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research findings for development policymakers and practitioners

Mobile phones and development

The future in new hands?

'Explosive' is the only way to describe mobile phone growth. Half the world's 6.5 billion people now use a mobile (up from two billion just two years ago). There are more than twice as many mobile owners in developing countries as in industrialised countries. Subscriber growth rates in developing countries are 25 percent per year – and double that in Africa.

More and more development workers tell stories of mobile surprises – not just who is using them, and where they are using them, but also how they are using them. Through mobiles, the first digital information and communication technologies (ICTs) have reached poor households and communities. In less than a generation, the majority of poor people will have access to mobile phones and services.

What difference will this make? Mobile ownership brings two types of benefits.

Incremental benefits improve what people already do – offering them faster and cheaper communication, often substituting for costly and risky journeys. Evidence is diverse – from fishermen in Kerala, India, earning more money and wasting less fish by phoning different coastal markets, to improved relief planning in the wake of recent Peruvian earthquakes.

In this issue of *id21 insights*, **Ananya Raihan** describes use of mobile phones to deliver information to Bangladeshi villagers, often to those from particularly-excluded groups or locations. This has helped them solve a variety of problems – mainly related to health and agriculture – that would otherwise have been costly or difficult to address.

Transformational benefits offer something new – new ways to access services and support livelihoods. Evidence on this is only just emerging because it relies on a mobile's ability to be 'more than just a phone'. **Jonathan Donner** summarises one area of promise: 'm-banking', which is allowing wider access to banking and other financial services.

In addition, there are ***production benefits*** that come not from using but from selling mobiles and related services. One of the best known examples is the creation of new livelihoods for women running each Grameen Village PayPhone in Bangladesh. Many others worldwide are also making a new living through activities like re-selling airtime and prepay cards, or even selling ringtones and phone covers.

Making a call at a phone booth run by Douglas Oduori in Funyula, Kenya. He operates a handset which is modified to function as a Global System for Mobile communications (GSM) wireless phone. The area recently received mobile phone coverage, so telecommunications companies, including Celtel and Safaricom, are fighting for a share of the market
© Sven Torfinn/Panos Pictures, 2005

As with all technologies, where there are benefits, there are also inequalities. As we talk of the 'digital divide', so we can talk of a 'mobile divide' between people who have mobile phones and those who do not. There may also be inequalities amongst people who have phones, because of the social context into which all new technologies are introduced, and by which they are shaped.

Daniel Miller reports on the various impacts of mobile phone use on different groups in Jamaica. Those already employed, in some cases, use mobiles to make money by selling more of their goods and services. By contrast, those who are unemployed use their phones to try to get money by 'link-up' with broad social networks.

Abi Jagun shows that mobile ownership has benefited producers in Nigeria's informal textile sector, increasing their trade at the expense of those who lack access to mobile telephony. But she also describes how those in powerful positions in the supply chain are strengthening their position through mobiles. Likewise, **Kutoma Wakunuma** traces the interplay of mobiles with husband-wife relations, describing how phones have become a new means for expression of an old story: the oppression of women by men.

And, as with all technologies, there is hype and then there is the reality. The growth and potential impact of mobiles are phenomenal. Mobiles can be seen in action, for example, helping deliver on every one of the Millennium Development Goals – including poverty, education, equality and ▶

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health. But technology has limits. Some limits are imposed by the social context. Others are imposed by the 'physicality of development': we cannot reduce all of development into the bits and bytes that mobiles handle. Actual money must still be transacted; face-to-face meetings must still occur; and real goods and infrastructure must still be produced and used. What we expect of mobiles must therefore have limits.

In mobile policy and practice, as well as limiting expectations, we should also recognise the lessons from existing work – on telephony, on ICTs, on communications, and on development more generally. At the project level, this means adopting good practices such as involving users and matching designs to local realities.

At the policy level, lessons are urgently needed because many development actors are 'playing catch-up':

- Governments – too focused on fixed-line telephony – are only just appreciating the reality of mobiles' domination of the field.
- Most donors and international agencies – obsessed about rural telecentres often based on unsustainable European models – were caught unawares by the popularity of mobiles.
- Only private firms have been paying attention, getting on with the business of addressing demands and needs.

