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MOBILE OPPORTUNITIES:

Poverty and Telephony Access in Latin America and the Caribbean

Background paper

Mobile Use/Adoption by Micro, Small and Medium Enterprises in Latin America and the Caribbean

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Mobile use/adoption by Micro, Small and Medium Enterprises in Latin America and the Caribbean

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I. Introduction

It is argued that the diffusion of Information and Communication Technologies (hereafter ICTs) is changing the way companies compete, their business models, and their value-adding processes. New opportunities are arising, affecting the creation of new firms and affecting business processes which rely even more on information and knowledge. These evolving processes are due to ICTs capability to transfer, to collect and to manage great amounts of information and to reduce space and time barriers. Hence, firms seek to reduce transaction costs of information-intensive activities by resorting to modern ICTs, such as, to name a few, fixed and mobile telecommunications, Internet, E-commerce, Electronic Data Interchange-EDI, Enterprise Resource Planning Systems-ERP and so forth. These opportunities may specially favor – at differing levels and scale – micro, small and medium-size enterprises (hereafter

MSMEs) that in many cases operate in a dense network of inter-firm relationships and, consequently, manage a great amount of information.

It is already acknowledged that up until now there has been no cut and dry positive linkage between ICT in general and an increase in trend growth in most countries[1]. In addition, as yet, there is also no clear cut way to explain penetration rates of component ICT technologies, even the most pervasive ones as Internet and mobile telecommunications, across a diverse range of countries, beyond changes in regulatory regime as a triggering event[2]. Traditional socio-economic markers such as GDP growth rate, GDP per capita as well as other socio-economic and geographic factors usually fall short of accounting for different penetration rates of mobile telecom, although some exhibit a strong correlation, e.g. income per capita[3].

A significant amount of research and international studies have been confirming that the production, utilization and the productivity associated to ICTs have been, although not entirely, among the most important factors behind the improved economic performance of many industrialized countries in the 1990s, more particularly the United States. In the past decade, the pace of technological change led by ICT developments quickened and the structure of developed economies, and of a few developing ones, migrated towards services; the previously quasi-automatic employment effects of economic growth were greatly damped and their transmission mechanisms became more complex. Globalization induced enhanced international competition and factor mobility further compounded the employment challenge for developing countries.

On the one hand, growth in manufactured trade and in the national service economies has opened up new opportunities of growth for (formal) MSMEs, the poor which reside in rural areas, are mostly illiterate, self-employed and unskilled rural laborers or subsistence farmers, often speaking a minority

[1] OECD, 2003.
[2] Gebreab (2002).
[3] ITU (2003).

language[4]. On the other, informal MSMEs which constitute the majority of establishments in countries with significant poor population, have seen their income and their revenue growth prospects further impaired by these trends, suggesting that the lives of a significant part of their population have not yet been touched by the innovations and progress brought about by modern ICTs. This is the case of many countries in Latin America and the Caribbean (hereafter LAC) where, in the past, institutional, socio-political and (macro) economic factors, although not homogenously for each country, have in part contributed to such backwardness.

Nevertheless, there seems to be positive growth effects related to the roll-out of discrete ICT technologies such as telecommunications, both fixed and mobile, with the latter exhibiting some convergence between countries and smaller differences within countries. Yet, as the mixed results of previous studies on the impact of fixed telecommunications on the poor show, it may still be too early to establish the social impact of mobile telephony on poverty alleviation and, more particularly, to fostering entrepreneurship, promoting the social inclusion of marginalized informal firms and workers, and enhancing the sustainability of competitiveness of formal MSMEs[5]. Studies found that the impact of telecom penetration rates is enhanced at near universal services, that there is a critical mass effect for developed countries and that the network effects may favor larger economies, partly explaining the low overall impact of telecom diffusion for developing countries, still far away from universal services[6].

Taking into account this brief scenario above, the main objective of this paper is then to review existing data on mobile use and adoption by MSMEs available in the LAC region and elsewhere in the developing world, to summarize findings and to suggest research areas and strategies necessary for a better understanding on the importance of mobile telephony for increasing creation and competitiveness (and, consequently, social quality conditions) of LAC

[4] Kenny (2002).
[5] It has been shown for past historical periods, that growth in fixed line telephone density is correlated with faster increase in poor income but event quicker progression in the incomes of the rich, thus ultimately generating growing inequality. Coyle, 2005.
[6] Coyle (2005), Roeller and Waverman (2001) for the critical mass effect and Qiang et al.(2003) for network effects.

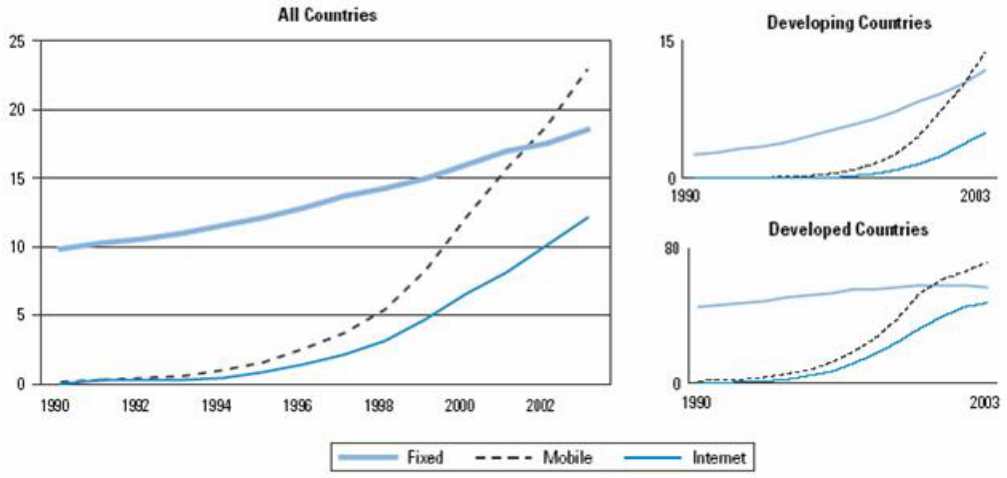
MSMEs, particularly those operating in the informal sector and at the bottom of the pyramid.

