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WHAT ARE THE ECONOMIC AND SOCIAL IMPACTS OF THE MOBILE PHONE SECTOR IN DEVELOPING COUNTRIES?

Should mobile telephony be promoted in low-income countries? *Via* which mechanisms can it have a positive impact on the development of these countries? This issue compares experts' views on the topic.

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Editorial

By Luc Rigouzzo, Chief Executive Officer of Proparco

This issue of the magazine Private Sector and Development is being published at a time when Haiti has been struck by a powerful earthquake which has thrown the country and its capital, Port-au-Prince, into chaos. This disaster carries serious consequences for a country which remains one of the most vulnerable in the world, despite efforts to help it emerge. Thanks to an evaluation study conducted a few months ago, we had planned to highlight - in this issue of the magazine dedicated to the developmental impacts of the mobile phone sector - the encouraging lessons to be learned from the development of telecommunications on the Island. We have decided to go ahead with the publication of this article because we see it as an example that should be promoted and a sign of hope and encouragement to send to Haiti.

In most South countries, the mobile phone sector has developed – under the impetus and supervision of public regulatory authorities – via the private sector. A considerable number of developing countries have seen a remarkably rapid establishment of mobile phone networks; for example, over the past four years Africa has recorded an average annual growth rate in the number of subscribers of over 40%. This success – in a context where the share of available income for these new services would appear limited – demonstrates that the right model is being implemented and, more generally, it bears witness to the dynamism of Africa's domestic market.

I am consequently very pleased to share this fourth issue of Private Sector and Development with you. I would like to extend my warmest thanks to each of the authors for their contributions which *provide readers with a summary of the various* impacts that the development of the mobile phone sector has had in recent years. First, they estimate its macroeconomic impact by taking a look at the link between the development of this service and GDP growth in the relevant countries. Its microeconomic impact can then also be measured by assessing the extent to which the mobile phone sector facilitates interactions between economic agents, and contributes to developing incomegenerating activities. Finally, the mobile phone sector has unquestionably positive social impacts: it increases social ties, makes certain households less vulnerable, gives access to new services such as mobile banking... Unfortunately, as we can see in some articles, it is not free of negative effects, which are specifically related to the weight of phone expenditures on household budgets. Moreover, some of the poorest populations particularly in rural areas – continue to be deprived of access to the network.

Many challenges remain. Operators need to *reinforce customer loyalty and provide more* services with high added value. For public authorities and users, population coverage needs to be extended and the cost of access to the service needs to come down. Finally, international donors must play a role in ensuring there is a balance between players, they must help reduce the negative effects of the mobile phone sector and at the same time – make sure its developmental impacts are maximized. They must also provide their financial support to the expansion of broadband connections in order to give easier access to Internet, which would appear to be an even more important factor for economic growth in developing countries than the mobile phone itself.

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WHAT ARE THE ECONOMIC AND SOCIAL IMPACTS OF THE MOBILE PHONE SECTOR IN DEVELOPING COUNTRIES?

AfricaNext

Investment Research is an advisory firm focused on the media and technology sectors in Africa. Guy Zibi, as founder and CEO of AfricaNext, has been in the very best position to observe the evolution of these sectors. In this article, he provides a clear overview of the key drivers of the mobile phone sector in the last years, and presents the main challenges faced by the market and mobile phone operators.

The African Mobile Phone Market: Beyond the Boom Phase, Between the Promise and Uncertainty of Maturity

The growth of African mobile markets over the past decade has been dramatic and well documented. Its impact has been far-reaching, directly through large capital investments and the emergence of large conglomerates, more widely through a positive influence on business practices, overall perception of African business investments and as a transformative technology platform for other industries. This article provides an overview of the performance of the mobile industry in Africa and outlines the main drivers behind the sector's performance, as well as its overall characteristics and challenges. It also offers some insights into the wider impact of the mobile sector and provides the outlook for the industry in the face of deep economic, regulatory and technological change.

By Guy Zibi, Managing Director of AfricaNext

Guy Zibi

Guy Zibi is Founder and Managing Director with AfricaNext Investment Research, an independent consultancy firm focused on telecommunication economics and due diligence analysis in the African TMT (Technology, Media and Telecommunication) space. Mr. Zibi has more than a decade-long experience in researching and analyzing the business of technology in developed and developing economies. In prior years, he also acted as Director of Pyramid Research's Communications Media and Technology (CMT) practice, Director of the Pyramid's EMEA research practice, and Africa analyst with the Economist Intelligence Unit.

y all accounts the growth of the African mobile industry over the past decade has been remarkable. At the end of 2008, the total number of mobile subscriptions in Africa reached about 375 million, up from 280 million in 2007 (AfricaNext, 2009). The overall subscription base is nearly three times larger than it was in 2005 and has grown by a compound annual average rate around 40% over the 2005-2008 period (see Figure 1). Where the pattern of growth was often confined to a small sample of countries, it is now widespread; in 2008, and two thirds of African markets have a mobile penetration higher than 30% (AfricaNext, 2009). A few African markets have broken the once mythical 100% mobile penetration threshold, and projections of similarly high penetration levels across the board are no longer quite outlandish (see Figure 2).

As the subscriber base has expanded, so has the market's revenue performance. Revenues generated from mobile services in Africa reached around USD 45 billion in 2008, up 20% from 2007, and revenue growth is expected to remain at least in the high single to low double digit range over the next five years (AfricaNext, 2009). Even as overall economic growth slowed in 2009, the African mobile market has continued to expand, seemingly impervious to the surrounding global economic downturn and a tightening in consumer spending.

Ten African markets generate more than USD 1 billion in mobile services revenue each year, including such large economies as South Africa and Nigeria, but also markets such as Cote-d'Ivoire and Angola. Six markets fall in the USD 500 million-1 billion revenue range and nine markets generate between USD 200 million and USD 500 million, a substantial opportunity for the private and the public sectors.

The explanatory factors of the African mobile industry performances

Such solid growth (see Figure 1) has been the result of an effective blend of competition-oriented regulation, technology deployments and sharp marketing acumen. Once dominated by state-owned monopolies, African telecommunications markets have become among the most competitive in the world, as regulators awarded more licenses and widened the service scope of indivi-dual licenses. The average number of operators per market has risen to 3.6 in 2009 from around 2.5 in 2005. Tanzania was expected to have around eight operators by the end of 2009; Cote-d'Ivoire and Ghana both have six players and even ostensibly small markets such as Rwanda will have at least three operators. While the increased competition has raised persistent questions about the financial viability of new entrants, it has raised the level of competitive ...

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... intensity as operators cut prices, expand networks and develop new offerings to protect or gain market share.

Technology improvements have also been a major driver of growth. Advances in spectral efficiency and network optimization tools, the deployment of IP-based solutions and more cost-efficient network configurations allowed operators to increase network capacity at a relatively marginal cost and lower overall network operating expenses. The sharp decline in the average cost of a mobile base station (BTS) similarly allowed new players to penetrate markets at a faster clip than was previously possible; technology enhancements made services more affordable and accessible. Prepaid platforms were refined, allowing customers to purchase airtime¹ at a price as low as USD 0.25 per minute, share airtime and even buy airtime on credit. Handset prices were slashed, with the introduction of ultra low cost handsets, bringing prices to as low as USD 15 per unit. Another key growth catalyst has been marketing. Borrowing a page from the brewery industry and other consumer goods sectors, mobile operators developed an aggressive, omnipresent brand of marketing. Mobile services are highly visible, and airtime packages are increasingly innovative and targeted towards specific consumer sub-segments.

Main characteristics of the mobile industry in Africa

The African mobile subscriber base has a number of distinguishing characteristics. It is predominantly prepaid (99% of the customer base in most markets), with the prepaid platform more of a preferred billing model than it is an indicator income level. Subscriber churn is high; depending on the market, 5% to 10% of all subscriptions are disconnected each month, though this has not represented an insurmountable obstacle to operator ability to generate consistent cash flows. Furthermore, the market is still voice-centric, with voice services accounting for 90% of revenue or more; large-scale data adoption remains limited to SMS. Nonetheless, non-SMS mobile data adoption is picking up. Nearly 4% of mobile users access the Internet through mobile networks ...



Figure 1: Evolution of Africa's mobile subscriber base, 2005-2013

*CAGR stand for Compound Annual Growth Rate; Source: AfricaNext, 2009

Figure 2: Distribution of mobile penetration of the population in Africa, 2008 and 2013 (forecasts)



How to read the graph: out of the 39 countries in the sample, only 14 (i.e. just over 1/3rd) had a penetration rate above 50% (7 between 50 and 75%, 7 above 75%). This number is expected to increase to 27 (i.e. 70% of the countries) by 2013, with only 10% of the countries having a penetration rate below 30%. Source: AfricaNext, 2009

¹ The airtime represents the amount of time a subscriber spends using his/her mobile phone.

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... (10% in the larger markets), and mobility already accounts for about 35% of an admittedly small broadband subscription base (AfricaNext, 2008).

Key players: from North-South investments to South-South flows

In a business largely defined by scale, multi-country players dominate the African mobile marketplace. To reach the cost and price sweet spots that make the business attractive and allow to raise service penetration levels, operators need to generate economies of scale; yet, few markets are large enough to provide such scale. In turn, operators look to build it through multi-country presence, a model that has led to the emergence of such African conglomerates as MTN South Africa, the Zain Africa Group or Orange Africa.

Today, these pan-African operations account for around 72% of the African subscriber base, nearly 80% of generated revenue and almost USD 0.75 of each dollar invested in African mobile markets (AfricaNext, 2009). Their share of operating profit is more difficult to estimate, but is higher than their share of revenue.

Besides the core group of pan-African operators described above, a new breed of cross-country players has emerged over the past three years, a wave of South-South investment flows that complemented (and in some cases replaced) traditional North-South foreign investment. The latest wave of pan-African investment has been Middle Eastern (Zain, Etisalat, Warid), North African (Maroc Telecom, Lap Green Libya) and more recently, Indian (Tata, Essar, Reliance). It has been driven by a mix of high oil prices, the increased attraction of the African telecoms space for foreign investors, and closer relationships between African governments and those in other emerging markets, in furtherance of "South-South Cooperation".

Overall market impact

The impact of the African mobile boom on the larger economy has been far-reaching. In many markets, the telecoms sector has become one of the main sources of foreign direct investment, often only supplanted by the oil and gas sector.

