

Full Length Research Paper

The impact of mobile phone and economic growth in developing countries

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The articulation of this paper is to examine key issues of a mobile phone facing sub-Saharan Africa to a country's technological progress and is capable of generating knowledge-driven economic growth, improve productivity and raise quality. The main objectives of this paper are considerable evidence that new forms of telecommunication can bring both macroeconomic benefits accruing to national economies and microeconomic benefits accruing to individuals, both in developed and developing countries. There is also some evidence that lower-income groups can benefit particularly from access to mobile phones, through improved work and business opportunities and productivity gains. The paper defines the mobile phones in less developed economies to be playing the same crucial role that fixed telephony played in the richer economies in the 1970s and 1980s. The purpose of this paper is to know how mobile phones transformed lives in low-income countries faster than ever imagined. The effect is particularly dramatic in rural areas of Sub-Saharan Africa, where mobile phones have often represented the first modern infrastructure of any kind. There is a long tradition of economic research on the impact of infrastructure investments and social overhead capital on economic growth. Studies have successfully measured the growth dividend of investment in telecommunications infrastructure in developed economies.

Key words: Mobile industry, technological progress and challenges, transforming lives.

INTRODUCTION

Developing countries, however, experience a low telecoms trap in which the lack of networks and access in many villages' increases costs and reduces opportunities because information is difficult to gather. In turn, the resulting low incomes restrict the ability to pay for infrastructure rollout. In the OECD economies, modern fixed-line networks took a long time to develop. Access to homes and firms requires that physical lines be built in a slow and expensive process. France, which had 8 fixed-line telephones per 100 populations (the 'penetration rate') in 1970, doubled this by 1976 and reached 30 main lines per 100 populations in 1980. Mobile phones are lower cost and far quicker to rollout than fixed-lines. In 1995, Morocco had 4 fixed-lines per 100 inhabitants after many years of slow investment and zero mobile phones per 100 inhabitants. In 2003, only eight years later, the mobile phone penetration rate in Morocco was 24, while fixed-line penetration had stagnated at its 1995 level (Röller and Waverman, 2001). The average fixed-line penetration rate of these 102 countries in 1995 was 2.5 phones per 100 populations and this level was achieved

after decades of investment. With the subsequent rapid growth of mobile phones in many, but not all, of these countries, the average penetration rate of mobile phones alone rose to eight per cent in 2003. In 22 of the 102 countries, mobile penetration reached double digits in 2003; and in 7 countries, Albania, Bosnia, Botswana, the Dominican Republic, Paraguay, the Philippines and Thailand, over one-quarter of the population had mobile phones in 2003.

The mobile phones in less developed economies are playing the same crucial role that fixed telephony played in the richer economies in the 1970s and 1980s. Many countries with under-developed fixed-line networks have achieved rapid mobile growth. Although, building a cell phone infrastructure for a given country is by no means inexpensive, it is relatively less costly to build cell towers than roll out land line connections to every home. It is not surprising that most developing countries have focused their efforts on building wireless infrastructure as a primary means of communication. In Africa for instance, cell phone penetration rates are approximately 21 versus

9% for land lines (Jasen, 2001). Governments in Africa and elsewhere made the construction of adequate cell phone infrastructure a priority. In several cases, they have performed partnerships with major carriers to facilitate the development of this infrastructure. While factors obstacles such as high taxes, in adequate availability of power and lack of geo-political stability, may hinder growth in some countries, there are numerous developing countries in which the environment is ripe for further cell phone infrastructure development (Figure 1). Carriers wishing to find new sources of growth have begun to reconsider developing countries. In the past, most wireless carriers chose not to do business in these countries due to inherent low margins. The average revenue per user (ARPU) was \$50 in developed countries versus 3 - \$7 in developing countries. It is difficult to sell a service plan for 39.99 (\$50+ with taxes) to a consumer that only makes \$100 per month. Markets in developing countries have continued to grow at double digit rates, some as high as 100% per year, and have penetration rates ranging from low double digits to 50%. Given these dynamics, several major carriers have decided to move into developing countries in a major way (Jason, 2001).