II. Impact of Telecommunications on Economic Growth in Developing Countries

At the end of the 1970s, the celebrated anthropologist Clifford Geertz presented the following assertion in respect to developing countries: “information is poor, scarce, mal-distributed, inefficiently communicated and intensively valued”.[7] At that time, residents of remote villages had enormous difficulties in discovering prices of commodities and farmers would not have access to alternative sources of fertilizers or to alternative buyers of their products without phone connections. In developed countries, such backwardness has been properly addressed long ago, with practically the whole industrialized world exhibiting penetration rates at universal access levels. In the developing world, though, it took more than three decades for this to happen, so that nowadays we see some convergence with developed country rates, mostly in urban areas, as shown in Figure 1. Yet, in most of poor rural communities – and even urban areas of low-income economies – there is not either a sufficient infrastructure or a positive price structure so that many developing countries still experience a sort of *telecoms trap*: the lack of networks and access in many communities increases costs, and consequently reduces opportunities because information is difficult to gather. In turn, the resulting low incomes reduce the ability to pay for infrastructure rollout.

[7] Clifford (1978).

Figure 1 **- Fixed, Mobile and Internet subscribers in all countries (per 100 people)**



Source: World Bank, 2006.

Figure 1 is illuminating in the sense that it portrays the evolution of telecommunications diffusion in both developing and developed countries. In particular, mobile phones are playing the same crucial role that fixed telephony played in the richer economies two to three decades ago.[8] Mobile phones substitute for fixed lines in poor countries, but complement fixed lines in rich countries, implying that they could have a stronger, and perhaps different, growth impact in poor economies. Many countries with under-developed fixed lines networks have achieved rapid mobile telephony growth, nearing universal access in some sub-regions, with much less investment than fixed-line networks would have needed, as shown in Figure 2.

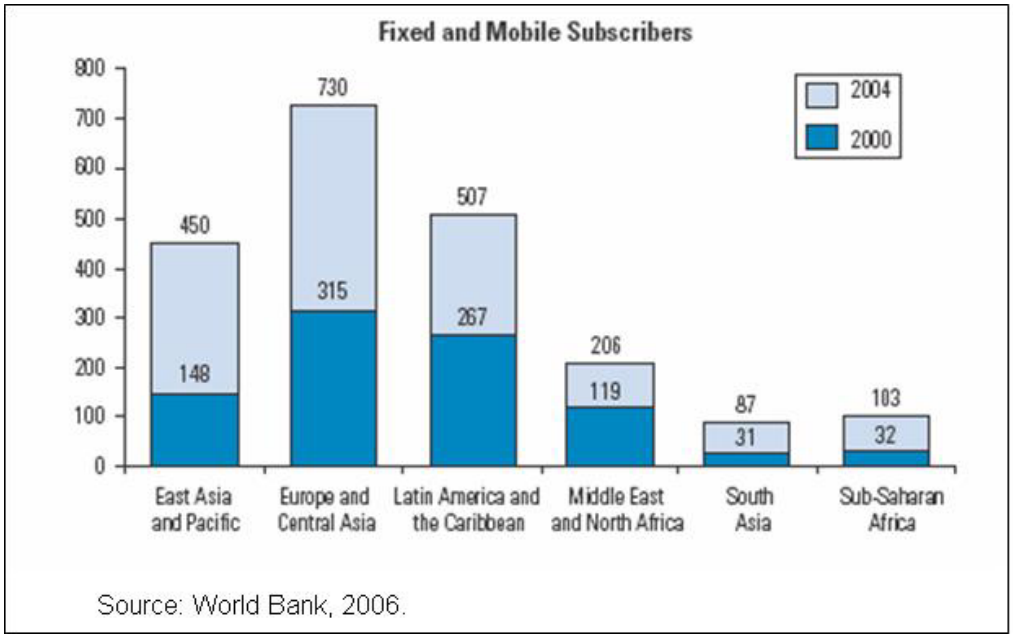
Mobile phones are thus responsible for the recent growth in world telephony, which now outnumber fixed ones. In Nigeria, the number of mobile subscribers jumped from 370,000 in 2001 to 16.8 million in 2005, making its mobile market the second largest in Africa. In the Philippines, which has had more mobile than fixed telephone subscribers since 2000, mobile subscribers continue to multiply. By the end of 2005, the Philippines had about 40 million mobile subscribers – six times more than in 2000. Mobile phones have an especially dramatic impact in developing countries – substituting for scarce fixed connections, increasing

[8] Waverman et. Al (2005).

mobility, reducing transaction costs, broadening trade networks, and facilitating searches for employment. The use flexibility provided by mobile telephony, with prepaid services and calling cards, made that even poor households have been able to benefit from increased telephone access. [9]

Telephone services now reach many small cities and towns, and by 2005 half of the world's households had telephones. Among developing regions the telephone subscription rate is highest in Europe and Central Asia, where between 2000 and 2004 it more than doubled to 730 per 1,000 people. But growth was highest in Sub-Saharan Africa, with the rate tripling—albeit to a still-low 103 subscribers per 1,000 people. With the subsequent rapid growth of mobile phones in many, but not all, of these countries, the average penetration rate of mobile phones alone rose to 8 per cent in 2003. In 22 of the 102 countries, mobile penetration reached double digits in 2003. And in 7 countries, over one-quarter of the population had mobile phones in 2003 – Albania, Bosnia, Botswana, the Dominican Republic, Paraguay, the Philippines and Thailand.