Telecoms revenue and expenditures now contribute a combined 5% to as much as 10% of GDP in many countries. African mobile network capital expenditure reached around USD 12.5 billion in 2008, and investment in communications has reached around 5-6% of total investment spending on the continent. In addition, the mobile sector has had a notable contribution to employment, directly, and indirectly through the establishment of extensive networks of dealers, sub-dealers and sub-contractors. In Nigeria for example, MTN's distribution network includes more than 10,000 sub-dealers, 30,000 sub-sub-dealers and more than 50,000 retail points and street hawkers (Farroukh, 2006).

Just as significant has been the impact of mobile networks on other economic sectors. Financial institutions, for example, are increasingly using mobile banking to expand the reach of their offering. Mobile operators themselves have expanded the financial services field with new applications such as M-PESA, Safaricom Kenya's popular money transfer service. The mobile platform is similarly becoming a favorite tool to optimize the economic potential of urban and rural areas. In Uganda for example, MTN Uganda launched a service combining its mobile network with the Google platform allowing end-users to have access to basic, localized, and actionable information through short message services (SMS).

Challenges and outlook

For all the achievements of the African mobile industry, the outlook is as uncertain as it is promising. While the number of subscribers continues to grow, marginal revenue per subscriber has declined precipitously, reaching less than USD 5 per month in many markets. This has redefined the traditional parameters of telecoms profitability (for example reducing the reliance on average revenue per user) and compelled operators to optimize their models to remain viable. Profitability levels remain low outside of the top tier operator group, as the business undergoes a dramatic transformation from premium, value-based models to the scale-focused approaches more typical of commodity businesses. ...

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... African markets are also challenging traditional paradigms of mobile profitability analysis; for example, average revenue per user (ARPU) has long been one of the most popular indicators of operator performance. This is largely the outcome of convenience; it is a relatively easy concept to grasp and does have some value as an indicator of revenue generation. In African markets however, ARPU has emerged as a poor indicator of operator performance- that is once it falls below USD 10. As illustrated below (Figure 3), many African operators are generating high margins despite ARPU levels that are considered low; to date, market share and capital expenditure levels have emerged as the best indicators of profitability.

The African mobile model, long built on the spending power of high end consumer segments and urban areas, is now about building volumes and driving profits through scale efficiencies and the sheer power of massive numbers. Research conducted in a sample of 35 African markets indicates that operating expenses are growing faster than revenues, and that at least a third of all African mobile operators are not profitable on a net income basis. Capital requirements are higher, with the cost of mobile licenses on the rise and the need to build scale necessitating increased investments. Intense competition has raised concerns of increased negative returns and long term consolidation.

With these challenges have come a new set of opportunities, for the mobile industry is now seeking to achieve for the Internet market what it did for voice telephony. The obstacles are numerous; limited infrastructure in key portions of the Internet network value chain; high cost of bandwidth and customer equipment, low literacy levels and small addressable markets. And yet the opportunity carries this perennially unique African blend of highly promising potential and often uncertain returns, setting the stage for the next phase of mobile market expansion on the continent.

Figure 3: African mobile ERPU vs Ebitda margin*



*Based on data for FY2008 or FY2008/09; Source: AfricaNext, 2009

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Private Sector

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WHAT ARE THE ECONOMIC AND SOCIAL IMPACTS OF THE MOBILE PHONE SECTOR IN DEVELOPING COUNTRIES?

The World Bank

Group is the largest multilateral investor in ICTs in developing countries. Over the past five years, the Group has supported this sector in over 80 countries for a total amount of USD 3 billion. In this article, Christine Qiang, senior economist at the World Bank, makes a review of the strong impact of ICT on GDP growth, and insists on how important competition is for the sector to pursue its development.

Mobile Telephony: A Transformational Tool for Growth and Development

The past 15 years have brought an unprecedented increase in access to telephone services in developing countries. This growth has been driven primarily by wireless technologies. Mobile phones have made a bigger difference to the lives of more people, more quickly, than any previous technology. They have spread the fastest and have become the single most transformative tool for development. A recent World Bank study of 120 countries shows that for every 10 percentage point increase in the penetration of mobile phones, there is an increase in economic growth of 0.8 percentage points in developing countries. The growth impact of mobile telephony is substantially higher in developing countries than in developed ones.

By Christine Zhen-Wei Qiang, Lead Economist at the World Bank

The past 15 years have brought an unprecedented increase in access to telephone services. This growth has been driven primarily by wireless technologies and the liberalization of telecommunications markets, which allowed for faster and cheaper rollout of mobile networks.

Christine Zhen-Wei Qiang World Bank

Ms. Qiang is a lead economist at the Policy Division of the Global ICT Department of the World Bank Group. She manages the Information and Communications for Development flagship reports. Her main responsibilities include overseeing the World Bank's analytical work on ICT policies, economics, and impact analysis, as well as leading ICT operations and policy dialog in countries in Asia. She has published over 20 journal articles, book chapters, and reports on ICT and development, economic growth, and productivity. She holds a PhD in Economics and a M.S.E. in Computer Science and Engineering from the Johns Hopkins University. The total number of mobile phones in the world surpassed the number of fixed-line telephones in 2002; by the end of 2008, there were an estimated four billion mobile phones globally (Wireless Intelligence, 2008)¹. The proportion of mobile phone subscriptions in developing countries increased from about 30% of the world total in 2000 to more than 50% in 2004 - and to almost 70% in 2007.

Mobile spread: no longer a luxury

No technology has ever spread faster around the world (The Economist, 2008a). The introduction of competition in the mobile telephony market has often led to an immediate growth of mobile penetration (Figure 1). Countries that have taken decisive steps to establish independent regulators and foster competition have seen notable improvements in sector performance. In some cases, the announcement of a plan to issue a new license has been effective in triggering growth, encouraging the existing mobile phone operator to improve service, reduce prices, and increase market penetration before the new entrant started operations.

In recent years, steep price reductions (Figure 2), driven by technological advances, market growth, and increased competition, have contributed to the rapid expansion in mobile phone use in many countries. Increased use of prepaid services allows mobile customers to make payments in small amounts instead of having to commit to fixed monthly subscriptions. For those who could not afford their own handsets, small loans were made available, mainly to the rural poor, to enable them to buy a mobile handset, an antenna and a large battery. This gave enterprising individuals an opportunity to rent phones to other villagers and charge for calls (The Economist, 2009). Furthermore, prepaid cards, often available in small denominations, enable even lowincome consumers to have access to mobile communications, leading to higher penetration rates in poor and rural areas.

The strong growth impact

In the past few years, several macroeconomic studies have suggested a link between mobile phones and economic growth (The Economist, 2009). Sridhar and Sridhar (2004) investigate the relationship between telecommunications and the economic growth using data from 28 developing countries. The study finds that there is a positive impact of fixed lines and a significant impact of mobile phone penetration on national output. The impact of telecommunications penetration on total output is found to be significantly higher for developing countries than for OECD countries.

Waverman *et alii* (2005) have found that mobile telephony has a positive and significant impact on economic growth. An extra 10 mobile phones per 100 people in a typical developing country added 0.6 percentage points of growth in GDP *per capita*, and this impact is about twice as large in deve-loping countries than in developed ...

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... countries. The results concur with the theory that 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. Mobile phones substitute for fixed lines in poor countries, but complement fixed lines in rich countries, implying that they have a stronger growth impact in poor countries.

Lee *et alii* (2009) examine the effect of mobile phones on economic growth in Sub-Saharan Africa where a marked asymmetry has been observed between fixed line penetration and mobile telecommunications expansion (in favor of the latter). The findings show that mobile cellular phone expansion is an important determinant of the economic growth rate in Sub-Saharan Africa. The contribution of mobile cellular phones to economic growth has been growing in the region, and the marginal impact of mobile telecommunication services is even greater in areas where fixed-line phones are rare.

Recent World Bank study

Recently, the World Bank conducted a new analysis to test the impact of telecommunications penetration on economic growth rates at country-level. According to this analysis of 120 countries, for every 10 percentage point increase in the penetration of mobile phones, there is an increase in economic growth of 0.81 percentage points in developing countries, *versus* 0.60 percentage points in developed countries (Qiang, 2009). This growth effect of the mobile phones is higher than that of fixed-line phones, but less than internet access or broadband (Figure 3).

The study also found that all information and communications technologies promote growth more effectively in developing countries than in developed ones. This is because telecommunications services help improve the functioning of the markets, reduce transaction costs and increase productivity through better management in ...

Figure 1 : Mobile telephony penetration before and after the introduction of competition



Year 0 indicates the year of entry of a second mobile operator. Source: World Bank, 2009

Figure 2 : Average annual change in price of mobile phone services in various countries, 2004-06



Source: World Bank, 2009

Figure 3 : Growth effects of information and communication technologies



The y axis represents the percentage point increase in economic growth per 10 percentage point increase in telecommunications penetration. Source: Qiang, 2009

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... both the public and private sectors. These issues were more acute in developing economies than in developed ones. Therefore, developing countries gain more by resolving some of them through better access to telecommunications (Qiang, 2009).

With the rapid development of wireless broadband, mobile communications are evolving from simple voice communication services and text messaging to a more sophisticated offering with a wide range of applications in locations where conventional services are not available. "Smart" wireless phones, for example, now allow users to also browse the Internet, download music, and access information services.

This opportunity is especially promising considering how inadequate infrastructure led the developing world to miss out on much of the initial web revolution (The Economist, 2008b), and that access to the Internet can provide an even bigger boost to economic growth than access to mobile phones (Qiang, 2009). Broadband Internet, wireless and fixed, is becoming a service of general economic interest—by enhancing the knowledge, skills, and networks of individuals; raising private sector productivity; and increasing community competitiveness. It also plays an essential role as an enabling technology in increasing investment payoffs in other sectors, transforming research and development, facilitating trade in services and globalization, and improving public services to enhance national business environment and competitiveness (Qiang and Rossotto, 2009). •

¹ It is important, nevertheless, to note that the sale of 4 billion mobile phones worldwide implies far fewer than 4 billion individual users. The phenomenon of multiple mobile phone ownership is growing in many economies, including some in Africa. As evidence of this trend, penetration rates for mobile phones have risen to more than 100% in some markets. On the other hand, shared usage of mobile phones in rural areas of developing countries is also growing, suggesting that the footprint of mobile phone coverage is wider than for other ICT services.

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Private Sector @ Development

WHAT ARE THE ECONOMIC AND SOCIAL IMPACTS OF THE MOBILE PHONE SECTOR IN DEVELOPING COUNTRIES?

