mobile phone owners share their resource with friends and relatives.[90] In many sub-Saharan

[87] Etzo and Collender, "The Mobile Phone 'Revolution' in Africa: Rhetoric or Reality?" pg. 665.
[88] Ibid.
[89] Ibid.
[90] Aker and Mbiti, "Mobile Phones and Economic Development in Africa," pg. 9.

communities, mobile phones are viewed as common property and poorer households often share the use and costs with others.[91]

The inflation of mobile phone use has also attributed to the exacerbation of gender inequality. Perhaps due to cultural factors, women in poor sub-Saharan areas are especially prone to marginalized positions in society. In a very general sense, women in these communities have less access to education and financial opportunities, which further weakens their ability to access technological benefits like the mobile phone.[92] Hence, women are barred from reaping the benefits of mobile telecommunications while men are free to engage in activities such as economic pursuits, political engagement, and the purchase of a mobile phone. While the mobile technology paroxysm has contributed to the advancement of several human capabilities that serve as a protection from poverty, it has also exacerbated the situation of some others.

SECTION THREE: POTENTIAL FOR FURTHER POVERTY ALLEVIATION

Focus on Human Capability

In all three of the realms analyzed for the impact of mobile telecommunications, human capability is helped and human capability is diminished. The expansion of mobile telecommunications provides individuals with economic faculties like knowledge of business practices and access to banking, which in turn support and foster other elemental freedoms of human capability like political freedoms, social opportunities, transparency guarantees, and protective security. When another attribute such as social

[91] Ibid.
[92] Salomonsson, "Mobile Phones in HIV Prevention in Uganda," pg. 7.

opportunities is fortified, the effects ripple into the other freedoms as well. An examination of the growth of the mobile telecommunications industry reveals how all of the elemental freedoms of human capability are intertwined and independent. Thus, the positive effects of enriching an intrinsic freedom will diffuse to other freedoms, but the negative effects of undermining an intrinsic freedom can also diffuse to other freedoms. These freedoms can be cultivated with the support of development oriented initiatives and policies. So can equal opportunity, or the ability of all individuals to participate in community life.[93] In turn, the intrinsically important promotion of these freedoms as well as the instrumentally important generation of income can combat the capability deprivations that perpetuate poverty in individuals' lives.[94] However, plans of action and implementation need to be carefully considered in order to perceive the possibly damaging ramifications on human capability. Therefore, growth-facilitating policies for the mobile telecommunications industry need to be devised with development and human capability objectives in mind.

Broad Reform in Mobile Telephony Research

The expansion of mobile telecommunications has tremendous potential in advancing human capability and ultimately freeing the marginalized and poor. First and foremost, it is necessary to frame the discourse on mobile technology expansion around poverty and development issues in order to identify the key points of possible leverage in utilizing mobile telephony for the advancement of human capability.

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[93] Amartya Sen, *Conceptualizing and Measuring Poverty*, (United States: Stanford University Press, 2006), pg. 37

[94] Amartya Sen, *Development as Freedom*, (United States: , 2011), pg. 87.

It is crucial for research on mobile telecommunications to widen and deepen in scope to include poverty alleviation, human capability, and development issues in the discourse of mobile telephony. The research available covers a great deal of topics yet remains generalized, clumping countries together when analyzing a single facet of mobile telephony. For example, this sentence comes from a small paragraph that only grazes the topic of poverty: "Many people in Africa are still marginalized or excluded from accessing the benefits of mobile telephony because of barriers that include cost and the lack of adequate regulation and policy" purports that *many* people are marginalized and fails to delineate with quantitative data.[95] Researchers must conduct more case studies and in-depth investigations of specific countries, regions, industries, and demographics to enhance the reservoir of research. Another issue with available research is the inflation of the effects of the mobile telecommunications industry on national wealth and poverty, whether good or bad. It is the responsibility of scholars, researchers, and other members of academia to conduct detailed researches to avoid generalizations that prompt exaggerations. It is also imperative to refrain from solely focusing academic research on already prosperous communities well equipped with mobile telecommunications that can not only perpetuate exaggerations of prosperity but also disregard areas in need of mobile technology. Researchers should also collaborate with mobile service providers as well as local institutions to collect data

[95] Etzo and Collender, "The Mobile Phone 'Revolution' in Africa: Rhetoric or Reality?" pg. 665.

pertinent to poverty alleviation and development.[96] This way, research can be truly comprehensive and include varied perspectives.