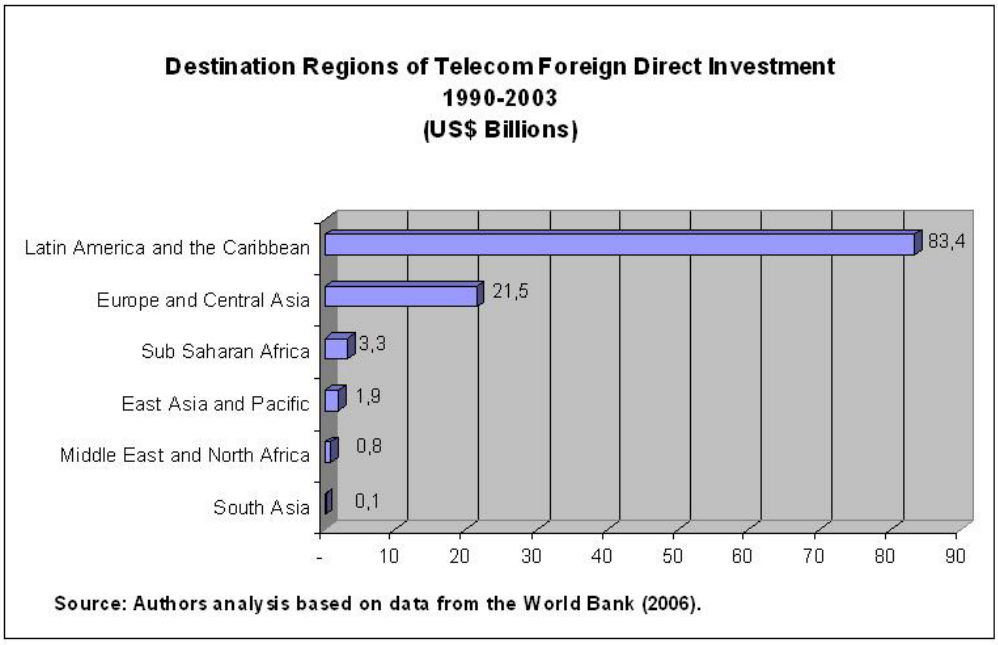
Figure 2 **- Telephone Access by Region, 2000 and 2004 (per 1,000 people)**



[9] World Bank (2006).

During the 1990–2003 period telecommunications projects accounted for 12 % of FDI in developing countries, amounting the sum of US$ 230 billion. Countries with well-regulated competitive markets have seen the greatest investment.[10] Several firms, such as Orascom Telecom, Vodacom, Telecom Italia Mobile (TIM), and Telefónica de España, specialized in providing mobile access in developing countries. Handset-makers, meanwhile, are racing to develop cheap handsets for new markets in the developing world.[11]

Figure 3 **- Telecom FDI by Regions 1990-2003**



Latin America and the Caribbean figure out as the region that attracted more than half of the world FDI in telecommunications, while Europe and Central Asia received about a quarter. These large shares reflect the prominence of middle-income countries in telecommunications FDI: during 1990-2003 low-income countries received just 6% of such investment, as portrayed in Figure 3. LA&C, Europe and Central Asia are the two regions with the highest percentage of countries in which private capital has become a significant source of funding for the telecommunications sector. By and large, it was the wide privatization of telecom infrastructure throughout the 1990s in most of the middle-income LA&C

[10] World Bank (2005, 2006).
[11] See, for instance, the September 21st 2006 Economist article titled “Splitting the Digital Difference”.

countries that paved the way for such a massive presence of FDI investments. Privatizations accounted for 70% of total investment in projects with foreign participation in Latin America and the Caribbean, 48% in Europe and Central Asia, and 35% in Sub-Saharan Africa. Large privatization transactions in Latin America and the Caribbean during that period included: Argentina ($3.3 billion in 1990-92); Mexico ($7.5 billion between 1990 and 1994); República Bolivariana de Venezuela ($2.9 billion between 1991 and 1996); Cuba ($1.4 billion in 1994); Peru ($3.1 billion between 1994 and 1996); and Brazil ($34 billion in 1998 from the privatization of the Telebrás system).[12]

Increasingly, in developing countries, modern telecom systems are largely mobile systems and not fixed lines. The reason is the lower cost and faster roll-out of mobile systems as compared to fixed lines. It has been estimated by recent studies that a mobile network may cost 50% less per connection than fixed lines and can be rolled out appreciably faster.[13] The cost advantages of mobile phones as a development tool consist not only of the lower costs per subscriber but also of the smaller scale economies and greater modularity of mobile systems.[14] As networks grow, their social value rises. This in turn suggests that the marginal social return – the value to society of an additional person connected or of an additional dollar invested in the network – exceeds the private return to the network provider, if that provider cannot price so as to extract these externality values.

[12] World Bank's World Development Indicators (WDI) and International Telecommunications Union's World Telecommunications Database.
[13] Waverman et al. (2005).
[14] Coyle (2005).