Developed economies by and large had fully articulated fixed-line networks in 1996. Even so, the addition of mobile networks had significant value-added in the developed world, that is, the value-added of mobility and the inclusion of disenfranchised consumers through pay-as-you-go plans are unavailable for fixed lines. The mobile telephony has also a positive and significant impact on economic growth. This impact may be twice as large in developing countries compared to the developed ones. In developing countries, it is found that the growth dividend is far larger because mobile phones provide, by and large, the main communications networks; hence, they supplant the information-gathering role of fixed-line systems. A developing country that had an average of 10 more mobile phones per 100 populations between 1996 and 2003 would have enjoyed per capita GDP growth that was 0.59% higher than an otherwise identical country (Röller and Waverman, 2001). Economists have long examined the importance of social overhead capital (SOC) to economic growth of any nation. Social overhead capital (SOC) is generally considered as expenditures on education, health services and public infrastructure such as: roads, ports, etc., but telecommunication infrastructure, whether publicly or privately funded, is a crucial element of social overhead capital (SOC). The story in Africa is different. McCormick (2002) showed that although Africa is home to 12 percent of the world's population, it has only 2% of the world's telephones. This growth rate is even more impressive when the cost of access is estimated. In sub-Saharan Africa, excluding South Africa, a phone connection costs an average of 20% of average per-capita income compared to 8% as the world's average and 1% for the industrialized world.

Recent figures indicate that the growth rate of cell phones in Africa exceeds 65%, one of the fastest in the world.

During the introductory phase, mobile phones diffused rapidly in high-income countries and widened the digital division between them and the developing countries (UNDP 2001). In recent years, mobile communications are experiencing higher growth rates in low-income countries. For instance, during 1995 - 2001, mobile subscribers in Africa registered a cumulative average growth rate (CAGR) of 82.1% compared to 47.8% of the world. As a result, Africa's share in the world mobile market increased from 0.7% in 1995 to 2.5% in 2001 (UNDP, 2001). During the same period, Asia's share in the world mobile market increased from 25 to 35% (ITU 2002). More importantly, a large proportion of the newly added mobile phones in developing countries are getting into the hands of relatively poor people (Economist, 1999).

AFRICA'S EXPERIENCE ON MOBILE PHONES

The poor in Africa tend to use public access facilities and share phones, so low tele-density figures can mask the extent to which the poor accesses telecommunications services. Research shows that in 'typical' rural districts of Africa, about 80% of households make regular use of phones. One of the key features driving growth in mobiles is that they are mobile and inherently suited to remote areas with poor infrastructure. In addition, the prepaid system of low denomination scratch cards is perfectly matched to the economic situation of many Africans and it is recognized that mobiles offer potentially cheap means of communicating, especially through the use of SMS and 'beeping'. It is important to consider constraints facing women in access to and use of mobile phones, but preliminary evidence indicates that the phone appears to be a gender neutral tool. It can be concluded from the above that phones (especially mobiles) are already part of African culture and are not just for the elite; but what about the future? The study acknowledges the difficulty in making predictions, that is, ten years ago it would be difficult to predict the current uptake of mobile phones in Africa. However, it is clear that mobile voice telephony will converge with other digital technology (for example, VoIP). Therefore, it seems reasonable to suggest that within ten years, the mobile phone will be able to access a range of data based services (for example, market and other agricultural information and financial services) using either voice or text. In 30 years, technology will permit every household in Africa to have access to a handheld device capable of being an all in one radio, television, camera, minicomputer (PDA) and phone. However, when the almost limitless uses to which these devices could be put are considered, the need to ask whether the poor will be involved and whether they will share in the benefits would arise (Scott et al., 2004).