After a PhD in agricultural economics from the University of Berkeley, Jenny C. Aker focuses on the impact of ICTs on agro-foods markets in developing (performance and behavior of players). In this article, the author, based on the example of the cereals market in Niger, explains how the use of mobile phones - by reducing transport costs and correcting information asymmetry – has promoted harmonization, reduced prices and increased profits for traders

Jenny C. Aker Accession Center for Global Development

Jenny C. Aker is currently a post-doctoral fellow at the Center for Global Development (CGD) and Assistant Professor of Development Economics at the faculty of Tufts University. She received her Ph.D. in Agricultural Economics at the University of California-Berkeley. Ms. Aker's research agenda assesses the impact of agro-food market performance on producer and consumer welfare in Sub-Saharan Africa, with a specific focus on the impact of information (technology) on grain price dispersion, market actors' behavior and welfare in Niger.

Mobile Phones, Markets and Firms in Sub-Saharan Africa

In Sub-Saharan Africa, the use of mobile phones has positive impacts on the way local consumer goods markets operate. Indeed, a study conducted in Niger shows that mobile phones help reduce costs and give traders access to a wider number of markets. This leads to a harmonization and reduction in prices that is often to the consumer's advantage. These results appear to be in line with those obtained in other developing countries. They consequently make it possible to learn some lessons that can enhance the impact of information technologies on economic development.

By Jenny C. Aker, Assistant Professor of Economics at Tufts University and Post-Doctoral Fellow at the Center for Global Development

frica has some of the lowest levels of infrastructure investment in the world. Merely 29% of the continent's roads are paved, barely a quarter of the population has access to electricity and there are less than three landlines available per 100 people (Ramachandran, 2008; World Bank, 2009). Contrasting with these limited investments in power, roads and landlines, access to and use of mobile telephony in Africa has increased dramatically over the past decade. Mobile phone subscriptions increased by 49% per year in Africa between 2002 and 2007, as compared with 17% per year in Europe, and the number of mobile phones in Sub-Saharan Africa now outstrips available landlines by a factor of ten to one (ITU, 2008).

The potential poverty alleviation benefits of mobile phones have been widely touted by policymakers, the popular press and the private sector. In 2008, for example, *The Economist* explained, "A device that was a yuppie toy not so long ago has now become a potent force for economic development in the world's poorest countries" (The Economist, 2008). An emerging body of research suggests that this might indeed be the case, as mobile phones improve households' and firms' access to information, thereby making markets more efficient and improving welfare.

The effects of mobile telephony on market inefficiencies in Niger

Niger's 12 million people had access to a mere 20,000 landlines – about 2 landlines per 1000 people – when its first mobile phone network was introduced in 2001. Over the following seven years, mobile phone services became available throughout the country's main population centres. By 2008, the number of mobile phone subscribers had reached 1.7 million, representing 13% of the country's population (Wireless Intelligence, 2008).

With an estimated 85% of its population living on less than USD 2 per day, Niger is one of the poorest countries in the world. The majority of the population consists of rural subsistence farmers, who depend on rainfed agriculture as their main source of income. Grains are dietary staples, accounting for over 75% of rural households' caloric consumption. These commodities are transported from the farm to the consumer through an extensive network of weekly markets. The transaction chain starts with the farmers, who sell the grains they produce to intermediaries. In turn, these intermediaries sell directly to wholesalers in local markets. Wholesalers are the main agents of inter-regional trade, selling agricultural produce to other wholesalers, retailers or consumers. With only one growing season per year (October), traders have to rely on imports of grain from neighboring countries (Benin, Burkina Faso, Mali and Nigeria) in April, once the local supply is depleted. The density of grain markets varies considerably by geographic region, with inter-market distances ranging from 10 km to over 900 km.

Economic theory has long established that information is a crucial factor in ensuring the efficiency of markets. Such information, however, also has to be freely accessible and symmetrical (*i.e.* everyone should have equal access to information). In low-income countries such as Niger, however, this is rarely the case: searching for information can be costly. As grain markets take ...

Mobile Phones, Markets and Firms in Sub-Saharan Africa

By Jenny C. Aker, *Assistant Professor of Economics at Tufts University and Post-Doctoral Fellowat the Center for Global Development*

... place only once a week, grain traders and farmers have historically traveled long distances to markets to obtain price information. This not only involves the cost of travel, but also the opportunity cost incurred by time spent on the road rather than in a productive capacity. The arrival of mobile phones in Niger introduced a new technology that significantly reduced the cost of obtaining price information compared with traditional search mechanisms. In theory, then, mobile phones should have reduced traders' search costs, thereby facilitating their search for market information.

The introduction of mobile phone coverage in Niger between 2001 and 2006 has coincided with a reduction of grain price dispersion of a minimum of 10%, suggesting that markets were approaching the Law of One Price (Aker 2008)¹. Moreover, mobile phone coverage was associated with a 12% reduction in the intra-annual variation of grain prices (Aker, 2008). Mobile phones had a greater impact on price dispersion for markets where travel costs were higher, namely those that are farther away and for those that are linked by poor-quality roads. This effect was stronger over time: the reduction in inter-market price dispersion increased as a higher percentage of markets had mobile phone coverage.

Cells for grain sellers

Why would mobile phones lead to a reduction in price differences across markets? Since mobile phones reduced traders' search costs by 50%, they were able to obtain more information. Grain traders operating in mobile phone markets searched in 26% more markets as compared to their nonmobile phone counterparts, and increased the number of market contacts by 33%. In addition, traders in cell phone markets sold in 22% more markets compared to their non-mobile phone counterparts. These figures suggest that traders with access to mobile phones could improve their ability to respond to surpluses and shortages, allocating grains more efficiently across markets and reducing price volatility. Mobile phones were associated with an increase in traders' profits, as traders decreased their costs and increased the prices received for their goods.

The evidence also suggests that traders were not the only ones to benefit from mobile phones. During the same period, mobile phones were also associated with a 3.5% overall reduction in average consumer grain prices in Niger². All other factors being equal, this would have enabled rural households to purchase an additional 5-10 days' worth of grain per year. This is significant in a country such as Niger, where persistent food crises are associated with higher food prices. During the 2005 food crisis, the presence of a functioning mobile phone base station was associated with a CFA 9.6 per kg reduction in consumer prices³. As the mean price of grain in non mobile phone markets was CFA 212 per kg (USD 0.50 per kg), this implies that grain prices in cell phone markets were 4.5% lower.

Evidence beyond Niger

While rigorous empirical studies on the impacts of mobile phones remain limited, there is increasing evidence of their effects on markets and wellbeing at the micro-level in low-income countries. In his study on fish markets in India, Jensen (2007) found that the expansion of mobile phone coverage led to a significant reduction in price dispersion across markets, as well as a decline in waste. The results of the study also suggested that there were important welfare improvements for both fishermen and consumers; fishermen's profits increased by 8% and consumer prices declined by 4% More recently, Muto and Yamano (2009) studied the impact of mobile phones on farmers' market participation in Uganda. They found that mobile phone coverage was associated with an increase in the probability of market participation for banana farmers. And finally, Klonner and Nolan (2009) researched the impact of mobile phone coverage on labor force outcomes in South Africa, finding that the introduction of mobile phone coverage increased employment by 15 percentage points, with most of the impact due to increased employment by women.

The way ahead

Governments, donors, mobile phone companies and non-governmental organizations are increasingly aware of the potential of information technology in achieving development goals in a variety of sectors. In response to this, there has been a proliferation of mobile-phone based services and products, as well as mobile phone-based development projects.

Does information technology promote economic development in Sub-Saharan Africa? How can it be used to better contribute to economic growth and poverty reduction? Evidence from Niger and elsewhere points to the following:

• Access to information is crucial for ensuring that farmers, traders and consumers can engage in optimal arbitrage – in other words, buying and ...

¹ The law of one price is an economic theory that states that in an efficient market. identical goods should cost the same (minus transport costs). ² While this seems counterintuitive, more information enabled traders to move grains from high to lowsupply areas, thereby reducing the intra-annual of variation and the mean. However, unless overall supply increased, this implies that some consumers were better off, whereas others were worse off.

³ Niger experienced a severe food crisis in 2005. Grain expenses represented 27% of per capita income, and were 8% higher in food crisis regions as compared to non-crisis regions (Aker 2008).

Mobile Phones, Markets and Firms in Sub-Saharan Africa

By Jenny C. Aker, *Assistant Professor of Economics at Tufts University and Post-Doctoral Fellowat the Center for Global Development*

... selling goods when and where it's needed most. This, in turn, improves market performance, which increases welfare.

• Mobile phones allow consumers, traders and farmers to search for market information when, where and how they want. While agricultural market information systems (MIS) have provided low-cost information to farmers, traders and consumers *via* radios or message boards, mobile phones are a particularly effective means of providing such information and are being quickly adopted in low-income countries⁴. Consequently, the role of mobile phones should be central to the future design and implementation of information systems in low-income countries.

• While development outcomes are not an explicit goal of IT companies, information technology can serve as an effective poverty reduction tool for governmental and non-governmental organizations. By combining the public sector's knowledge of and expertise in development-oriented domains (agriculture, health and education) with private companies' technical expertise and innovation (such as M-pesa⁵ in Kenya), public-private partnerships can increase the potential impact, sustainability and efficiency of development interventions. The key is ensuring that such partnerships are used to develop and disseminate relevant and effective information technology solutions to solve specific development challenges.

• Given high illiteracy rates in Sub-Saharan Africa, a majority of mobile phone users rely on mobile phones primarily for voice calls, rather than data services such as short messaging service (SMS) or internet. Mobile phone-based services and products therefore need to be adapted to this reality. Existing economic evidence suggests that mobile phones can, in fact, serve as a powerful tool for economic development in the world's poorest countries.

But mobile phones are not necessarily a panacea that will lift people out of poverty; rather, they can be used to reduce information costs, improve markets and strengthen development projects in a variety of sectors. While information is necessary for the efficient markets, it is not sufficient: markets (and development) require infrastructure and financial services to work, which is often not the case in Sub-Saharan Africa. Donors and international organizations that seek to improve market access in Africa therefore should not focus on information alone: power and roads are also needed to boost growth (Ramachandran, 2008). ⁴ Market information systems (MIS) is a service that attempts to address this issue by collecting market information on prices (sometimes quantities) of widely traded agricultural products from a variety of markets (rural assembly, wholesale and consumer) and disseminating them on a timely and regular basis via various media to a variety of actors – farmers, traders, government officials, consumers and others. The idea behind such systems is to reduce the costs for searching for information. Traditional MIS have relied upon message boards, radio or paper dissemination to disseminate the information, but information and communications technology (ICT) has provided new possibilities in this area.
⁵ M-Pesa (M for mobile, Pesa is Swahili for "money") is the mobile banking product launched by Safaricom in 2007.