Exhibit 1 **Mobiles in LAC at a glance**

- The Latin American and Caribbean economy grew by 4.5% in 2005, and the region's per capita GDP is estimated to have risen by about 3%. All Latin American countries recorded positive growth rates, ranging from 1.8% in Haiti to 9.3% in Venezuela.
- Economic expansion is expected to continue unabated in 2006, and ease slightly in 2007. GDP growth for Latin America and the Caribbean is projected to be 4.6% in 2006, and 4.1% in 2007.
- The drive towards consolidation, witnessed in 2004, continued in 2005-2006, with América Móvil buying mobile operations in Chile, Peru, and Paraguay; Telecom Italia divesting its investments in Chile, Peru, and Venezuela; and Verizon deciding to pull out of the region altogether. In April 2006, Verizon agreed to sell Verizon Dominicana (Dominican Republic), Telecomunicaciones de Puerto Rico, and CANTV (Venezuela) to América Móvil and Telmex.
- Despite a low 17% average teledensity in the whole Latin American and Caribbean region, fixed-line growth continued to stagnate in 2005. Telecom infrastructure varies greatly from country to country and from urban to rural areas.
- There is a marked trend towards the use of alternative systems in fixed-line telephony, especially Wireless Local Loop (WLL) and Voice over Internet Protocol (VoIP).
- In 2005, Latin America was only second to Asia in rolling out WiMAX networks. By April 2006, WiMAX systems were operating in Argentina, Brazil, the Caribbean, Chile, Colombia, Costa Rica, the Dominican Republic, Guatemala, Mexico, Peru, Uruguay, and Venezuela.
- In March 2005, Chile's VTR was the first company in Latin America to launch Broadband Powerline (BPL) services commercially, for its residential clients.
- 2005 was a big year for triple play in Latin America, with several countries seeing this strategy for the first time. By early 2006, triple play services had either been launched, or were planned, in the following markets: Argentina, Brazil, Chile, Colombia, El Salvador, Guatemala, Honduras, Mexico, Panama, Puerto Rico, Venezuela, and Uruguay.
- In April 2005, Telefónica Móviles adopted the Movistar brandname for all of its operations (except for Brazil, where the Vivo brand was retained) in order to create a unified image internationally. The company manages companies in Argentina, Brazil, Chile, Colombia, Ecuador, El Salvador, Guatemala, Mexico, Nicaragua, Panama, Peru, Puerto Rico, Uruguay, and Venezuela.
- TDMA, traditionally the leading mobile technology in Latin America, was overtaken by GSM in March 2005, and by CDMA in late 2005. The number of TDMA subscribers in the region has been falling since 2004.
- In 2005, TDMA subscribers decreased by 21%, CDMA subscribers increased by 41%, and GSM subscribers soared by 133%.
- At end-2005, the number of GSM subscriber was more than double the number of CDMA subscribers. Every country in Latin America and the Caribbean (except Haiti) enjoys GSM-based mobile services. In terms of GSM subscriber numbers, Latin America was one of the fastest growing regions in the world in 2005.
- In early 2006, EDGE technology was being rolled out or was already in service in approximately 30 Latin American and Caribbean countries, including Argentina, Bermuda, Bolivia, Brazil, Chile, Colombia, Ecuador, Guatemala, Mexico, Paraguay, Peru, Trinidad & Tobago, and Uruguay.
- In early 2006, Latin America had 39% of the world's CDMA 2000 1xEV-DO networks. Countries with commercially operating cellular 1xEV-DO services included Bermuda, Brazil, Chile, Ecuador, Puerto Rico, Mexico, Guatemala, and Venezuela. In Argentina and Brazil, 450MHz CDMA 2000 1x and 1xEV-DO networks have been rolled out for WLL.

Source: 2006 Latin America Telecoms, Mobile and Broadband - Overview Paul Budde Communication Pty Ltd., May 2006, Pages: 82.
http://www.researchandmarkets.com/reportinfo.asp?report_id=338212

III. The LAC MSMEs Scenario

According to the Inter-American Development Bank, LAC MSMEs are responsible for 20% to 40% of jobs created. In the 14 largest economies in the region, in 2001, there were about 8.4 million firms operating in the formal economy, of which 93% were micro-enterprises (up to 5 or 10 employees, according to each country's definition of SME); 6.8% were small and medium enterprises (between 5-10 or 100-200 employees); and only 0.2% were large enterprises, most of them multinational firms (more than 200 employees). Micro, small and medium firms accounted for 60% to 80% of employment in most countries in the region. In the 1990's, micro-enterprises and SMEs have created, respectively, 6 out of 10 and 3 out of 10 new jobs. Their share in total production, in most LA&C countries, is between 30% and 60%.[15]

In Brazil, as the Brazilian Small Business Support Agency (SEBRAE) points out, micro and small enterprises represent about 3.5 million companies, accounting for 98.3% of all enterprises registered in Brazil and contributing to 43% of the Brazilian income, 20.6% of GDP, 59% of labor force and 42% of salaries paid. In Mexico, SMEs account for 50% of the country's GDP and in Chile they represent 99% of the total where micro enterprises occupy about 82 % of this total.[16] In Ecuador, SMEs employ about 60% of the total labor force contributing to over 30% of the country's GDP. However, many of these local industries are static as major technological changes in products and processes have hardly occurred, as many studies on LAC MSME issue point out.[17]

The importance of SMEs to job creation is not a new phenomenon in the literature.[18] Nevertheless, there is no consensus yet about the main causes of informality in both employment and entrepreneurship. Given the hazardous consequences to quality job creation – notwithstanding its social consequences – the informal economy is a *benign plague* in the region's socio-economic

[15] BID (2002).
[16] The Anglo-Mexican Foundation and Corfo.
[17] See, for instance, BID (2002), Crespi (2003), Stumpo & Dini (2004), De Nigri & Salerno (2005).
[18] Pyke & Sengenberger (1992); Butera (1999); Becattini et al. (2003); and Caniëls & Romijn (2003).

fabric. In Brazil, according to SEBRAE, there are 10 million informal enterprises employing 13 million people. In Chile, according to CORFO, almost half the country's SMEs are informal. In Ecuador, this figure comprehends more than half the firms in its manufacturing business.[19] This picture is not much different in other countries, and even more skewed in the smaller and poorer ones. The main causes, although varying from one country to another, can be derived by macroeconomic aspects (more particularly high interest rates and its impacts to credit provision and investment), inadequate incentive systems for growth and opportunity-drive in entrepreneurship, low educational levels of entrepreneurs, high levels of bureaucracy in local public administrations, corruption and lack of trust in public authorities.

Even though informal firms constitute the majority of micro and small enterprises in the larger and more advanced economies of the LAC region and the majority of the firms in the smaller and more backward economies, overall they represent the major source of employment in the region. Yet it is still far from clear that small is beautiful in terms of net employment (usually negative) and employment stability (high employees rotation), if the performance of micro formal firms can be taken as a proxy. Most of these firms generate comparatively few jobs beyond self-employment or family lifestyle business model. Moreover it seems that the skill requirement of these firms is relatively low, as they generally do business in traditional, technologically mature industrial sectors and in low entry barriers service segments. Of course, in some smaller countries and in those with high levels of poverty, the majority of these firms are in the agricultural sector, requiring very low levels of qualifications. In general, the market and institutional environment in which these firms operate do not generate incentives for them to take up ICTs, even the relative low-cost ones as mobile telecom. If and when they do, it is likely that they will make sub-optimal use of them; refuse to see their full competitive value and thus neglect to make needed organizational changes for full appropriation; and fail to adapt and adopt them to enhance internal business processes, strategic learning and cooperation capacities.

[19] Ministerio de Industrias, Comercio y Competitividad de Ecuador, 2002.