Tim Kelly discusses some of the policy lessons that should be learned. Liberal policies and private business will work for the majority of mobile service delivery. But they must be combined with government intervention and regulation to ensure the poorest people are not excluded.

Development actors must also plan for the future. To date, mobiles in developing countries have been understood mainly as a means to provide connectivity: the promise of fixed-line telephony finally delivered to a mass market because mobiles have better fit (to needs, income and culture), better functions, and different corporate strategies and government policies.

Mobile phones are more than just a fixed-line alternative, however. Policies and strategies must now recognise that they are also:

- Mobile – this 'communications on the move' means people can engage in development activities that previously would not have been possible. For example, although mobile phones enable state surveillance, to what extent can they also allow citizens to monitor the state (see box on page 4)?
- Multi-functional – what are the opportunities, now that many of the world's poor communities have access not just to a phone but to a camera, calculator, audio player, video player, timepiece and – soon enough – a platform for email and Web use, all built into one device?
- Cross-functional – they bring together services that cross existing boundaries and present governments with new decisions. How, for instance, should they handle the overlap between telecommunications and financial regulation now that mobile phones allow airtime to be used as currency?

The implications of all these cannot be understood simply by generalising from past research on other ICTs. Governments and others need to build specific knowledge about these new capabilities.

We have heard about the 'information revolution' and the 'digital revolution' in development. Tempting though it may be, we should avoid talk of a 'mobile revolution'. Yet this is also more than just a 'mobile evolution' – for the next decade or more, we will continue to be surprised by the ways in which these new technologies interact with development processes.

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See also
Mobiles and Development: Infrastructure, Poverty, Enterprise and Social Development, UK Development Studies Association 'Information, Technology and Development' Study Group, workshop summary and papers, 2007
www.sed.manchester.ac.uk/research/events/conferences/mobile.htm

Micro-enterprise and the 'mobile divide'

New benefits and old inequalities in Nigeria's informal sector

Mobile phones are starting to penetrate the informal sector in developing countries. Do they bring benefits? Reinforce inequalities? Both?

Information is vital to trade. Yet trade in the informal sector is shaped by information challenges. Information may be absent – for instance customers do not know who to buy from. Information may be uncertain – suppliers can be unsure about what prices they can charge. Information may be asymmetrical – some participants know more than others. Micro-entrepreneurs can, therefore, spend a lot of time travelling in order to gather information. They also rely on middlemen – the link between them and their customers – who hold vital information.

Mobile phones are starting to be used in this context. Can they make a difference? A study of mobiles in the *aso oke* (hand-woven textile) sector in south-western Nigeria addresses this question. This is an informal industry that suffers from typical information challenges. Customers and producers have traditionally relied heavily on middlemen, travel and meetings. Trade has been slow, costly and even risky, given the physical dangers of travel in Nigeria.

The study found mobile phones benefit everyone in the *aso oke* industry. They provide the first reliable access to telecommunications. They also:

- increase awareness of opportunities for trade
- shorten the time taken to fulfil orders
- substitute for travel or complement it by improving coordination of visits
- reduce communication costs in terms of time spent travelling, transportation costs, and the opportunity cost of income foregone when travelling
- reduce travel-related risks
- improve monitoring of the production process to reduce errors, improve product quality, and increase customer satisfaction.

However, the need to inspect items being produced, the complexity of product design and the lack of trust between participants, means a continuing need for physical meetings. Mobiles therefore cannot substitute for all travel.

In addition, mobiles help reinforce existing structures and inequalities. Information and communication technologies (ICTs) promise to remove self-serving middlemen from trade. In the *aso oke* industry, however, middlemen are driving the adoption of mobiles, using them to consolidate their power and influence.

ICTs also promise to make the situation more equal for everyone involved. Yet it appears that mobiles are increasing the difference between those who can afford access to a mobile (who find greater opportunities to trade) and those who cannot (who find they have fewer orders). Also, micro-entrepreneurs with established business networks benefit more because access to a phone rarely leads to new business contacts.