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Private Sector Development

WHAT ARE THE ECONOMIC AND SOCIAL IMPACTS OF THE MOBILE PHONE SECTOR IN DEVELOPING COUNTRIES?

Millicom Group incorporated by Swedish interests – is a mobile phone company operating in 16 emerging countries in Africa, Asia and Latin America. At the end of 2008, it had a total of 32 million subscribers. François-Xavier Roger, the Group's chief financial officer, explains the financial model that allows Millicom to reach a high level of profitability while having a mass-market customer base in countries where average GDP per capita remains very low.

François-Xavier Roger Millicom

François-Xavier Roger holds an MBA from Ohio State University and graduated from Audencia Management School in France. He began his career at Aventis and Hoechst Marion Roussel, where he specialized in emerging markets in Asia, the Middle East, Africa and Latin America. After holding the position of Vice Chairman in charge of corporate finance at Danone, his extensive experience in developing countries allowed him to join Millicom Group as chief financial officer in September 2008.

> ¹ Airtime represents the amount of time a subscriber spends using his/her mobile phone.

How to Succeed in Developing Countries for a Mobile Telephony Operator? The Case of Milicom

Some mobile phone operators invested in developing countries very early on, whereas profitability seemed to be uncertain. If such investments are to be profitable, it is necessary to respect some key criteria for success. First, the service must be financially affordable for the clients. Similarly, the operator must base its service on prepayment in order to minimize the risk of unpaid bills. Finally, it is necessary to develop an extensive sales network so that consumers can easily purchase airtime. In this context, the operator must see itself as a business selling mass consumer goods, rather than a technology earmarked for a niche market.

By François-Xavier Roger, Chief Financial Officer of Millicom

M obile phones scarcely existed 20 years ago. It took years for penetration to pick up in developed countries because handsets and calls were expensive, and network coverage was poor. Today, however, mobile phone penetration exceeds 100% in almost all developed nations.

Nobody would have thought that mobile phones could have been as successful in emerging countries, as the barriers to entry were even greater: limited infrastructure, low purchasing power, unaffordable handsets, and illiteracy, not to mention the apparent lack of need. Finally, given the extremely low penetration rate of fixed phone lines, the case for a profitable business for mobile operators was very weak.

As a result, very few investors were truly prepared to invest in mobile licenses and infrastructure in emerging countries. Millicom, supported by its largest shareholder Kinnevik, and led by the vision of its late founder, Jan Stenbeck, acquired 13 mobile licenses around the world in the 80's, mainly in Latin America, Asia, and Africa.

This bold vision soon became reality: in countries like Guatemala, Honduras and El Salvador, to name a few where Millicom operates, more than 80% of the population now use mobile phones, and penetration rates continue to increase. In Africa, most countries still have a lower average penetration rate of around 30%, but it is highly likely that over time, penetration rates will eventually reach the same levels as in Central America.

Two main factors, at the heart of Millicom's strategy, have driven such high growth rates: increased affordability, and improved accessibility.

Affordability

Millicom is a mobile operator exclusively focused on offering mobile services in emerging countries. Many of the countries where Millicom operates have very low GDP per capita levels: from USD 300 in DRC to USD 9,000 in Colombia. In spite of limited purchasing power, almost anybody in these countries can get access to mobile services. Affordability has proved to be a key success factor for Millicom: it removed cost as an entry barrier, even for the poorest. The introduction of prepaid offerings has been instrumental in this regard: a subscriber only needs to buy a SIM card for a token amount (around USD 1), and can then purchase airtime¹ (in the form of scratch cards or electronic reloads, for instance) in the smallest currency denomination available in his country (USD 0.5 or 0.10 is common), and is then ready to place calls. One consequence of this low entry cost with cheap SIM cards is that many customers routinely use multiple SIM cards in order to avoid "crossnet" charges (mobile operators often charge more for "cross-net" calls - i.e. calls placed from one network to another network - than for "on-net" calls calls within the same network, for example from a Millicom number to another Millicom number)....

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... Prepaid offerings are attractively priced, and allow users to have full control over their call expenses. The handsets, on the other hand, are not subsidized in prepaid offerings, in contrast to most of the postpaid packages. And many customers cannot afford even the cheapest of handsets, despite the fact that some new or second-hand handsets are for sale for as low as USD 25. Such an amount may look small, but it could represent up to a month's income for many individuals living on USD 2 a day. Mobile phone users manage to bypass the issue of handset prices though, as many don't own one individually but borrow from, or share it with, their friends and relatives. Another way to reduce the cost of mobile services has been the introduction of per second billing (as opposed to per minute billing).

Accessibility and availability

The second key success factor for emerging markets operators is to provide accessibility of the service to all customers, which means providing them with the opportunity to buy airtime anywhere at any time in the same way they can buy basic food, cigarettes or personal care products. Millicom does not see itself as a company selling technology but rather as a consumer goods company. As such, branding and distribution networks are two key elements of success. Millicom for example trades under the TIGO brand, which ranks among the three most recognised brands in most countries in which Millicom is present. The company manages more than 600,000 points of sale. These points of sale range from individual hawkers selling airtime in the street to pharmacies, supermarkets or even gas stations.

The efficient distribution of airtime through this dense network of outlets is essential to the success of the model. Millicom uses very sophisticated and powerful mapping systems, allowing it to know at any given moment the amount of airtime stock available at any single point of sale, as well precisely what street promotional material (billboards, umbrellas...) is available in any particular outlet in any country where it trades. The sales force makes direct use of this tool to generate revenue and avoid out-of-stock situations, while the technical team can manage the network and demand according to airtime consumption.

Finally, network availability is a critical point. Any operator must be in a position to offer both appropriate geographic coverage as well as excellent service levels to all customers at any time. Such requirement requires major capital expenditure. A company like Millicom invested 40% of its revenues two years in a row, in 2007 and in 2008, with about USD 1.4 billion spent in capex to build infrastructure and network in 2008.

The impact of the mobile phone industry on household spending

Thanks to improved access and affordability of mobile handsets, phone services have become a significant part of household spending, and as such have triggered a notable redistribution of income and of spending habits for people living in developing countries. It is indeed often the third largest item of household expenditure behind housing and food. Analysis has demonstrated that it is fairly common to see people in developing markets spend as much as 15% of their disposable income on mobile telephony.

In Tanzania, for instance, Millicom clients' average expenses (also known in the industry as average revenue per user or ARPU) reach around USD 5.6 per month (*i.e.* USD 67 per year), representing around 5% of Tanzania's *per capita* GDP of USD 1300, or the equivalent of around 28% of GDP *per capita* in the Democractic Republic of Congo (average ARPU of USD 7 per month, *i.e.* USD 84 per year for a GDP *per capita* of USD 300). These figures are provided for illustration purposes only: the analysis obviously has to be mitigated by the penetration rate in each country (27% in Tanzania and 9% in DRC), knowing that early adopters of mobile services often belong to the wealthiest parts of the population.

Margins and returns

Considering the risks involved as well as the higher cost of capital, investors in emerging markets typically demand a higher return than would be the case in developed markets. As an example, the weighted average cost of capital of many African countries is higher than 15%, which means that investors like Millicom must generate decent returns and margins to recover their long term investment and compensate for risk factors.

As indicated above, many customers spend as little as USD 1 a month of airtime. Few spend more than USD 50 a month. On average, Millicom customers spend less than USD 10 a month on mobile phone while European spending *per capita* is about five times higher. However, profitability is not a function of spending levels per customer as business models in Europe/USA are very different from business models in emerging markets. ...

How to Succeed in Developing Countries for a Mobile Telephony Operator? The Case of Milicom

By François-Xavier Roger, Chief Financial Officer of Millicom

... In Europe or in the USA, most customers subscribe to post-paid offers: they have accounts with their operators and get billed for calls per month ("postpaid" customers), or they subscribe to fixed packages with a predetermined amount of airtime. These packages usually include a handset, a system that carries a huge cost to the operator.

Millicom's model is totally different: like most operators in emerging markets, it uses the prepaid model. Prepayment means that the subscriber buys airtime that is stored in his account and that he can only call for as long as his account is loaded with sufficient airtime and credit. In Millicom's case, for example, prepaid airtime constitutes 95% of sales revenue. Such a model offers huge opportunities for operators, who shift credit risk to the consumer and do not carry the cost for expensive, "subsidized" handsets. Prepayment, however, does not mean that subscribers do not have access to sophisticated tools.

The absence of a handset subsidy and the prepaid model are the main factors behind mobile operators' capacity to generate decent margins, an absolute necessity for operators as they invest massively in emerging countries, often with high risk profiles.

The operators generate these high margins despite the fact that, as mentioned above, average spending *per capita* is around five times lower in emerging countries than in developed countries. Figures 1 and 2 below show that Millicom ARPUs and margins tend to be related to the group's competitive position in its markets rather than the absolute level of GDP *per capita*.

Figure 1 shows a clear correlation between market share and EBITDA² margins. Figure 2 also illustrates this idea and shows the absence of correlation between ARPU and EBITDA margin, and to some extent between ARPU and GDP *per capita*. For instance Millicom's average ARPU is almost 30% higher in Central America than in South America, while average GDP *per capita* (weighted by the number of Millicom's subscribers in each country) is 13% lower, and the group's EBITDA margin in the former region is 20 percentage points higher than in the latter. Millicom holds leading positions in all of its Central American operations, while it is only number two in Bolivia and three in Paraguay. Similarly, average ...



Figure 1: Correlation between EBITDA margins and market share at a global level

Source: Millicom

² Earnings before interests, taxes, depreciation, and amortization.

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... ARPU in Africa is 9% higher than in Asia, while GDP *per capita* is 40% lower, but EBITDA margins remain lower in Africa than in Asia. Ultimately, EBITDA margins generated by Millicom are similar in Asia, Africa and South America, while ARPUs are very different.