Although fundamental engines for job creation and economic growth in the LAC region, MSMEs – particularly micro-enterprises – have not yet caught up the same benefits of experiences brought about by mobile telephony in India and a few African countries. Even though mobile telephony usage has significantly increased in the region, its impact in enterprise development and growth, and in job creation has not yet considerably changed the social and productive fabric of micro-enterprises in the region, in many cases due to high costs of phone calls and low supply of associated solutions (software for mobile telephony and targeted services by operators) as well as related microcredit. The main reasons behind this phenomenon in the region have not yet been sufficiently explored so that more research is needed to identify and understand the barriers blocking an effective translation of mobile telephony usage into business opportunities, particularly by both young and adult micro-entrepreneurs.

IV. Recent Experiences: Analytic Shortcomings

IV.1 Lessons from International Experiences

It was only very recently that mobile technologies started to be taken more seriously into account in the policy and industry arenas in both developing and developed economies. The March 10th 2005 Edition of The Economist magazine portrayed a critical view of the "mainstream" digital divide argument, by resorting to the Vodafone study on the socio-economic impacts of mobile telephony in Africa.[20] According to this article, it is mobile technology what really deserves special concerns of policy makers and industry alike so that to more effectively tackle the causes of digital exclusion and, consequently, to promote sustainable development: "[…] even if it were possible to wave a magic wand and cause computers to appear in every household on earth, it would not achieve very much: a computer is not useful if you have no food or electricity and cannot read". The benefits of building rural computing centers, for example, seem so far unclear in terms of the expected socio-economic benefits to their target users. Rather than trying to close the divide for the sake of it, the more

[20] The real digital divide. The Economist, March 10th 2005.

sensible goal is to determine how best to use technology to promote bottom-up development. And the answer to that question, apparently, turns out to be remarkably clear: by promoting the spread not of PCs and the internet, but of mobile phones. The Economist article concludes by stating that the effective promotion of sustainable development rooted in ICTs is quite clear if not concentrated on the spread of PCs and the Internet, but rather on mobile phones.

The view expressed therein is corroborated by the research study sponsored by Vodafone, consisting on a pioneering analysis carried out by eminent (mostly European) academics, sociologists and economists to examine the socio-economic benefits of mobile telephony in Africa.

According to the referred Vodafone study, entitled "Socio-economic Impacts of Mobiles" – SIM Project –,[21] there is sufficient evidence to suggest that the mobile phone is the technology with the greatest impact on development. The study points out that mobile phones raise long-term growth rates, that their impact is twice as big in developing nations as in developed ones, and that an extra ten phones per 100 people in a typical developing country increases GDP growth by 0.6 percentage points. And when it comes to mobile phones, there is no need for intervention or funding from international donors and organizations. Today, even the world's poorest people are already rushing to embrace mobile phones, because their economic benefits are so apparent. Mobile phones do not rely on a permanent electricity supply, do not require formal training and can be used by people who cannot read or write. New media and new technologies are most readily adopted within populations when they meet established needs or offer substantial added value – and ease of access – in comparison with existing media and technologies. In the surveyed populations of the Vodafone study, the Internet faces considerable barriers to use, including cost, skill requirements and lack of valued content as well as difficulty of access and lack of experience in use. Take-up is also likely to be slower with more complex technologies.

[21] Coyle (2005).

The African experience is elucidating given the continents' critical development challenges. More than half the world's poorest countries are in Africa, and they face many of the world's most intractable social and economic challenges. Yet in the past five years mobile communication has grown faster in sub-Saharan Africa than in most parts of the world.[22] This dramatic growth has risen to meet a range of everyday needs stemming from Africa's particular physical, social and economic landscape. Physically, distances are enormous, which makes transport and travel difficult. People in isolated communities often do not have access to basic services including electricity and communication. Economic challenges include lack of information, infrastructure, employment, trade and finance.

Exhibit 2 **Lessons brought about by the African experience on the impact of mobile telephones in local poor communities.[23]**

• In Tanangozi, a farming community in west Tanzania, most butchers cannot stock large amounts of meat because they have no electricity or cannot afford a refrigerator. Butchers frequently run out of meat and cannot serve their customers. Customers can now use mobiles to place orders ahead of collection, enabling butchers to buy the right amount to satisfy their customers' needs, enabling efficiencies in the whole value chain. • In Mango Parish, a coffee farming community near Mount Kilimanjaro, mobile phones are helping to improve the taxi service. Instead of a 20-minute average wait, taxis can be called for passengers, on a 'just-in-time' basis. • In a township in Cape Town, mobile phones are used to buy electricity cards (pre-paid cards used by households to purchase electricity units). Households wanting to buy cards send a text message to the seller of electricity units, and then the electricity provider sends a text message to the household with the code number to make the purchase.	• Two job seekers from Kwa Kgapane, South Africa, found employment using their mobile phone. 42% of mobile phone users in the local community used their mobile phones for seeking employment, and 20% of mobile phone users made weekly calls about job opportunities. Having a mobile phone is important for not only making calls about opportunities, but also for being contactable should they be successful or should another position arise in the future. Without a mobile phone, and with no private fixed line service, there are few options for employers to contact prospective employees. • Mobile phones assist students in Kwa Phake, South Africa, to study with UNISA (University of South Africa) via correspondence. Instead of having to travel to institutions to find out critical information they can easily access the information over the phone. Monthly calls for education purposes were made by 31% of respondents in the village. • Mobile phones have been used to communicate with Tanesco, the electricity provider in Tanzania, to inform them of power cuts.

[22] According to data from International Telecommunications Union (ITU).

[23] Extracted from the Vodafone (2006). The British mobile operator commissioned two surveys in 2004 to learn more about these challenges on the ground and to find out the impact of mobile in developing countries. The first survey covered 475 people in South African and Tanzanian communities, while the second involved nearly 300 small businesses in South Africa and Egypt. The results of the survey are available in Vodafone (2006).