It is important to recognise that:

- Physical communications – supported by transport and roads – still matter to micro-entrepreneurs, even in an era of mobile digital communication.
- Mobile applications in developing countries will not be used in the same ways as in developed countries. We need specific research to determine the real processes and impacts of mobiles in development.
- The 'mobile divide' will increase the disparities in society unless new initiatives and innovations, including increasing the affordability of mobile phones, help reach those who are currently disconnected.

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See also
Mobile Telephony and Developing Country Micro-Enterprise, Development Informatics Working Papers, IDPM, University of Manchester, by Abi Jagun, Richard Heeks & Jason Whalley, 2007
www.sed.manchester.ac.uk/idpm/research/publications/wp/di/index.htm#wp

'Mobile Ladies' in Bangladesh

Connecting villagers to livelihoods information

Villagers often lack information they need to help improve their livelihoods. Such information exists but is often denied to them by the lack of connection to mainstream information systems. Mobile phones can solve this problem.

In 2004, the Development Research Network (D.Net) in Bangladesh set up the Rural Information Helpline. Specialist helpdesk operators in the capital, Dhaka, have Internet access and a database of responses to common livelihoods-related queries. They also have links to a variety of relevant institutions around Bangladesh.

Initially, however, many villagers were disconnected from the Helpline: although mobile phone networks cover more than 80 percent of the country's territory, in rural areas millions still cannot contact people beyond their local villages.

In response the 'Mobile Ladies' initiative was introduced. These women – with mobile phone in hand – go door-to-door in their villages, listening to problems and advising on how best they can be solved.

In about half the cases this involves sending a letter or email via a community-based information worker. For the rest, a mobile phone call is made directly to the Helpline and an answer is provided instantly or in a few days. A 'no exclusion' policy – meaning that everyone can receive services irrespective of literacy, physical handicap or social status – has proved effective in creating confidence among the villagers.

The Helpline was accessed by more than 4,000 users over a 15 month period. Nearly half the queries are health-related (skin diseases or advice on medicines, for example). Over one third are agriculture-related (animal diseases or how to increase crop yields). Others are to do with education (information on admission procedures for instance), human rights (including providing women with information about legal processes in cases of dowry, rape and physical assault), or non-farm activities (like weather reports for fishermen).

The facility makes a crucial difference. Research shows:

- 95 percent of queries are answered and over 80 percent of users are satisfied with the information they get.
- Villagers cannot afford their own phones and 70 percent of users report having no local source for the information they seek. The poorest village covered was the greatest user of the Helpline.
- The main benefit is financial saving, with many examples of travel or use of potentially costly middlemen avoided.
- Women are key beneficiaries. Many women villagers will not go outside the home to seek information; 36 percent of the mobile service users are housewives.
- Mobile Ladies is a profession for women in even the most remote villages and the project could ultimately lead to employment of about 89,000 women.

Challenges remain, including cost, sustainability, turning information into action, and assisting the poorest people. However, the project has shown mobiles can help connect the disconnected and address important social and economic needs.

Key lessons include the ability of a mobile-based service to:

- support an 'infomediary' model, involving a person (intermediary) who is able to add value to the communication of information
- draw on local community members to act as the infomediaries
- act as part of a multi-channel (phone, email, letter) strategy for information delivery
- be truly user-driven, responding to communities' needs.

The 'Mobile Lady' in Bangladesh connects people of different ages and occupations with a group of experts who can advise on a range of livelihoods. She stands as a symbol of empowerment, and participating in this programme has improved her own social status.
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See also
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www.pallitathya.org/en/case_studies/index.html
Pallitathya Help Line, D.Net, Dhaka, 2005 (PDF)
www.dnet-bangladesh.org/Pallitathya_pcc.pdf

Mobiles reinforce unequal gender relations in Zambia

Mobile phones affect more than just communications. They can also reinforce society's unequal power relations. A three-year study in Zambia looks at this, partly in terms of relationships between husbands and wives.