New technologies and prospects for mobile operators in developing countries

Even 3G mobile data capability is now reaching emerging markets, which means that broadband and internet access will be widely available and most probably affordable to all nations in the foreseeable future. As fixed infrastructure is limited, the internet will be mobile in emerging countries. This is a significant new growth opportunity for mobile operators, but also a new challenge, as they seek to finance increasing investment and look to develop pre-pay pricing structures to make mobile internet access a mass market proposition. The mobile industry is now looking at new opportunities beyond its traditional voice offering. Value added services ("VAS") are growing much faster than voice communication services: it ranges from simple text messaging (SMS), to information (weather forecast download, access to database), entertainment (gaming, contest, lotteries...) and even services. Furthermore, with few emerging market consumers holding bank accounts or having access to insurance services (as low as 10% in many countries), some mobile operators have taken enthusiastically to offering basic financial services such as money transfers. In Kenya for example, more than half of mobile phone users (i.e. more than seven million customers) regularly use cash transfer or payment facilities through their mobile phones. With so much unmet demand for financial services remaining in the emerging markets, the relevance of such services is certainly much bigger here than in developed countries.



Figure 2: Millicom ARPU and EBITDA margin by region

The size of each bubble is function of the weighted GDP per capita in the region (weighted with MIC subs in each country where MIC operates). The analysis presented here must be taken with care as the level of penetration differs from one country to another, and therefore the level of GDP per capita of the people having a mobile phone as well.

Source: This graph is based on Millicom figures as of end 2008. GDP per capita figures come from the CIA Worldfactbook database.

Private Sector Development

WHAT ARE THE ECONOMIC AND SOCIAL IMPACTS OF THE MOBILE PHONE SECTOR IN DEVELOPING COUNTRIES?

In charge of Africa'NTI, a partnership between European and African research institutes to analyse the integration and use of communication technologies in Africa, Annie Chéneau-Loquay highlights in this article the fact that after several years of very strong growth, the mobile phone sector continues to face a number of challenges. Those are particularly related to the impact of this service on the budgets of the poorest households

Annie Chéneau-Loquay CNRS

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¹ The private African operator Telecel set up the first mobile cell phone network in Kinshasa back in 1986. The network was subsequently extended to Lubumbashi in 1992, Goma in 1993, then to Bukavu in 1996.

The Impacts of the Mobile Phone Sector on Development: Mixed Results?

The expansion of the mobile phone sector in developing countries would appear to have obvious benefits. However, the conditions in which this takes place can sometimes be questioned. Deregulation in the telecommunications sector has not always led to healthy competition, regulatory authorities seem to be too dependent on public policy, and the sector – even if it does create a lot of employment – has strengthened the informal economy. The share of income that users devote to mobile phones is also very often too high.

By Annie Chéneau-Loquay, Research Director at CNRS

'n Africa, where social relations are particularly complex and very often oral-based, the mobile phone has already clearly proven its usefulness. The benefits of its use may indeed be unquestionable, but the potential problems posed by the rapid growth in the mobile phone sector need to be examined. Technological innovations often shore up the liberalization of economies; for example, the development of "personal mobile communication systems" has scaled up deregulation in the telecommunications sector. This has led to sweeping changes in its economic model. National operators - entities that have traditionally enjoyed monopolies - have opened up to competition, even if only a handful of major international operators have expressed interest in taking them over. Smaller and more flexible newcomers - mostly foreign - are specifically moving into the profitable mobile phone niche.

A badly regulated market opening?

Following the advice of the IMF, World Bank and International Telecommunication Union (ITU), most African States have – either willingly or reluctantly – set out to liberalize their telecom markets. Regulatory authorities – reputed to be autonomous and independent – have consequently been set up to support and manage the opening of markets. They play a key role, for example, by imposing the nationwide extension of services through the specifications they draw up for operators.

Situations do, of course, vary enormously depending on the country – as demonstrated by the ITU 2008 report. The poorest countries have the lowest level of equipment – their States are weak and their regulators lack efficiency. There are considerable variations in population penetration and coverage rates; the average is 27%, yet they range from 90% in Gabon, the Seychelles and South Africa to under 2% in Ethiopia, Eritrea and the Democratic Republic of Congo (DRC). The latter is the archetype of a country that lacks structure and State control, yet in the late 1980s it was one of the first countries to support the development of the sector by liberalizing it¹. DRC today counts around 10 operators that compete in this growing market (63% between 2002 and 2007), yet they only provide a 50% nationwide coverage, suffer from mediocre service quality and an almost total lack of interconnections.

More generally, operators are particularly concerned about political interference in the regulation process. Some 88% of respondents to a survey conducted by the consultant Ernst & Young feel that regulatory authorities in Africa are not sufficiently independent (Ernst & Young, 2009). This lack of independence (perceived or real) may constitute a brake to the arrival of new operators - and, consequently, to the development of competition. It is clear that existing telecom regulatory authorities do not have the capacity to fully conduct all their missions. According to an OECD study, their creation and work have not brought about a substantial increase in private investments, despite the implementation of more suitable regulatory frameworks (Do-Nascimento, 2009). In Senegal, the public monopoly held by Sonatel, the former national operator, was simply replaced by a kind of private monopoly that benefited France Telecom. Indeed, the latter ...

The Impacts of the Mobile Phone Sector on Development: Mixed Results?

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... dominates the mobile phone segment with 64.3% of market share. The operator took advantage of both its position as firstcomer and support from the State, which on two occasions threatened to withdraw the licence awarded to its competitor Sentel (Sagna, 2009b). These quasi-monopoly situations are common in Africa. Two of the biggest operators on the continent, Vodafone and Mobile Telephone Networks (MTN), account for an average of over 50% of the market in some 20 African countries. For its part, Safaricom, East Africa's biggest operator, holds over 80% of Kenya's mobile phone market. Although these companies generate sizeable profits - USD 900 million in 2008 for Safaricom –, it partly stems from the fact that they are not always operating in the context of healthy competition that the regulatory authorities are supposed to create!

In addition to hampering the development of healthy competition, the shortcomings of regulatory authorities help foster informal activities in the mobile phone sector. In 2007, the latter directly or indirectly employed over 3.5 million people in Sub-Saharan Africa. Most of these jobs are in the informal economy. In Africa, like elsewhere, operators seek flexibility in order to reduce labor costs, absorb shocks from variation in demand and limit the power of unions. They consequently outsource or subcontract their services and the sector creates a whole host of new service activities that range from product imports to street trading. For example, phone companies subcontract the distribution of prepaid cards to wholesalers and semi-wholesalers that have their own networks of sellers who are very low-paid and not registered anywhere (Chéneau-Loquay, 2008). In Bamako, for instance, 98% of cards are sold in an informal context. Hundreds of youngsters find casual jobs in the mobile phone sector: mobile phone sales and repairs, decoding, sale of recharge cards, electric recharge, etc.

Mobile phone development to the detriment of landlines

Given their low standard of living, African populations have developed a mutualized access to the telephone and internet – which has widened the use of them (Chéneau-Loquay, 2004). However, this mutualization of communication tools may well gradually be replaced by a more individualistic model similar to developed countries.

While mobile phones are used in some countries in order to rapidly install - at a lower cost - telecommunications infrastructure that previously did not exist, it hampers the development of landlines. In 2007, ITU inventoried seven times more mobile phones in Africa than landlines; the number of landlines has been falling in 14 countries since 2002, while the number has stagnated in eight countries. This can be put down to landlines being replaced by mobile phones which limits the development of Internet. In Mali, for example, as well as in Burkina Faso and Senegal, telecenters² are no longer a success. In Senegal, the Sub-Saharan Africa country with the most landlines (excluding South Africa), the mobile network has developed, whereas the landline system was efficient. At the same time, the number of telecenters has plummeted: from 24 000 in 2006 it had fallen to under 5 000 in 2009 (Sagna, 2009a). And yet not everyone has a mobile phone: in 2007, ITU estimates that 40% of Africa's population was not covered by a mobile phone network – *i.e.* over 300 million people! Indeed, only 7% of households in rural areas have a mobile phone.

Mobile Internet: a way for the future?

One may be right in thinking that access to Internet via mobile phones may offset the low level of "cabled" Internet development³. Indeed, the number of Africans using their mobile connection for Internet access skyrocketed in 2008 and, for example, some seven million Nigerians now surf the Net via their mobile phones. This broadband mobile technology is considered by ITU as a solution to the lack of infrastructure. But these services will remain unaffordable to most private users; indeed, they require new investments and generate specific costs and are not destined to be developed on a large scale on a continent where the bulk of the population lives below the poverty line. From this perspective, it remains essential to create public access outlets for a whole host of functions that are useful to everyone: office IT, Internet research, e-mail services, etc.

In addition, the websites and services available *via* mobile phones only represent a selection defined by the operator. The freedom of choice – which is inherent to Internet – consequently disappears. This does not appear to particularly bother the biggest consumers that also put up with poor conditions of use (rightly criticized ...

² A telecenter is a public place where users have access to computers, Internet and other information and communication technologies. ³ Africa is seriously lagging in terms of Internet and broadband access. The continent has regressed in terms of connectivity; just under four Africans out of 100 have access to Internet. Broadband penetration remains below 1% (www.itu.int).

The Impacts of the Mobile Phone Sector on Development: Mixed Results?

By Annie Chéneau-Loquay, Research Director at CNRS

... by consumer associations): network cut-offs, complicated procedures, unclear tariffs, etc. In fact, mobile phone operators adjust their strategies to the society as it exists – to a shortage economy – even if this means promoting practices that do not respect the rule of law (Chéneau-Loquay, 2008).

A high-cost budget item for African households

Without asserting that the mobile phone sector contributes to making the poorest populations in developing countries poorer, it does not necessarily improve their lives. Research ICT Africa has underscored the size of the budgets that users devote to the telephone. In 75% of the low-income population in the 17 countries surveyed, the average African spends 26.6% of his individual income on it in Kenya, 23% in Ethiopia, 22% in Tanzania, 9.4% in Senegal. These statistics would appear to demonstrate that the cost of phone services is still too expensive and that it takes up an excessive share of income.

These levels of expenditure can be explained by the importance given to appearance in Africa: people are willing to make sacrifices in order to have the latest mobile phones. The high level of sociability and the strong community feeling mean that people tend to observe each other; mobile phones are modern objects and can help people stand out from the crowd. The symbol of what makes one different is today mainly based on the equipment one owns (Ndiaye, 2008). There is consequently an undoubtable irrational aspect to the importance given to mobile phones and the behavior they lead to (Song, 2009)⁴.

This article consequently takes stock of some of the negative impacts that the development of the mobile phone market may have in Africa. Without challenging its obvious usefulness, it is indeed necessary to question the most debatable aspects of the development of the sector. The profits generated have benefited a handful of minorities (private operators, foreign equipment manufacturers, etc.), while most of the opportunities of the information society remain inaccessible to the majority of people. Mobile phone equipment accounts for a significant share of individual incomes – to the extent that one can, in all cases, question the prices charged and the irrational aspect of certain purchasing behavior. •

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⁴ Steve Song is referring here to behavioral economics, particularly introduced by Dan Ariely.