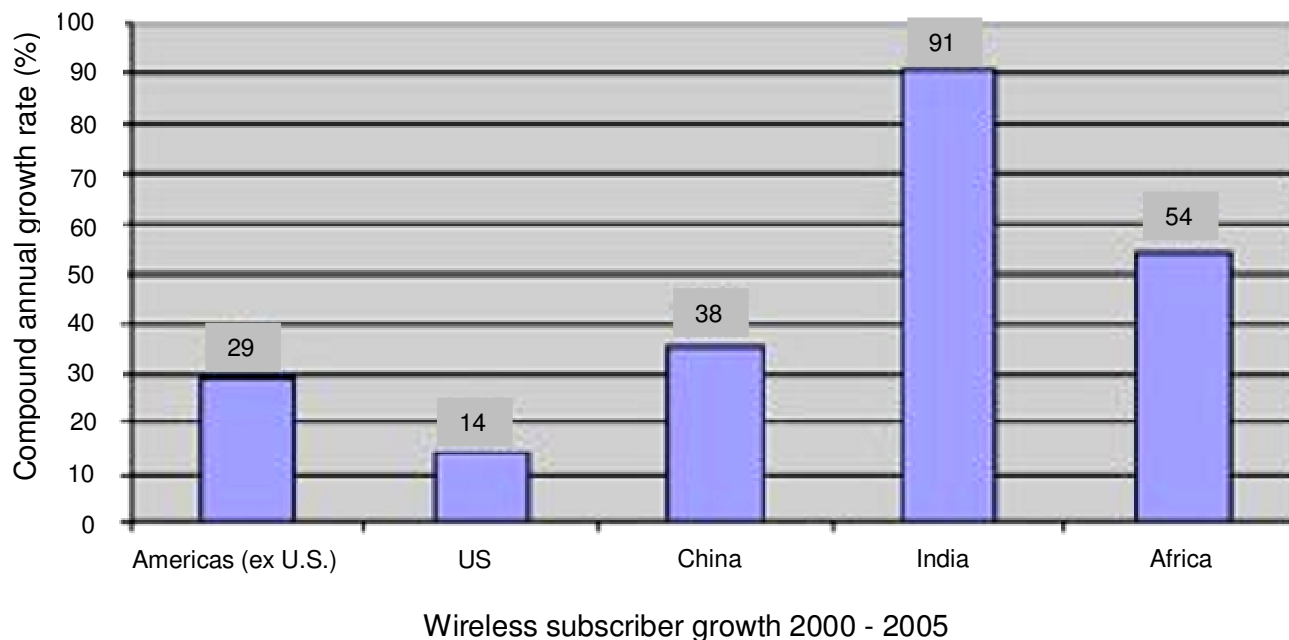


Figure 1. Maturation of cell phone markets in developing countries.

BENEFITS OF MOBILE COMMUNICATIONS

One of the important uses of mobile phones in developing countries has been in information search activities. Farmers and small business owners are utilizing the information gathered via mobile phones to eliminate or reduce the role of intermediaries in the value chain and to lower the risk of their profit margins being squeezed by larger firms or firms from developed countries. For example, mobile phones have enabled Bangladeshi farmers to find the proper prices of rice and vegetables. Similarly, groups of small farmers in remote areas of Côte d'Ivoire share mobile telephones so that they can follow hourly fluctuations in coffee and cocoa prices in the international market. Thanks to mobile phones, they can now choose the time to sell their crops when the world prices are in their favor. A few years ago, the only way to find out about the market trends was to go to the capital city and the deal making was largely based on oft-unreliable information from buyers (Lopez, 2000). Similarly, fishermen in India use mobile phones to get information about the price of fish at various accessible ports before making decisions about where to land their catch (Rai, 2001). Mobile data communication methods are enabling farmers to obtain and share information beyond just prices. In Costa Rica, small farmers in the field are employing HP handheld computers, equipped with simple icons, to interact with centralized databases that guide the farmers through the complex steps of growing certified organic coffee beans.

Mobile phones have enabled small business owners in developing countries to promote their products and

communicate with their customers effectively. In Johannesburg, South Africa, for instance, one can see many homemade signs in the streets with mobile phone numbers that offer services ranging from house painting to gardening (Economist, 1999). As Lopez (2000) observes, "huge billboard ads in Africa have made mobile phones as popular as Coca-Cola." Mobile phones have contributed to enhance the efficiency and competitiveness of small business owners. For instance, mobile phones have made taxis in Kampala, the Ugandan capital, more efficient. Similarly, tradesmen traveling on bicycles in Jamaica use mobile phones to communicate with their suppliers and customers (The World Bank, 2000b). The benefits discussed above can be realized in developing countries only when mobile phones are easily available at reasonable price and potential adopters are willing to use them. A number of contextual factors influence the availability of and willingness to use mobile phones. In some African countries, for example, although a mobile phone belongs to a person, it is regarded as a device for the community, because of the culture of sharing of tools (Lopez, 2000).

MOBILE PHONE: CREATING JOBS AND IMPROVING EVERYDAY LIFE

A former taxi driver, Mr. Mbaye, has run his kiosk for the past year and despite some concerns, finds that business is better than in his previous career (Jon Cronin, BBC, 2005). The reason for this is simple. Tanzania's three main mobile operators, Vodacom, Celtel and Mobitel,



Figure 2. Simu Ya, Tanzania.