The study found that mobile phone access and use has positive impacts for women. They benefit from faster, cheaper communication and a strengthening of family, friend and business-related social networks. However, mobile phones also provide a new focal point for social conflict between spouses and can reinforce traditional gender power differences. This happens as some husbands determine how wives use their phones, and even whether or not they are allowed to continue owning a mobile.

Interviewees consistently reported problems of insecurity, insensitivity, mistrust and jealousy, which sometimes resulted in physical and verbal abuse, particularly by men towards their wives:

- Some husbands accuse their wives of infidelity, thinking they use their mobile phones to communicate with lovers. They inspect call records on the mobile phones for proof, and some order their wives to sell their phones.
- In a widely publicised case in the Zambian media, a man reportedly beat his wife because he suspected her of having an extra-marital affair after she refused to let him check her calls and text messages.
- Men often demand that their wives make and answer calls in their presence, although they refuse to do the same.
- There are popular songs referring to the social difficulties that mobile phones have introduced between men and women. They are light-hearted but carry an important message about the way this new technology is adversely affecting gender relations.

These findings suggest that new technologies have become another aspect of oppression of women by men, and a source of inequality between them. These inequalities are not just social: mobile phones can also reinforce economic gender differentials. Handsets and airtime are still expensive, and women may be less able than men to afford their use. However, insufficient official statistics on a range of gender concerns relating to technology mean that these new developments are difficult to analyse.

For women, the social and economic advantages of accessing and using a mobile phone far outweigh the disadvantages. But those promoting and making policies for mobile phones must understand that these new technologies create problems as well as solutions. These problems must be recognised if they are to be addressed. Among other things, this will require much greater gender awareness in policies and projects.

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See also
The Internet and Mobile Telephony: Implications for Women's Development and Empowerment in Zambia, Gender, ICTs and Development workshop paper, 2006 (PPT)
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Beyond the three billion mark

In mid-2007, we passed the symbolic mark of three billion mobile phones in use around the world. How did we get here? And how will we reach the next three billion users?

The spread of mobile phones across the developing world is remarkable. In 1990, there were only 14,200 mobile phones in Africa out of a global total of 11 million. By 2005, this number had risen to 137 million out of a total 2.2 billion. Since then, around one billion more mobile phones have been added, the majority in developing countries; growth in Africa – more than 50 percent per year – is the highest in the world.

Mobile phones are not just complementing, or substituting, fixed-line services. They often provide access to electronic communications for the first time. In the Democratic Republic of the Congo, some 1.7 million new mobile phones were added in 2005, reaching a total of 2.7 million. By contrast, the installed base of just 10,000 fixed lines declined.

In a fraction of the history of fixed lines, mobile phones have come to dominate. How did this happen? Technical innovations helped: prepaid cards with low-value recharges reduced economic barriers and modern handset design increased the prestige of ownership. But the right policies also had to be in place – a mix of less government (liberalisation and competition) and more government (regulation and licensing requirements).

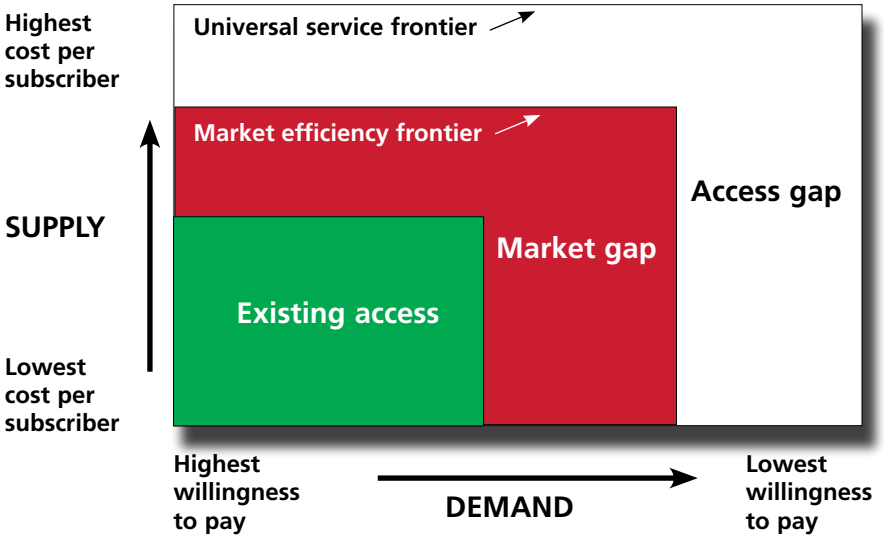
A key indicator of government policy has been the number of operators allowed into the market. Ethiopia, for instance, has maintained a monopoly: mobile penetration remained less than 1 per 100 inhabitants in 2006. In neighbouring Somalia, which has a similarly troubled past but largely unregulated market entry, penetration is already above 6 per 100 inhabitants.