Key data

Access to the mobile phone market has been booming in developing countries since the late 1990s. In Africa in particular, coverage rates have risen rapidly, while prices have dropped sharply in recent years. However, these countries still enjoy a considerable potential that remains unexploited with wide inequalities both between the different countries and within the countries themselves. Operators still have a lot of progress to make in order to increase access to these services for the poorest layers of the population, especially in rural areas. These statistics provide a snapshot of the mobile phone sector in developing countries, particularly in Africa.

Private Sector

Development

Mobile phone penetration rate in Africa (2008)



*Data for these eight countries are for 2007 and come from the International Telecommunication Union website (www.itu.int). Source: International Telecommunication Union, 2009. Information Society Statistical Profiles 2009 - Africa, Working Paper (in preparation for the 2010 World Telecommunication Development Conference).

"Mobile phone operators invested an average of some USD 11 billion per annum in Africa between 2006 and 2008. These investment levels are expected to be maintained over the five coming years (USD 10.4 billion), but should account for a lower percentage of operators' turnovers (18% against 30% in the past)"

Source: AfricaNext, 2009. The Future of African Mobile Profitability: Stupendous Value, Mobile Darwinism & The Next Phase of Growth, AfricaNext, report AFN2223025.

Mobile phone penetration rate by region



Source: International Telecommunication Union, 2009. Information Society Statistical Profiles 2009 - Africa, Working Paper (in preparation for the 2010 World Telecommunication Development Conference).

Evolution of price per minute in several African countries



Source : AfricaNext.

Population covered by a mobile network in Africa



Source: International Telecommunication Union, 2009. Information Society Statistical Profiles 2009 - Africa, Working Paper (in preparation for the 2010 World Telecommunication Development Conference).

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Price of an average mobile service consumer basket by country (2006)



Prices correspond to an identical basket of mobile phone services for all the countries compared. Source: Esselaar, S., Gillwald, A., Stork, C., 2007. Towards an Africa e-Index: Telecommunications Sector Performance in 16 African Countries, Research ICT Africa, Working Paper.

Strategic mobile investors in Africa (2008)

	Number of countries	Subscriptions (in millions)	Average market share in Sub- Saharan Africa*
MTN Group	16	67	38%
Zain	16	46	30% 33%
Vodafone/Vodacom	8	68	
France Telecom	15	38	32%
Millicom	6 10 5	9	22% 6% 75%
Etisalat		13	
Portugal Telecom		14	
Orascom/Telecel Globe	7	39	-
Vivendi/Maroc Telecom	5	17	38%
Total Africa		390	

* Average market share in the countries where the operator is present. Source: Operators and AfricaNext.

Access to telecommunications services: comparison between different regions



Source: Agence française de développement, World Bank, 2009. Africa's infrastructure - A time for transformation, The World Bank Press, Washington.

Private Sector

Development

WHAT ARE THE ECONOMIC AND SOCIAL IMPACTS OF THE MOBILE PHONE SECTOR IN DEVELOPING COUNTRIES?

Roshan, a subsidiary of AKFED, has been granted a mobile operator license in story in Afghanistan As the main private project in the country, it is the largest contributor to the State budget. In 2008, Roshan launched an innovative mobile banking service. Samir Satchu – one of the company's historical managers - explains how critical this new customers having little access to banking services, and how it also customer loyalty

Rebuilding a Shattered Nation: The Impact of Wireless Communication and Mobile Banking in Afghanistan

In an extremely difficult context – that of Afghanistan at war – mobile phones provide users with some basic services that are essential for the country's reconstruction. The explosion in the development of the mobile phone sector has led to a real "leap forward", particularly for financial services. The implementation of M-Paisa – whereby money transfer can be made via voicemail – has given the population greater access to financial services and has, at the same time, helped combat corruption, the financing of terrorism and money laundering. By reducing transaction costs for financial transfers, the service has also fostered microfinance loan repayments and has consequently promoted the development of microfinance.

By Samir Satchu, General Counsel and Head of Government Affairs for Roshan

Samir Satchu Roshan

Samir Satchu is General Counsel and Head of Government Affairs for Roshan, Afghanistan's leading telecommunications provider. Since joining Roshan in 2003, he has negotiated loan financing packages led by the Asian Development Bank for a total of USD 150 million. Mr. Satchu has steered his department through a period of increased competition (entry of MTN and Etisalat) and regulatory intervention. Before joining Roshan, Mr. Satchu worked in the telecommunications sector in London. He holds degrees from Cambridge University and Harvard Law School.

Rew aspects of life are untouched by mobile telephone technology. Families displaced or dispersed by conflict can remain connected. Commerce can grow when business owners have the tools to search for the best prices, know when goods will arrive, and need not close down their shops to meet with suppliers. Isolated villages and communities can be better integrated into the fabric of the nation and the economy.

Cellular phones above all mean access. And access to information, people and communities is the key to empowering billions around the world to improve their lives. Nowhere is that more evident than in Afghanistan. As the nation's largest telecommunications provider, Roshan has played a leading role in bringing the benefits of wireless telecommunications to the war-ravaged country, simultaneously contributing to the nation's reconstruction and economic development.

Leapfrogging Afghanistan's communications into the 21st century

When Roshan began operations in Afghanistan six years ago, there was virtually no telecommunications infrastructure. Simply placing an international phone call often required walking or traveling hundreds of miles, crossing the border, and paying very high rates. However the near-absence of any telecommunication infrastructure – a seemingly insurmountable challenge – also constituted a great opportunity. Roshan used the latest wireless technology to leapfrog Afghanistan's telecommunications system into the twenty-first century.

Today, Roshan is Afghanistan's leading telecommunications provider, with coverage in over 230 cities and towns and approximately 3.5 million active subscribers. Since launching operations, mobile penetration rates in the country have risen from 0.25% in June 2003 to 25% in November 2009. Roshan directly employs more than 1,100 people, of which 20% are women, and provides indirect employment to more than 25,000 people. Since its inception six years ago, Roshan has invested approximately USD 425 million in Afghanistan and is now the country's single largest investor and tax payer. Roshan is deeply committed to Afghanistan's reconstruction and socio-economic development. The Aga Khan Fund for Economic Development (AKFED), part of the Aga Khan Development Network (AKDN), is a major shareholder of Roshan and promotes private initiatives and building economically sound enterprises in the developing world. Other shareholders include Monaco Telecom International (MTI) and TeliaSonera, helping Roshan bring international expertise ...

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... to Afghanistan and commit itself to the highest standards of network quality and coverage for the people of Afghanistan.

Financial services through mobile telephony

Roshan continuously seeks new opportunities to harness the power of mobile technology in order to address development challenges, introducing innovative and relevant products that meet the basic, yet unique needs of the geographically dispersed, ethnically diverse local population.

Over 97% of the population in Afghanistan does not have access to a traditional bank account or financial services, one of the highest percentages in the world. Afghanistan's conventional banking industry is virtually non-existent and highly fragmented: a total of 17 banks share among them approximately 300 branches around the country (most of which are in major cities) and there are only 38 ATMs for a population of 32 million.

Afghans have minimal trust in their country's banking system. In contrast, Roshan has developed a strong brand over the past six years, building relationships with its customers and earning the trust of increasing numbers of Afghans. As mobile penetration rates continue to grow and banking penetration rates remain stagnant, Roshan is presented with a unique opportunity to bridge this divide, providing access to basic financial services for the Afghan population.

Migrant workers require quick and efficient money transfer services to send money to their families. Small entrepreneurs often have to take time off work and travel long distances to repay their microfinance loans. Companies need secure ways to pay and disburse salaries to their employees. Existing methods of money transfer in Afghanistan, however, are mostly inefficient and insecure. Moving cash throughout the country is risky, expensive and time consuming. Furthermore, the political situation in the country remains fragile and shifting, especially in the aftermath of the recent presidential election.

In 2008, Roshan partnered with Vodafone to launch M-Paisa in Afghanistan. M-Paisa enables registered Roshan customers to transfer money using their mobile phone in a quick, easy, safe, and cost effective manner for peer-to-peer transfer, repayment of microfinance loans, purchase of airtime and salary disbursement for companies. Today, M-Paisa has over 120,000 registered subscribers.

The M-Paisa SIM application is embedded on a GSM SIM card, which means that any Roshan subscriber can use the service. The sender simply punches in the mobile number of the recipient and the amount for transfer, followed by a PIN code that ensures security in the system. A secure Short Message Service (SMS) is sent to the recipient. Roshan's extensive distribution network, present in the most remote villages, serves as a transaction point for deposits and withdrawals. The recipient visits an M-Paisa agent to withdraw funds, entering a PIN code to secure the transaction. Both the agent and recipient receive a confirmation SMS once the transaction is complete.

Roshan's experience in understanding the local and technical environment of Afghanistan, along with Vodafone's technical experience with mobile money, helped bring banking services to the marginalized. It is a significant development for Roshan customers and even all Afghans looking for a means to conduct financial transactions. Even more significantly, it also serves as a catalyst for Afghanistan's economy by facilitating business transactions, loan repayments, and the movement of money nationwide.

The challenges of financial services

Roshan is rapidly expanding its network nationwide, making it easier for Afghans to access financial services, and working to overcome obstacles such as illiteracy, lack of awareness, a shortage of trained agents and the overall lack of development.

During the initial soft launch phase, Roshan quickly realised that it had to simplify the overall customer experience. In a country where less than one third of the population is literate, users find it difficult to use text messaging (SMS) to transfer funds. In response, the company developed a tri-lingual Interactive Voice Response (IVR) system through which users can be guided through prompts to complete transactions, in English, Dari and Pashto. The IVR can be used by low-income users who have no formal education. Awareness of IVR services is growing rapidly and Roshan expects this to increase user adoption. ...

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... Roshan has faced challenges both at the customer and agent level. Mobile money transfer and even conventional banking are relatively new concepts in Afghanistan. Most advertising has had to focus on educating the customer and explaining the value of the service. Once users realize the added value and benefits of using the service, they consistently and actively use it.

At the agent level, Roshan is working on developing tools for M-Paisa agents to provide them with the support to promote and encourage usage of the service. This includes developing training sessions, pictorial guides, and an agent-only IVR in the coming months. Agents can truly serve as ambassadors of the service, working to educate users on the benefits of mobile phone-based financial services. In addition, Roshan has had to constantly monitor agent float to ensure that there is enough cash on-hand to serve the customers in a particular city or village.