Figure 3. Bekowe Skhakhane of Yanguye, South Africa, LaFraniere (New York Times, 2005).

offer something the country's older fixed-line company has long failed to supply, that is, a reliable telecoms service. Simu ya watu is one way of making access to phones easier in Tanzania (Figures 2 and 3). Africa is both the second largest and most populous continent on the planet with over 800 million people in 54 countries. In the last 30 years, Africa is the only continent that has experienced widespread growth in poverty. The cell phone benefits included communicating with distant family members, making it easier to find employment opportunities, having more options during emergency situations, enabling farmers to check prices in different markets before selling produce or traveling long distance and eventually allowing the quick and easy transfer of

funds. The recent growth in the African telecom market has not only benefited local economies, but has also generated significant amounts of revenue for mobile giants. Going after the African market is not a money-losing proposition for firms. According to the July 1, 2005 issue of *The Economist*, MTN (a South African mobile-phone operator with networks in Nigeria, Cameroon, Uganda, Rwanda and Swaziland) had an operating margin of around 50% outside South Africa (Rhett, 2005).

The investment in mobile phone, its infrastructure and derived services provide significant benefits to the economy. It is important for developing countries to have such technology and benefit from it in order to further their economic growth. Investing in telecommunication

technology continues to be the best hope for developing countries to accelerate their development process (Klaus, 2005), since the intensity of cell phone and telecommunication technology adoption, in general, is in itself significantly dependent on the level of economic development and competitiveness of nations (Wong, 2006). This paper addresses these issues to help understand the dynamics of this casual connection of telecommunication technology services that accelerates economic growth, which in turn, creates the demand for more telecommunication services.

First, income and purchasing power determine the level of investment in mobile sector as well as the economic sacrifice potential adopters can make to acquire mobile phones. Secondly, the contribution of high technology in the Gross Domestic Product (GDP) of countries determines the extent to which mobile sets are available or imported in developing countries. High technology contributes to a relatively high proportion of GDP in some developing countries such as China, Malaysia and Thailand and mobile sets are likely to be cheaper and easily available in these countries. Many developing countries do not produce mobile sets domestically. Tariff and non-tariff barriers often make mobile phones expensive and unavailable in such countries. Thirdly, the types of uses of mobile phones depend on the economic activities in the country. Mobile phones in developing countries, for instance, are being used in such activities as buying and selling stocks online, protecting maize farms from robbery and tracking world prices of agricultural products.

Fourthly, availability of related technologies and infrastructure plays an important role in the diffusion of mobile phones. For example, the operation of mobile phone is same as fixed phones and mobile networks can be connected to fixed networks. So, potential adopters are not required to learn new skills. Moreover, formation of a critical mass of cellular phones is not necessary if there are already a large number of fixed phone users (Wong, 2006).

MOBILE PHONES: REVITALIZING ECONOMIC GROWTH IN AFRICA

Information and communication technology, which is mainly found in developed countries, could become an engine for long-run economic growth in developing countries, as railways and electricity once were. Furthermore, telecommunications has a direct influence on productivity growth. It raises the efficiency of service providers and opens new markets by reducing distances. Telecommunications is a growing sector that creates new activity in itself, contributing to economic growth and employment creation. Mobile phones have rapidly overtaken fixed-line communications. They are the only economic indicator in which there has been catch-up between Africa and the developed world. In nations where literacy rates

are low and general infrastructure are scarce, mobile phone take-up has far exceeded that for the internet. In South Africa, people spend 10 to 15% of their income on mobile phones, compared to 5% in the developed world, which indicates that the poor find mobile services particularly valuable (Coyle, 2004). More than a quarter of businesses operators in Egypt say that they would not have been able to start up without mobile phones. Many say that cell phones increase profitability, despite calling costs.

The value of communications in the developing world is also different. Imagine that you are a painter living in a township near Johannesburg and you are in some way far from your potential clients or you are looking for work but the postal service is poor and there is no fixed-line phone; how does a potential employer contact you? A mobile phone provides you with a point of contact; it actually enables you to participate in the economic system (Figure 4). Similarly, if you live in a rural community and you need to go to the nearest town to shop for some particular goods, a mobile phone call could save you a relatively expensive return bus fare and the lengthy journey time, if the goods were out of stock. When other forms of communication are poor, whether roads or fixed-line telephones, the value of quality mobile communications is much greater. Most infrastructure investments can favorably affect the economy in several ways. It can reduce the cost of production, increases revenues and can increase employment through both direct and indirect effects (Alleman et al., 2002). Similar to other infrastructural investments, investing in telecommunication will increase the demand for the goods and services used in their production and increase total national output. Telecommunication infrastructure is also a little different from other infrastructure, as a determinant of economic growth because of the existence of network externalities, a phenomenon that increases the value of a service with increase in the number of users. As a result of this, the impact of telecom infrastructure on economic development is more pronounced as compared to other traditional infrastructure (Kim et al., 1997).