Government Responsibility

In large part, it is up to national governments to prioritize social needs and elicit reform in infrastructure. Ghana, Nigeria, Tanzania, and Kenya are all developing or emerging countries that still lack comprehensive infrastructures for necessities like roads and electricity. The deprivation of access to these two infrastructures serve as serious barriers that block off the rural poor from entering the mobile telephony community. As it is with SEND's initiatives for rural Ghanaian farmers, the rural poor perceive mobile phones as essential in obtaining information, increasing communication, and ultimately escaping poverty. However, without electricity to charge their phones and sustain usage and without proper road networks to travel to markets, farmers cannot fully take advantage of the expansion of mobile telephony. As one farmer put it succinctly, "What use is the mobile phone if we have no electricity to charge our batteries?"[97] Governments need the pressure and perhaps financial assistance from the UN and its Millennial Development Goals to invest in such social needs.

In addition, the manipulation of market forces may be necessary to incentivize investment in areas lacking mobile coverage and electricity, especially poor rural communities. Currently, the UN Millennium Development Goals group is pushing for

[96] Aker and Mbiti, "Mobile Phones and Economic Development in Africa," pg. 229.
[97] Edward Kutsoati and Sarah Bartlett**,** "Texting TradeNet: What's the Price of Soya Beans?" AfricanLiberty.org. September 4, 2008. Accessed April 14, 2013. http://www.africanliberty.org/content/texting-tradenet-whats-price-soya-beans.

wider mobile broadband availability.[98] Scholars advocate for governments to open more mobile operators to increase competition and eliminate obstacles to foreign investments to ultimately drive mobile development.[99] Local organizations provide mobile-based services to reach out to poorer communities and provide access to information. Mobile telephony development will reach out to previously marginalized rural poor populations.

Replication

Finally, successful mobile telecommunications-based projects must be experimented with to consider the replication of those programs. Of course, there is the risk of applying a successful program to a community in a different country and it fails. But, if major commonalities can be identified and prove to be eliciting favorable outcomes, then standard organizational structures can be determined to ease program operations. Bozza, the mobile-based service that raises awareness of AIDS prevention and creates jobs, caters to the four separate countries of South Africa, Nigeria, Kenya, and Tanzania. Because mobile phones everywhere provide the same basic modes of communication, replication is possible for other mobile-based services other than the health care sector. Ideally, global institutions, national governments, and local groups need to cooperate and collaborate with the mobile telephony industry to meet all of these objectives.

[98] Deloitte, "Sub-Saharan Africa Mobile Observatory 2012," pg. 38.
[99] Etzo and Collender, "The Mobile Phone 'Revolution' in Africa: Rhetoric or Reality?" pg. 666.

SECTION FOUR: CONCLUSION

The projection of mobile penetration for 2016 is a reach of 75% of the sub-Saharan population and 700 million connections.[100] The growth that we are witnessing today will continue and the mobile technology industry will develop, diversify, and ultimately transform. On a worldwide scale, the expansion of mobile telecommunications will indicate nothing more than a healthy industry complete with bountiful investments, innovation, and increased efficiency. On a local individual level, the progress will be less obvious more so in rural poor communities. International institutions, national governments, and community-driven organizations must focus their attention on the potential for the mobile telephony industry to contribute to development initiatives as well as the absolute need for infrastructure reform. The challenge is for those entities to understand that the mobile telecommunications industry can support and implement development-centered policies that comprehensively target social, economic, and political growth. Mobile phones are direct, intimate, resourceful, and multifunctional tools for people in their everyday lives. This proximate relationship cannot help but foster human capability, but only if mobile technology policies are mindful of development and poverty alleviation objectives. Certainly, this cannot be done without changes in research focus, partnerships between international, national, local, and business entities, and perception of mobile technology as a tool for development and poverty relief.

[100] Deloitte, "Sub-Saharan Africa Mobile Observatory 2012," pg. 10.

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