Other helpful policies include allowing foreign investment and ownership, and requiring the main fixed-line operator to allow mobile operators to interconnect, and make calls across their networks, at reasonable rates.

In simple terms, however, mobiles work because they are driven by demand rather than supply, and by needs rather than technology. Everybody, it seems, wants a mobile phone. But how will 'everybody' get one?

We can assess this through analysis of the gaps between existing and potential use of mobile phones in developing countries (see Figure 1 above):

Figure 1: Methodology for assessing gaps in the provision of phone services



Source: Winrock International/Pyramid Research 'Costing ICT Infrastructure Needs for Africa' (Forthcoming, October 2007).

- **Existing Access** is the portion of a country's population already served by either fixed-line or mobile phones.
- The **Market Gap** is a measure of how many more people than currently have service could be reached if markets were functioning efficiently.
- The **Access Gap** measures those parts of the population that could only be reached with some kind of subsidy – capital expenditure, operational expenditure, or both.

Research carried out for the World Bank by Winrock International and Pyramid Research, covering 24 countries in sub-Saharan Africa, found that 57 percent of people were already within range of a mobile signal. By improving the efficiency of existing markets, a further 40 percent of the population could be served, with some US$3.0 billion of market-led investment (Market Gap) by 2015. Only the remaining 3 percent would require government intervention, through a subsidy of around US$2.1 billion (Access Gap), as they live in areas outside the range of commercially-viable mobile service provision.

Moving beyond the three billion mark is a major challenge. It will require low-cost handsets and services, innovative funding schemes and, most of all, more efficient markets. Research evidence suggests, however, that it will be possible to almost double current levels of penetration before services become uneconomic to provide. The development impact of that change, which could be achieved within a single generation, is hard to predict. But it does suggest a much faster rate of narrowing some development gaps than at any previous time in human history.

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See also
Costing ICT Infrastructure Investment Needs for Africa, study for World Bank, by Winrock International and Pyramid Research, (forthcoming, October 2007)

From surveillance to 'sousveillance' in elections

New technologies are often associated with state surveillance of citizens. Mobile phones are no exception. Examples of surveillance and censorship include tapping phones and tracking journalists in China, and suspending all short message services (SMS) during elections in Cambodia.

But mobile phones can also reverse the process to enable 'sousveillance' – bottom-up monitoring of the state by citizens.

In 2007, 500 NGO election monitors were sent out with mobile phones to polling stations in Sierra Leone. Their job was to send reports via SMS/text messages. Benefits included rapid awareness of irregularities and unofficial voting tallies that could be compared with official results.

Less organised 'souveillance' also occurs. In the 2004 Ghanaian presidential elections, individual voters called radio phone-in shows by mobile to report intimidation or obstruction. This prompted a police response in a way that a direct call to the police might not have done – a reminder of the power of combining mobiles with other information and communication technologies. Similarly, combining mobile phone cameras with websites has proven effective in reporting electoral misdeeds in a number of countries.

See also
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Texting It In: Monitoring Elections With Mobile Phones, MobileActive.org, by Katrin Verclas, 2007
www.mobileactive.org/texting-it-in

What do you think?

Please write and tell us your views about the issues raised in id21 insights. And what topics would you like to read about?

Email insights@ids.ac.uk with your ideas.