The evidence presented seems to corroborate the belief in the importance of mobile telephony in the developing world, more particularly in India and Africa, where most of the research carried out so far has been concentrated. In the countries surveyed, phones were widely shared and rented out by the call, for example by the "telephone ladies" found in Bangladeshi villages.[24] Farmers and fishermen use mobile phones to call several markets and work out where they can get the best price for their produce. Micro and small businesses use them to shop around for dealing prices with different suppliers. Mobile phones are used to make cashless payments in Zambia and several other African countries. Even though the number of phones per 100 people in poor countries is much lower than in the developed world, they can have a dramatic impact on reducing transaction costs, on broadening trade networks and on reducing the need to travel, which is of particular value for people looking for work.[25] Little wonder that people in poor countries spend a larger proportion of their income on telecommunications than those in rich ones. On the other hand, results of a survey on the economic impact of mobiles on rural small business in South Africa, Tanzania and Egypt found that most of the interviewees reported increased sales and profits, saved time and acquired greater efficiency[26]. Obviously, this latter research regarded formal and legally established businesses.

Another recent study, carried out by the UK Department for International Development (DFID), to evaluate attitudes of rural people towards mobile telephony in Tanzania, Mozambique and India confirms this trend, also presenting other relevant findings. Interviewees in these countries declared that they do not generally use phones for business activities, although a small proportion does value them highly for this purpose. Phones are valued more for saving money than for earning it and very few people among those interviewed find them useful for gathering information.[27]

[24] The telephone ladies of Bangladesh became known after making a business of charging others to use their mobile phones.
[25] Goodman (2005), DFID (2006).
[26] Goodman (2005).
[27] DFID (2006).

Important research areas and topics not yet explored by these studies, sponsored or not by mobile telephony operators, like the Vodafone study itself, include economic evaluations of the supply side, studies of mobile user attitudes and strategies of mobile service firms and public regulators in developing countries. Again, in Africa, in comparison with the sluggish growth and high monthly rentals of fixed telecommunications, mobile operators have attracted large numbers of customers with packages of handsets, calls and text messages that are considered to be affordable by a significant part of the population. This can be observed in most of the countries which liberalized their State-owned telecom sectors. Notwithstanding this, many complaints have been made about the poor quality of services, high prices for local calls and roaming, as well as about the inadequate levels of customer care services provided by African operators. On the regulatory side, a growing concern in the African continent is that regulators are not being capable of dealing with the market power of international heavy-weight operators who drive prices up and competition down.[28] Such market inefficiencies arise from the low levels of competition and the high degree of concentration and can largely be addressed by increasing competition.

To conclude, the digital divide that really matters then, seems to be the one between those with access to a mobile network and those without. It seems that this gap is closing fast, particularly in Latin America. The United Nations has set a goal of 50% world access to mobile telephony by 2015, but a new report from the World Bank notes that 77% of the world's population already lives within range of a mobile network.[29]

The possible areas of research intervention have been split into five prospective segments: identification of potential barriers; market opportunities; growth strategies; firms; infrastructure provision.

IV.2 Implications to Latin America

[28] Sutherland (2006).
[29] World Bank (2006).

Based on the above discussion, this section identifies research gaps to Latin American and Caribbean countries so to more effectively (and functionally) understand how mobile telephony can be translated as a lever to enhance entrepreneurship and MSME growth and to promote economic development in the region. As discussed above, the few studies available so far have targeted developing countries in Asia and Africa, with little attention to LAC experiences. LAC countries in particular have seen in the recent past a substantial inflow of consulting reports and academic studies on the importance of ICTs to firms, people and institutions (public or private) in general. They show that, notwithstanding the ICT-based Information Society fuss in the region, not much has been turned into concrete policy and industry action, except for some small countries, individual regions and isolated experiences.[30]

While it is not easy to establish the ICT-specificity of policy instruments, particularly for MSMEs, mobile telephony seems to have a different role, given the faster network effects associated to its expansion, the positive externalities arising from its diffusion, the low costs of its implementation and the low educational investments related to its utilization. Not to mention the limited need of public funds to its diffusion in low-income communities.

The possible areas of research intervention so far identified have been split into five prospective segments: infrastructure provision; market opportunities; growth strategies; and individual firms.

Infrastructure

After financial considerations, most research on the ICT theme in developing countries point out that Internet access and staff capacity remain key constraints in MSMEs seeking to grow and at the same time to benefit from ICTs. Confidence in technology and the lack of a coherent strategy are also

[30] See Botelho & Alves (2005) for a literature review on the theme in Latin American and Caribbean countries.

significant factors, with many SMEs owners admitting to difficulties in knowing how to effectively harness ICTs into their business. In terms of mobile technology, as discussed in Section II, LAC received half of the world's FDI investments in the last decade, particularly due to changes in the regulatory regimes and privatizations carried in the 1990s. As a consequence, most of the LAC region presents a good telecoms infrastructure, as well as very widespread mobile telephony penetration rates for developing country standards, although it is not yet sufficiently known the overall impact of telecoms on LAC GDP growth. The methodology used by Waverman et. al. (2005) in African countries could be useful in this attempt.

The telecom market is also very competitive in many of LAC countries, particularly in urban areas. The continent also has both CDMA (US standard) and GSM (European standard) mobile telephony systems so that in some countries, as in Brazil, different companies operate in both segments, competing for new customers with aggressive marketing campaigns. Nevertheless, although very widespread in the region, mobile telephony has not yet been translated into a strategic lever to increase the competitiveness of MSMEs, particularly smaller ones operating in the booming informal economy which cannot – by their size and limited resources – rely on other ICTs such as PCs, Internet, decision-making and production management tools. A significant growth, though, has been evidenced in certain associated services, such as e-Banking or m-Banking. In Brazil, Banco do Brasil and Bradesco are offering their corporate customers with the possibility to pay their bills and to perform other banking transactions via mobile phones. As the latter experience is very recent, it would be of good value to concentrate some research efforts on understanding how such associated services are benefiting LAC MSMEs as well as potential barriers found to sustain its effective utilization.