A second major challenge for Roshan is to navigate through Afghanistan's very specific political circumstances: a country still grappling with war and insurgency, in which the central government's authority is at best precarious and effectively exists to varying degrees in different parts of the country.

Such factors mean that for the time being, drafting and enforcing regulation related to mobile commerce is extraordinarily difficult. Therefore, Roshan has proactively been working with the Government, through the Ministry of Communications and the Ministry of Finance, to ensure the security and transparency of the service.

M-Paisa is regulated in Afghanistan by Da Afghanistan Bank, the country's Central Bank. The service is, first of all, "Know Your Customer" (KYC) compliant: to open an account, prospective customers need to provide national identification and a photo, and are also required to sign a statement that they are not involved in any terrorist activities. Secondly, M-Paisa is "Anti-Money Laundering" (AML) compliant: this means that each transaction is closely monitored and suspicious transactions need to be reported immediately to the Central Bank. Finally, M-Paisa is "Combating the Fight of Terrorism" (CFT) compliant. All three compliance systems have been put in place as part of an attempt to prevent illegal activity and money laundering.

M-Paisa's capacity to measure money flows is a key ingredient to its success, especially in light of the environment in which it operates. M-Paisa provides a legitimate and transparent way for funds to be tracked, reducing the transfer of money between illegitimate industries.

Mobile telephony as a tool to widen access to microfinance and combat corruption

M-Paisa has also facilitated access to microfinance for thousands of individuals, following a partnership between Roshan and First MicroFinanceBank (FMFB) to test-run M-Paisa in Afghanistan. Today, over 2,500 microfinance clients make loan payments through M-Paisa. M-Paisa makes it easy for small informal, often rural entrepreneurs, as well as women and the ultra-poor with no access to banks, to reimburse loans without having to travel vast distances and shut down operations for a day. With a repayment ratio of 97%, microfinance loans have been a roaring success to date.

Clearly, as the experience with FMFB seems to suggest, microfinance institutions (MFIs) in Afghanistan can benefit greatly from a product such as M-Paisa. Interest rates charged by MFIs are typically higher than those charged by conventional financial institutions, given the high administration costs of thousands of small accounts and the logistical difficulties of traveling to remote areas to deliver loans in cash or receive reimbursements. With the introduction of M-Paisa, MFIs no longer need to open additional branches. Instead, a Roshan agent can serve as an outsourced microbranch, increasing the MFI's presence in cities and towns to a level the industry could not have hoped to reach before.

In Afghanistan, the Ministry of the Interior physically distributes salaries to the Afghan National Army (ANA) and Afghan National Police (ANP) in cash. This practice is intrinsically risky, and M-Paisa can offer an alternative solution which mitigates security and corruption issues, as well as the issue of soldiers often going absent without leave shortly after salaries are paid. M-Paisa can serve as a secure, instantaneous, scheduled mechanism to transfer and receive funds. ...

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... In July 2009, Roshan and the Afghan government started a salary disbursement trial run with the Afghan National Police (ANP) in the District of Jalreez, in Wardak Province. A recent assessment made by the United Nations Department of Safety and Security (UNDSS) reported that the security situation in Wardak province is now volatile, making it difficult for officers to leave their post to deliver salaries to their families. Without funds, families could be left without basic provisions for weeks.

In this trial, 49 ANP officers received their salaries via M-Paisa instead of the traditional method of cash paid through one of three trusted agents in Wardak. The salaries range from 5,000 AFN (USD 100) to 21,000 AFN (USD 420) per person. Now these ANP officers can visit an authorized M-Paisa agent to withdraw their salaries in cash at their convenience and send cash to their families in their home villages.

Many of the ANP officers who received their salaries through M-Paisa realized for the first time what their actual salaries were. Until then, the cash used for the payment of salaries went through so many intermediaries that inevitably some of the funds were either stolen or skimmed. The trial run is now expected to be replicated throughout the country in the coming months. With a formal mechanism of delivering salaries to their families, mobile money can help the National Police to dematerialize transactions and prevent the circulation of physical cash that currently helps to fuel the war. In a country where economic development is desperately needed, the benefits of allowing legitimate funds to flow freely are endless.

In 2010, Roshan will continue to expand and rollout M-Paisa nationwide, to provide more Afghans with access to financial services. Roshan is also looking for ways to further integrate utility invoice payments into the system, hoping to work for instance with the Ministry of Water and Energy, which could ultimately receive payments through M-Paisa.

M-Paisa has the potential to boost economic growth through the elimination of common financial barriers, especially in remote areas and in particular with regards to women, who often are the sole supporters of their families. Through M-Paisa and Roshan's wide mobile network coverage, there is now an important vehicle providing financial inclusion for the majority of Afghans.

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WHAT ARE THE ECONOMIC AND SOCIAL IMPACTS OF THE MOBILE PHONE SECTOR IN DEVELOPING COUNTRIES?

Proparco has financed a large number of mobile operators both in Africa and in Asia for a total amount of some EUR 200 million. In order to better evaluate the tangible impacts of these projects, AFD and Proparco commissioned a study on the economic and social impacts of the launch of a new mobile phone operator in Haiti. The results highlight effects on GDP growth and employment, as well as the direct impact on households and users

The Economic Impact of the Development of Mobile Telephony: Results from a Case Study in Haiti

Haitian data confirm that mobile phone development acts as an engine for economic growth, what consequently brings a number of social benefits. However, a large part of the population remains excluded from mobile phone services due to a lack of resources, and those who can afford them mainly use mobile phones to contact their families and friends – mobile phone expenditures can nevertheless sometimes be to the detriment of food and clothing. Yet some evidence suggests that mobile phones can make poor populations less vulnerable by facilitating financial transfers and access to information in case of emergency.

By Guillaume Barberousse, *Project Officer at Proparco*, Tanguy Bernard, *Economist at AFD* and Véronique Pescatori, *Project Officer at Proparco*

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Tanguy Bernard AFD

Tanguy Bernard joined AFD in 2008 where he assesses the impacts development projects have on their beneficiaries. He holds a PhD in Economics and has conducted research on issues relating to agricultural products' trade in Sub-Saharan Africa. Before joining AFD, he worked in Ethiopia as a researcher for IFPRI (International Food Policy Research Institute).

Véronique Pescatori

Véronique Pescatori has been an investment officer at Proparco since 2003 and is currently a project manager in the infrastructure sector. The past decade has seen a rapid expansion of mobile telephony in developing countries. In 2006, it was estimated that 56% of individuals in low-income countries were covered by one or several mobile networks, and 22% actually subscribed to such services, up from virtually zero at the end of the 1990s. With less than 5% of the population having access to a landline phone, mobile phones have made telecommunications available for the first time to hundreds of millions of people, either through the ownership of personal handsets or as users of rented phones in public access points.

While the development of mobile telephony in poor countries has often been driven by private investors, various international donors have also contributed to its expansion. In fact, several studies have highlighted the beneficial impact of communications infrastructure on growth (through better market integration for instance), but important risks and limited infrastructure have sometimes hampered the expansion of mobile telephony in countries facing particularly difficult conditions, prompting calls for active support in favour of its development. This was, for instance, the case in Haiti, where penetration rates remained extremely low at below 5% by the end of 2005. Since then, a third mobile operator, Digicel-Haiti, was launched with support from Proparco, the World Bank, as well as the Dutch and Canadian International Development agencies. As indicated in Figure 1, mobile phone penetration had risen to 30% of the population in 2007 (with Digicel accounting for 60% of the market), and Haiti has caught up some more developed countries like Senegal.

Importantly, the increase of penetration rates in the country was not limited to urban areas, as is often the case when mobile phone infrastructure investment is driven by private interests. The expansion of network coverage has managed to cover 95% of the population by 2008, providing potential access for even the most isolated households in Haiti. In rural areas, access rates to cellphones is now on par with that of radio, far above other means of communication such as landline telephones, phone kiosks, and television. As shown in Figure 2 however, penetration rates remain much lower in rural areas (18%)¹, precisely, in fact, where mobile phones are most needed with a large share of the population having to endure higher transport costs due to their isolation.

The rapid development of Haiti's mobile phone coverage and penetration rates offers an opportunity to further study the effect of mobile telephony on the country's economy. Based on data from the Haitian Institute of Statistics, the World Bank and Digicel, along with a nationally representative sample of nearly 2000 households, this article summarizes the results of a joint study by FAFO International and BearingPoint (FAFO International, 2009; BearingPoint, 2009)². The study covered impact assessment at both macro and micro-level. The study did not, however, cover the likely effects of mobile phones on market ...

By Guillaume Barberousse, *Project Officer at Proparco*, Tanguy Bernard, *Economist at AFD* and Véronique Pescatori, *Project Officer at Proparco*

... integration – Abraham (2006), Jensen (2007), Aker (2008) – nor did it assess the likely multiplier effects generated *via* Digicel-Haiti's investments on job creation.

A contribution of 20% to Haiti's GDP growth between 2006 and 2008

With an initial investment of USD 130 million, followed by another USD 130 million in the subsequent years, the development of Digicel-Haiti constitutes the single most important foreign direct investment in the country's history. While most of the equipment was purchased abroad, local sourcing of products, assets and services amounted to USD 140 million (mainly spent on the installation of the BTS network, real-estate and the media).

Digicel-Haiti's development has also had a significant effect on employment. As of 2008, the company hired close to 1000 employees, and provides an income to 60,000 street vendors, each earning an average USD 24 per month income. Digicel-Haiti has rapidly become the country's biggest tax-payer: with an amount of USD 24 million paid in 2007. Less than two years after Digicel-Haiti's launch, this represents close to 15% of the country's tax income. Looking at a macro-economic perspective, Digicel-Haiti has directly and indirectly contributed to a remarkable 20% of the country's GDP growth between 2005 and 2007 (14% directly, 3% through suppliers and another 3% through retailers). In terms of percentage points, the contribution of Digicel actually represents 1.12 percentage points (ppt) of GDP growth out of the total 5.6 ppt recorded at the country level between 2005 and 2007.

This figure is consistent with the results that would be found by applying the ratios described in previous literature on the link between mobile penetration and GDP growth. For instance, Waverman *et alii* (2005) have found that a developing country with a 10% higher mobile penetration rate would have enjoyed an additional 0.6 ppt GDP growth compared to other developing countries, while a recent study issued by the World Bank estimates that a 10% increase in pe-netration rate would entail an additional 0.81 ppt of GDP growth (World Bank, 2009). Using both ...