M-banking

Extending financial services to poor people

For many people across the developing world, storing or sending small sums of money is economically impractical. This is due to the high cost and inaccessibility of banks and formal financial services. Recently, however, telecommunications providers, banks, and other companies have begun offering a variety of financial services via a basic mobile phone handset.

Many are optimistic that these mobile banking or 'm-banking' systems will lower the cost of financial services to millions of poor mobile phone users.

M-banking systems offer three general capabilities. Users can:

- convert cash in and out of 'stored value' accounts linked to their mobile phone
- use this stored value to pay for goods and services
- transfer stored value between their account and other people's accounts.

Unlike simple airtime transfer features, m-banking systems support transfers of actual currencies. This means a person can walk into an m-banking location, 'cash in' as if he or she were buying airtime for a pre-paid mobile account, and then transfer that money anytime – often via text message – to merchants, utility providers, or other individuals.

M-banking reduces the need to carry cash, or to travel or wait in line to pay bills. It can guard against theft, replace costly bank cheques and increase the speed and reliability of transactions. In addition, people use m-banking services to send remittances home, quickly and inexpensively.

Some of the more successful m-banking initiatives in developing countries are in South Africa (WIZZIT), the Philippines (Globe), and Kenya (M-PESA). Each has a different set of actors and services. For example, some countries' laws require stored value accounts to be managed by a registered bank, which requires a bank partner. In other cases, no bank is involved.

The systems are not yet found in all countries but their take-up where they are available has been impressive. Some ongoing issues will impact how the services evolve:

- Providers generally must offer physical presence. The systems require points of access throughout the country with cash-in and cash-out facilities, and merchants need to be motivated to accept m-payments.
- The regulatory environment is complex and varies from country to country. For example, important money-laundering and anti-terrorism laws constrain what services can be offered.
- Most systems currently offer only stored value; credit features are rare. However, microcredit institutions may be able to use m-banking systems to improve their operations.
- Literacy and language barriers may prevent some people from using m-banking systems.
- Shared handsets complicate issues of security and account ownership.

A mobile phone seller at the Souk el Goma'a, Cairo's Friday market. Growth trends of mobile phones in developing countries have exceeded all expectations. Experts had estimated that there would be 67 million mobile phones in Africa by 2005; the actual figure was 137 million – more than double the estimate.
© Mark Henley/Panos Pictures, 2004

The elegance of transactions via handsets and text messages hides the services' complex organisational and technical capabilities. However, it is this simplicity and affordability that is likely to make m-banking a valuable service for poor people.

There are many more mobile phone users than bank account holders in the world. If m-banking can continue to bring financial services to people who currently do not use them (the 'unbanked'), it will be more than a convenience – it will be an important new way for poor people to control their finances and their livelihoods.

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See also

Micro-payment Systems and their Application to Mobile Networks, infoDEV: Washington, DC, 2006 (PDF)
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Mobile networks at the centre of infrastructure

Reflecting Northern models, mobile telecommunications in developing countries were initially conceived as secondary to fixed lines. Now, however, mobiles are central to information and communication technology (ICT) infrastructure and policy:

- Globally, Asia is the largest regional mobile telecommunications market, not only in terms of consumption, but increasingly in terms of production.
- Mobile operators now control 70 percent of the telecommunication network capacity in sub-Saharan Africa, leaving fixed-line monopolies far behind.
- Mobile operators' plans for telecommunications coverage now determine how and when poor and rural populations are reached by the 'digital revolution'.
- Using General Packet Radio Service (GPRS) technology, mobile networks are now a potentially viable way to deliver Internet services, and avoid costly and protracted fixed-line models.

With mobile operators now taking the lead in ICT policy, however, several issues need to be resolved:

- Interconnection: can the operators be persuaded to allow shared access to their infrastructure, allowing the creation of national and regional networks?
- Technology: can new low-cost Internet devices achieve the type of mass market mobiles phones currently enjoy? Only then can the promise of mobile Internet be realised.
- Affordability: access to mobile networks and services is still far from universal, and advances are needed to reach the poorest people. Can innovations such as micro-prepay (allowing purchase of very small amounts of airtime), combined with low-cost pricing strategies and public policy initiatives like universal service funding schemes be introduced to make this happen?