Additionally, and still on the supply side, there are not yet many firms providing mobile solutions geared towards LAC MSMEs. As the m-Banking Brazilian experience suggests, most mobile solutions so far have been developed (or sponsored) by large firms to their customers so that very few firms – apart those operating in the entertainment business (games) – have been specialized in providing tailored mobile applications to MSMEs. It would be worth

understanding whether such barriers lie on the supply side (reduced or very low financial returns) or on the demand side (mobile users not willing to pay for services they do not see potential benefits for). The security issue (cloning, encryption) is another argument that deserves special attention, given that it can be at the heart of important mobile transactions with potential economic value (m-Banking, for instance).

Still, it could be of significant importance to understand how regulation could be improved so to launching the basis for the approximation of handset makers, mobile telecom operators and their users, particularly those in the low to middle-income range. Tax exempts, as already being applied to low income customers and firms for the acquisition of PCs, for instance, tend to be considered as initiatives targeted to tackling the digital divide in developing countries. How could regulation act in the price structure so that to interfere in the demand elasticity of LAC micro and small firms for mobiles, for instance? Are there similar experiences being carried out in Latin America or in other developing countries in this direction? Is regulation in Latin America and the Caribbean powerless to face telecom giants (most of them foreign multinationals) as the African regulatory system is? Is price really blocking the translation of mobiles into better business opportunities to SMEs?

Market Opportunities

- Do marketing strategies like those geared at brand loyalty promotion work out when applied to providing micro and small firms with suitable information of their interest via SMS? Are people willing to pay for information such as weather forecasting, jobs, prices of raw materials etc? How can it be translated into new business opportunities to MSMEs?
- Can specific ICT applications such as those combining Radio Frequency Identification (RFID) with mobile telephony, designed to increase the productivity of technicians, inspectors and retailers be appropriately used to increase the efficiency of LA&C MSMEs? Are there firms specializing in developing such applications in the region?

- Can geo-referenced marketing applied to mobile technologies, as European pilot experiences have been showing, work out in LA&C? How users could benefit of such technologies?
- Particularly in the informal sector, as the experiences in Africa, India and Bangladesh have shown, can mobile technologies increase communication and reduce transaction costs throughout communities of informal entrepreneurs, their customers and suppliers? What communities and businesses are more *elastic* to mobile telephony utilization as a business ally? Can it promote business model upgrading?
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Growth Strategies

The relationship between mobile telephony and sustainable development in the LA&C region has not yet been exhaustively explored so that no consensus has yet been built around this theme. Main areas in this segment can be grouped in the following categories:

- Employment: how can entrepreneurship experiences such as the ones evidenced by the “Bangladesh ladies” and the others reported in poor rural African communities be stimulated in LA&C? Are low-income LA&C countries this similar to the other developing countries already surveyed so to see the same convergence in terms of mobile telephony roll out? How can mobile telephony be translated into employment opportunities to their users?
- Turnover (revenues): particularly in poor rural communities, transportation costs tend to be prohibitive to many informal entrepreneurs who need constant interaction with their customers and suppliers. Time and low quality of transports tend to increase risks and so to blocking entrepreneurial attitudes of rural people. Could mobile telephony contribute to reducing these transaction costs and hence increase their revenues and, consequently, their quality of life?
- Flexibility and cooperation: academic evidences and studies carried out in the LA&C region have been stressing the increase in the last decades of the agglomeration of firms – particularly MSMEs – in certain areas of production specialization (clusters and industrial districts). This organizational phenomenon is not new in industrialized countries, where SMEs within a

value chain agglomerate to explore the synergies arising out of cooperation among firms and the consequent flexibility of production. In the same direction, a myriad of studies have been pointing out the benefits brought about by modern ICTs to facilitate the flow of information, to reduce transactions costs, to reduce time to market and to enhance decision making within clusters. Nevertheless, no previous study, including the ones carried out in Africa and the Middle East on the socio-economic impacts of mobile telephony, have stressed whether or not mobile technology could enhance the integration of micro and small firms within clusters and industrial districts.

- Sustainability of firms: market opportunities arising out by modern ICTs, such as e-Commerce, ERP systems, VoIP, Supply Chain Management (SCM) tools have been of much more relevance to medium and large firms than to micro and small firms in LA&C, given the investments in infrastructure, education and production scale required to the effective roll out of such technologies. A significant amount of small-to-medium and medium-to-large firms, by resorting to ICTs, have gained new markets and thus guaranteed conditions for promoting their business' sustainability. Though, LA&C micro and small firms have not yet caught up the benefits of modern ICTs, in particular due to the lack of incentives for them to take up ICTs. The questions that could be arisen so to understanding how mobile telephony could promote the sustainability of micro and small firms could be the following: a) could microcredit provide such firms with the lacking incentives to take up mobiles? b) do entrepreneurs see any significant benefits into using mobile technology as a business ally? c) are LA&C entrepreneurs acquainted on the possible advantages of mobile technologies to their businesses?

Firms

At firm level, some microeconomic concerns underlie the utilization and diffusion of mobile technologies so that more research is needed to understand, for instance, whether it is price and/or the availability of quality associated

solutions (e.g. software) in mobile technology that constitute determinant conditioning elements to promote mobile roll out by LAC SMEs. Other aspects deserving more attention by researchers and experts include, for instance:

- Organizational efficiency: how could mobile phones increase the organizational efficiency of firms? The increased communication of employees in different units or even outside the firm, the possibility of sending/receiving e-mails and exchange documents via mobiles increase the organization efficiency of Latin American firms? Are there cases of best practices to be reproduced and shared?
- Capacity building: could mobile telephony promote the same capacity building benefits to firms as other ICTs do?
- Management: can mobile telephony support decision making, particularly by enhancing the access to quality and sensitive information micro and small entrepreneurs would not have otherwise access to?
- Technological innovation: is there any relationship between technological innovation, or even organizational or process innovations, with the effective roll out of mobile solutions?
- Competitiveness: can mobile telephones increase competitiveness of firms? Are there evidences sustaining that mobile technology reduces costs and promotes market integration, particularly to MSMEs located in rural areas? If not, how could mobiles promote market efficiency and competitiveness of firms?