¹ Penetration rates are computed using the total adult population in the country. Later statistics report the percentage of households with at least one telephone apparatus and are therefore higher. ² The authors of the study are Henri Tcheng, a partner at BearingPoint in charge of telecoms and media, Jean-Michel Huet, a senior manager in the telecoms and media teams of BearingPoint, Isabelle Viennois, a manager in the telecoms and energy teams of Bearing Point, Pierre Labarthe, a consultant at BearingPoint and Tewodros Aragie Kebede a researcher at Fafo.

Figure 1: Mobile penetration rate in Haïti and low-income countries (% of the population)



Source: BearingPoint, 2009; Data based on World Bank and Digicel

By Guillaume Barberousse, *Project Officer at Proparco*, Tanguy Bernard, *Economist at AFD* and Véronique Pescatori, *Project Officer at Proparco*

... metrics and considering that Digicel has been responsible for around 70% of the 25 ppt increase in penetration rate in Haïti between 2005 and 2007, the impact of Digicel on GDP growth would range between 1.05 and 1.42 ppt.

The challenge of assessing the impact of mobile phone development at individual and household-level

At individual and household-level, measuring the impact of the development of mobile telephony essentially depends on how access is defined, and the type of usage that people have for cell phones.

As described above, cell phone ownership patterns differ significantly between urban and rural areas. There various reasons behind this. For instance, all other things being equal, rural traders are 16% more likely to own a handset than farmers; while those with direct access to an asphalted road are 30% more likely to own a telephone than those without a direct access to such a road. These differences may in turn be related to different levels of income. In fact, for 80% of non-subscribers, the very first reason cited for not owning a cell phone has to do with their limited financial capacities, with 69% claiming they cannot afford to buy a handset, while 11% say they cannot afford to pay the bills for using it. This is further confirmed in Table 1 where one clearly observes a correlation between higher income quintile and telephone ownership.

In fact, the purchase of a handset and its utilization is a very expensive proposition for the mostly poor Haitian population: the cost of a handset is at least USD 40, and median cost of use would range between USD 6 and USD 7.5 per month in rural and urban areas respectively. In comparison, median income of households with a telephone reaches USD 105 to USD 125 per month (rural-urban), which means that cell-phone usage in itself represents about 5% of households' total expenditures. Evidence points to tradeoffs in consumption patterns as a result: more than 50% of the households in the poorest quintile owning a telephone report that they had to reduce other expense items in order to afford their usage. Although the study could not quantify the effective amount of these reductions, it concludes that they mostly occurred for expenditures related to food and clothes.

Recent studies have documented that usage of cell phones in developing countries is mostly limited to non-income-generating activities (Donner, 2005; Donner, 2006; Souter *et alii*, 2005; Chowdhury, ...

Figure 2: Penetration rate in Haïti by rural/urban areas



Source: BearingPoint, 2009; Data based on World Bank and Digicel

Table 1: Percentage of households equipped with mobile telephony

		Budget quintiles	Without mobile	With mobile
Ru	ral	<1 quintile	67	33
	Higher	1-2 quintiles	56	44
	income	2-3 quintiles	60	40
		3-4 quintiles	36	64
\checkmark		4-5 quintiles	23	77
Urban		<1 quintile	30	70
	Higher	1-2 quintiles	20	80
	income	2-3 quintiles	10	90
		3-4 quintiles	6	94
~	\mathbf{k}	4-5 quintiles	1	99

Source: FAFO International, 2009

By Guillaume Barberousse, *Project Officer at Proparco*, Tanguy Bernard, *Economist at AFD* and Véronique Pescatori, *Project Officer at Proparco*

... 2006). While certain activities such as trading clearly benefit from having permanent access to distant information and partners, the overwhelming majority of cell phone subscribers use their mobile phone service for social purposes (Frost & Sullivan, 2006; Samuel et alii, 2005; Goodman and Walia, 2006; Morawczynski, 2008). This is also the case in Haiti. As shown in Figure 3, the vast majority of phone calls do not clearly relate to any income-generating activities but to social purposes, or to administrative services: six out of 10 calls are made to family and friends, while an average of three calls are made to service related activities such as getting medical assistance, calling school teachers and officials for administrative related issues in urban areas. However, business related calls in urban areas are limited on average to just one call, implying that the use of mobile phones in

Haiti is mainly for social and administrative purposes. The average number of calls made for social purposes is slightly higher in rural areas while the average number of business calls is lower compared to urban areas. Virtually no respondents reported making direct profit from letting nonsubscribers use their handsets (as is the case, for example, in Bangladesh with the Grameen phone models), and fewer than 30% of cell-phone owners in urban areas and 10% in rural areas declare using their telephone for any business-related activities.

The use of cell-phones for social reasons may however carry significant economic importance, particularly in terms of reduced vulnerability. In fact, as displayed in Table 2, a significant proportion of these calls are used to connect with family and friends at time of emergency and to ...



Source : FAFO International, 2009

Table 2: Reasons for social calls and their importance

Reasons for social calls	1 st most important		2 nd most important	
	Rural	Urban	Rural Urban	
Better coordinate visits and meetings	25	28	17 12	
Collect news on distant family more often	57	55	30 27	
Help quickly in cases of emergency	5	6	27 30	
Call family to send/receive money faster	7	6	13 16	
Call family abroad to send money if need	4	4	5 5	

Source: FAFO International, 2009

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... ease money transfers. In a country where natural disasters are relatively frequent, subscribers recognise the importance of telephones when it comes to being alerted or alerting others about impending catastrophes, or to call for help during emergencies. Finally, mobile banking and money transfers may still not be developed, but cell phones do allow to reach family members faster in times of need.

The data presented in this overview of the Haitian context support the growing evidence that the development of mobile telephony can have a positive effect on overall economic growth and hence indirectly impact a large portion of the population. However, when it comes to assessing the direct effects on the well-being of households, it also shows that a significant share of the population remains excluded from cell phone services, essentially due to a lack of sufficient resources. For those who do have access, with a few exceptions, cell phones essentially involve social services to link subscribers with their families and friends, possibly at the expense of spending on food and clothing. Some evidence suggest however that cell phones may positively affect income through ease of transfers, and access to information at time of emergencies, although further research is needed.

From a donor perspective, the present results suggest that supporting the development of mobile telephony in difficult conditions such as Haiti is in fact feasible. In terms of poverty reduction however, results are mixed. Finally, from a public good perspective, they show that the most economically fragile individuals remain excluded from this technology, calling for adapted solutions.

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Lessons-learned from this issue

By Julien Lefilleur

he mobile phone industry has been moving into developing countries and expanding extremely rapidly for ten years now. Although equipment rates remain much lower than in the North, the mobile phone has widely replaced landlines in these countries. It is one of the first industry to benefit from investment often second only to the fossil energy industry (oil and gas) – and infrastructure is consequently developing rapidly. The fact that the mobile phone may be considered as a non-essential good makes this success surprising. As such, one would have thought that it would only have limited prospects in low-income countries. For a long time, operators consequently did not venture to invest in these risky countries where market potential was unsure and infrastructure either nonexistent or unreliable. Yet for the most courageous (or visionary) investors, these markets have turned out to be particularly profitable with local demand much higher than expected. Indeed, mobile phones have provided local populations with a solution to telecommunications problems in countries where transport infrastructure is deficient and landlines have failed to develop. The difficulty for operators has been in developing strategies and economic models tailored to these new markets. They have opted to base their strategies on volumes rather than margins in order to offset the high entry costs as well as the average level of per capita expenditure - and therefore the ARPU - which is structurally limited. Mobile phones have, in this respect, been designed as mass consumer goods similar to basic foodstuffs or other essential goods.

The economies of developing countries unquestionably benefit from the substantial improvement in telecommunication systems. For example, mobile phones improve the way in which markets operate: they facilitate the circulation of information and this helps harmonize prices and better adapt supply to demand. Moreover, they promote the development of financial systems by allowing mobile banking services to be implemented. The balance of payments (via foreign direct investment flows) and State budgets (via fiscal revenues) also benefit from the development of mobile telephony. Similarly, there are considerable effects on employment: distribution networks need to be extensive and this means that the sector must mobilize an abundant labor force. However, the benefits of the expansion of the mobile phone industry go well beyond economic considerations. Mobile phones help maintain and strengthen social and family ties - particularly in regions with high levels of migration and deficient transport infrastructure -, they facilitate rapid money transfers, improve the circulation of information in case of emergency and thus help make people less isolated. It may be more difficult to quantify these impacts, but they are nevertheless important as they make people less vulnerable.

However, all these positive impacts must not obscure the problems posed by the mobile phone industry in developing countries. One particular problem is that mobile phone services represent a major expense item in the budgets of the poorest households which may then be inclined to reduce expenses for their basic needs (education, health, food, clothing). Moreover, as a result of the high cost of the services provided, penetration rates still remain limited. It is likely that the most disadvantaged segments of the population will continue to be unprofitable for the operators, and will, as a result, be excluded from this technology over the long haul. A whole host of structural constraints the small size of markets, the high entry costs in the sector, the all too often deficiencies of regulatory authorities and the risks inherent to investments in regions that can be politically unstable severely hamper the possibility of strengthening competition in these countries. There are de facto usually very few operators in these markets. In addition, operators prefer to develop services with higher added value (for example, mobile banking, mobile Internet...) rather than increase their number of subscribers. Finally, the boom in the mobile phone industry has unquestionably put a brake on the development of landlines which ...

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... – it has to be said – was already rather slow. In doing so, it has further reduced prospects for deploying cable networks which are however essential for implementing a low-cost telecommunication system accessible to all. Internet may be developing via mobile phones, but its widespread dissemination may be limited by the lack of classic wired networks.

Development financial institutions (DFIs) can both strengthen the positive effects of the mobile phone industry and limit its negative effects. They certainly have a role to play in this sector, for example by encouraging new operators to invest. Indeed, competition can help increase penetration rates and bring down the cost of services. In addition, DFIs can promote the implementation of services that have a proven impact on the development of economic activity - mobile banking for example. Indeed, they work with both banks and local operators and are in an ideal position to promote closer ties between them. DFIs can also foster the circulation of information on local markets - particularly agricultural or agribusiness markets. By seeking to develop communication platforms for small producers they can help reduce information asymmetries. More generally, the aim for DFIs is to develop mobile phone services oriented towards economic activities. Finally, these different types of actions to support operators may also be combined with programs to support public institutions in developing countries in order to strengthen regulatory frameworks and regulatory authorities.

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