See also

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Telecoms Demand : Measures for Improving Affordability in Developing Countries, Media@LSE, London, by Claire Milne, 2006 (PDF)
www.lse.ac.uk/collections/media@lse/pdf/affordability%20report%2031.01.06.PDF

Options for terrestrial connectivity in sub-Saharan Africa, Scanbi-Invest, Stockholm, by Anders Engvall and Olof Hesselmark, 2007 (PDF)
www.scanbi-invest.com/download/ExSum_OptTe.pdf

Mobiles and impoverished households in Jamaica

How do mobile phones affect low income households? Has this technology spread so far that it can now create a development impact right down to the poorest families?

Researchers from the Information Society Research Group studied these questions. They lived with low income households in one rural and one urban Jamaican community for 12 months, conducting ethnographic research. Fixed-line access is often limited, but nearly 100 percent of households have a mobile phone.

Mobile phones are significant for the day-to-day survival strategies of poor people but their economic value is not exploited as expected. Mobile phones are not used for job-hunting (most believe this requires face-to-face meetings instead). And very few use them for business purposes:

- Only those few in certain specific forms of employment, such as taxi drivers or musicians, use mobiles to get more custom or talk with existing customers more easily.
- Some women who already sell goods (such as chickens) from their homes have also started selling pre-paid phone cards. This funds their own phone use and perhaps some of their children's educational costs.

But around one-third of those interviewed had no income from any type of labour or sales. They use their phones to seek money from others in their social network, including remittances from family and friends overseas, sometimes linked to specific health or educational needs. The poorest people therefore use the mobile phone not to make money but to get money: it is a means of moving money from those who might otherwise save or expand businesses, to those who have no other income.

Mobile phones also have a social value:

- Crime and fear of crime are major factors in poor people's lives. Mobile ownership increases their sense of security and their ability to report crime from the privacy of their homes.
- In the absence of an ambulance service, access to taxis by phone provides transport during health emergencies for the first time.
- Some Jamaicans reported feeling 'pressure', which includes elements of loneliness, depression and boredom. In the absence of formal help, mobiles are used to reach out to others for advice and support.

Overall, the poorest people use mobile phones to strengthen their close social networks of immediate family and friends. They also use mobiles for 'link-up' – short calls averaging 19 seconds – to broader, more extensive social networks. These short calls sustain connections until a more specific reason for contact emerges: a visit, a problem, a request for money or information, or beginning a friendship or sexual relationship. These broad, shallow, technology-enabled networks are central to meeting financial, emotional, sexual and social needs.

Development practitioners must recognise that mobile phones are now impacting the very poorest members of society. Jamaica's pricing and regulatory regime – a mix of intervention and liberalisation – has been central to this. To understand the impact of mobiles on such groups, policymakers cannot just look at the experiences of richer users, or of other countries and regions. They must understand the specific effects of mobile phones on their own populations; for example through long-term ethnographic research.

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See also
The Cell Phone: An Anthropology of Communication, Berg: Oxford, by Heather Horst and Daniel Miller, 2006
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www.isrg.info/Jamaicasummary.doc

Useful web links

Development Informatics Group, IDPM, University of Manchester
www.sed.manchester.ac.uk/idpm/research/is/index.htm

GSM World – Bridging the Digital Divide
www.gsmworld.com/digitaldivide/index.shtml

International Telecommunication Union
www.itu.int

Microsoft Research Technology for Emerging Markets
http://research.microsoft.com/research/tem/default.aspx

MobileActive.org – A resource for activists using mobile technology worldwide
www.mobileactive.org

Mobiles and Development Dgroup
www.dgroups.org/groups/mDevelopment

Nokia Research Centre
http://research.nokia.com

Vodafone socio-economic impact of mobiles (SIM) research
www.vodafone.com/start/responsibility/our_social___economic/socio-economic_impact.html

ShareIdeas.org – Mobile Knowledge for Social Change
www.shareideas.org

The Mobile Development Report
www.cks.in/mdr

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