V. Conclusions and Recommendations

MSMEs are the pillars of the bottom of the pyramid market and therefore the main avenue for sustainable poverty reduction. While there have been recently calls from international organizations to embed ICTs into SME policy (e.g. UNDP, 2005; OECD, 2004), policy recommendation have been limited to lists of discrete MSMEs corporate functions and government service provisions that can be improved through the use of ICTs without specifying the differential advantages, barriers and impacts of various ICT technologies, individually as well as their cumulative effect.

This paper was based on an extensive review of different aspects of the mobile telephony and MSMEs topic. The available documents, however, are heterogeneous and fragmentary. For example, data on the attitudes of users of mobile services have still not yet been collected and analyzed on a systematic basis. Mobile telecom suppliers themselves provide a large share of information sources. Alongside with useful information, they are at the same time promoting research initiatives, which in some cases could be at pilot stages. Thus it is currently difficult to obtain reliable data MSMEs adoption and use of mobile telephony and its impacts.

An issue that has received increasing attention is the ability of developing countries to leapfrog technologies. The need for fixed line terrestrial infrastructures, for example, is questioned when the jump to mobile communications can be made instantly. Yet these arguments are not supported by research evidence. Nor does research point to the opposing argument: a lack of appropriate technologies and a lack of local ability to use and convert technologies to their advantage. The fact that developing countries regulatory agencies and incumbent telecom service providers are, in many cases, not open to experiment with the latest technology or that they cannot use this to their advantage, leads them to opt down for a step-by-step approach instead of leapfrogging into the unknown. The inconclusive nature of research on the meaning of appropriate technologies in this high-technology field (are low-tech ICTs possible or even useful?), and on the merits of technology leapfrogging in greenfield situations points to yet another area of further work.

- There's a need for comparable longitudinal base line studies of (formal) firm mortality and employment contribution across firm size categories and sectors controlled for mobile telephony use patterns..
- There's a need to map out sectoral distribution of informal firms, their patterns of employment generation and business networks, and how does mobile telephony has affected them.
- There's need to distinguish different dynamic patterns of discrete ICT tecehnologies adoption sequence and complementary usage among informal firms.

- There's a pressing need to assess the impacts of geographic focused (clusters) ICT take up policies, as they may quickly multiply in the region. Here one needs to be able to identify the good and the bad practices in order to refine policy and to promote cost effective policy learning.
- At the different analytic level, there's a need to understand differences in the nature and motivation of ICT uses, ownership and valuation by MSMEs.

Some remaining larger policy questions must also be addressed at a later date:

1. Should LAC governments focus on expanding low-cost technologies that are more easily adopted in both rural and urban areas, such as WiMax mobile phones, or on expanding more robust ICT services, such as broadband and fiber-optic cable, that require heavy infrastructure investment (see Exhibit 5 below)?
2. What is the role of large firms in supply chains and production networks in regard to the enhancement of the use of mobile telephony among participating MSMEs?
3. Are mobile telephony MSMEs specific development projects required to enable infrastructure build-out and services development or can their mobile telephony needs to be met through mainstream financing programs for businesses?
4. Given the cost of investing in the development of specific services for MSMEs, which institutions (i.e. state, NGO, business associations) should be charged with their development and become the first targets of government and donor efforts to drive mobile telephony adoption and effective usage?
5. What is the most effective way for these governments and donors to demonstrate the potential benefits of mobile telephony adoption and usage to firms?

Exhibit 3 **WiMax Technologies in the Brazilian Northeast State of Rio Grande do Norte**

Internet technologies are a moving target. They continue to evolve and to expand. As bandwidth continues to expand, it becomes technically feasible and cost-effective to integrate data, voice and video, thus making customer interfaces and services more user-friendly and richer in scope. Another key trend is the convergence between fixed and wireless networks, which is at the core of new mobile telecommunications networks (3G and CDMA). Many countries view this evolution as key to effectively lowering the cost of their service delivery channels. Though, it is

the private sector that seems to be taking the lead in the provision of effective solutions combining mobile and Internet-based technologies. Here follows a good example sustaining this view.

In the countryside of the Brazilian northeast state of Rio Grande do Norte there is a very interesting experience being carried out with poor rural communities in localities with virtually no mobile operators available. A pilot experience is being tested so that to incorporating broadband Internet and VoIP (Voice over Internet Protocol) with *mobile* technologies in eight municipalities. What is new in this experience is the combination of the WiMax technology with mobile telephony and broadband Internet for the benefit of poor rural communities. In sum, 500 users are connected over an extension of up to 300km, paying very low fees for both urban and interurban calls. As a matter of fact, as the project coordinator points out, local calls are made at a cost that is barely zero. Users pay an R$ 8.00 subscription to local operators, compared to R$ 40.00 charged by fixed telephony operators. The reason for this lies in the very low cost of IP-based telephony. Initial investments are up to US$ 75 per user compared with US$ 500 necessary to make a fixed telephony infrastructure available to a single user.

The user access is made available by a Wi-Fi network that is then connected to other localities by means of WiMax links. The latter work out as if they were *virtual cables* (wireless) supporting Wi-Fi networks to cover distances of up to 50 km. The WiMax technology functions as a bridge between broadband wireless (Wi-Fi) nodes and the users, in this case spread over a 300km network.

The technological support to the small local operators is being provided by a private US company, Voice Global. The company specialized in the design and implementation of IP infrastructure since 1999.

Other experiences being carried out in Brazil involve IT and Telecom giants like Intel, IBM, HP, Microsoft and Telefônica, and cover not only WiMax and WiFi but also another emerging wireless technology – WiMesh. All of these experiences are being acknowledged as pervasive ICT instruments geared at providing rural communities with mobile technologies combined with the low implementation and utilization costs associated to wireless Internet-based telephony.

As these projects are still in testing phases so that it is not yet possible to evaluate their socio-economic impacts in the communities served. However, initiatives like these are worth mentioning given the low investment and operational costs associated to the implementation of a mobile telephony strategy rooted in wireless Internet technologies. On the one hand, if such a business strategy proves successful in the near future, it may create a market niche that can be exploited by small locally-based mobile (IP) telecom operators and, on the other, to more effectively serve poor communities without relying on public funds from governments and donor agencies.

Source*: O Estado de São Paulo, September 24th, 2006.*

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