Mobile communications are experiencing faster growth rates in low-income countries, more than twice as fast, as in the high income countries in recent years. Low - and middle-income countries are therefore accounting for a rising share, now more than 20%, of the world's mobile market; but there is great variety between countries in mobile phone penetration and use. Surprisingly, given its extensive poverty, Africa has been the fastest-growing mobile market in the world during the past five years. The first cellular call in Africa was made in Zaire in 1987 (the operator was Telecel) (Coyle, 2004). Now, there are more than 52 million mobile users in the continent (compared to about 25 million fixed lines). In 19 African countries, mobiles account for at least three quarters of all telephones. Africa, as a whole, lags far behind richer regions of the world. Nevertheless, the rapid spread of mobile in so many of its countries is a remarkable



Figure 4. The Vodafone policy paper series • number 2 • March 2005 Africa: The impact of mobile phones.

phenomenon, especially in the context of their huge economic and social challenges. Morocco is a good example of the spread and impact of cell phones. In 1995, the Moroccan telecoms penetration rate was 4 fixed-lines per 100 people and zero mobile phones per 100 people. Only eight years later, mobile penetration alone in Morocco was 24 per 100 people, while fixed-line penetration stayed essentially the same.

On the average, there are now 60 mobile subscriptions for every 100 people in the world. In developing countries, the figure stands at 48, more than eight times the level of penetration in 2000. In Africa, average penetration stands at more than a third of the population and in North Africa, it is almost two-thirds. Gabon, the Seychelles and South Africa now boast of almost 100% penetration. Only five African countries, Burundi, Djibouti, Eritrea, Ethiopia and Somalia, still have a penetration of less than 10% per 100 inhabitants (Mail and Guardian, 2009). Uganda, the first African country to have more mobiles than fixed telephones, is cited as an example of cultural and economic transformation. Penetration has risen from 0.2% in 1995 to 23% in 2008, with operators making huge investments in infrastructure, particularly in rural areas. Given their low incomes, only about a quarter of Ugandans have a mobile subscription, but street vendors offer mobile access on a per-call basis. They also invite those without access to electricity to charge their phones using car batteries.

INTERESTING FACTS

Nigeria, South Africa and Egypt are the fastest growing markets. Africa has become the fastest growing mobile market in the world with mobile penetration in the region ranging from 10 to 30%. Pre-paid subscriptions account for nearly 95 percent of total mobile subscriptions in the region. Most of the mobile operators are home-grown. In 2005, the continent's seven largest investors controlled 53% of the African mobile market. Across most of Africa, SMS is likely to be the only non-voice value-added service to gain mass market popularity in the immediate future. East Africans pay taxes of between 25 and 30% on mobile phone services, compared with an average of 17% across Africa. African states with less than 600,000 subscribers include Burundi, Cape Verde, Central African Republic, (Union of the) Comoros, Djibouti, Equatorial Guinea, Eritrea, (The) Gambia, Lesotho, Liberia, Mayotte, Sao Tome and Principe, Seychelles, Somalia, Swaziland and Rwanda. There are (or will be) a staggering 11 mobile phone operators in Nigeria, with 4 in Kenya and South Africa and 3 in Egypt and Morocco. "MTN dominates the African market with over 73.9 million subscribers in the region as of 4Q 2007 followed by Vodacom (33.4 million), Orascom (32.4 million), Zain (30.6 million) and Orange (27.7 million), respectively" (Chris, 2007).

CONCLUSION

Social participation increasingly relies on technologies over and above traditional fixed-line and standard telecommunication services, which have been the focus of universal service obligations and affordability measures. This is also an important time for the wider telecommunications industry, the community, government and the regulators to take up and debate more comprehensive policy measures in telecommunications affordability. This would provide an opportunity for in-depth discussion of the areas of need of low-income consumers, such as mobiles and broadband, and it would also provide the opportunity to discuss how affordability policy should be structured to ensure all consumers are better included. Characteristics of mobile phones such as no requirement of electricity and geographical flexibility make these a more appropriate technology for developing countries. Recent innovations in pricing such as prepaid pricing (thus, eliminating credit checks, billing, etc.) have made mobile phones more attractive and opening possibilities for faster diffusion of mobile phones. Hence, a developing economy may have to implement the strategy in its own form considering the characteristics of mobile technology as well as the prevailing local conditions. Given that there are already about 400,000 subscribers and the number is growing at an exponential rate, providing mobile telecom products and services in the local language would help accelerate mobile diffusion and at the same time boost the revenues of manufacturers and service providers.

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