



the magic of mobile phones?

ROBERT HARDING, MANOBI

Mobile phones are good news for developing countries, according to the vendors – but the reality is more complicated than that, says **Christine Evans-Pughe**

ARE MOBILE phones the modern equivalent of Jack's magic beans, bringing health, wealth and happiness wherever they are scattered? Recent studies might make you think so. According to a 2005 paper by economist Leonard Waverman and colleagues at the London Business School, each 10 per cent increase in mobile phone ownership in developing countries produces an additional 0.6 per cent of growth in gross domestic product per person. Similarly encouraging figures featured in a more recent Harvard case study on Indian fishermen, which showed how the fishermen increased their profits by around 8 per cent by using mobile phones to call coastal markets from their boats.

These and other studies suggest that mobiles can revolutionise the way subsistence farmers and nomadic tribesmen trade crops and livestock. It's fabulous PR for mobile-phone companies, which see developing countries as offering millions of new subscribers. But how realistic is the idea that mobile phones are an absolute good for the developing world?

FAST GROWTH PROMPTS OPERATOR INTEREST

GSM subscriptions have increased most quickly in Africa, growing 50 per cent a year for the last five years. Total subscriber numbers have reached 365 million, up 100 million in 2008 alone. According to the International Telecommunications Union, almost one in three Africans now owns a mobile phone. Subscribers are also becoming more evenly distributed: in 2000, over half of Africa's mobile subscribers lived in South Africa. By 2007, almost 85 per cent were in other countries.

And yet the International Monetary Fund figures on economic growth show that sub-Saharan Africa is having similar economic problems to the rest of the world, despite the increase in mobile-phone ownership. Sub-Saharan African gross domestic product growth was nearly 7 per cent in 2007, around

5.5 per cent in 2008, and is forecast to fall to 3.5 and 5 per cent in 2009 and 2010, respectively. On those figures, a positive correlation between mobile ownership and economic growth seems tenuous. Buying mobile phones may even divert resources from more productive spending.

Setting aside tricky questions about the data and models used in such studies, do their conclusions make sense? Mobile phones might form a distraction in the short term, and could facilitate commerce and growth in the long term, but there's much stronger evidence to say that relating economic growth with mobile phone ownership confuses correlation with causality, since the sources of economic growth tend to accompany one another. Countries with lots of mobile phones tend to be those with better-educated people, better legal systems, venture capital, functioning financial markets, more competent governments and so on. Disentangling the relationship between those factors is difficult.

Common sense suggests that mobile phones can stimulate economic activity and improve people's lives by making up for bad roads and inadequate transport; by enabling mobile banking services; and by making it easier to share pricing and other data so that traders can be more profitable. But it isn't straightforward to translate, say, the benefits of fishermen using mobiles into a corresponding benefit for farmers. "Although a fisherman may be able to choose from a variety of ports, a rural farmer may have only one marketplace through which to sell his goods. Hence, applications to aid in price discovery may not be as helpful," writes Kurt DeMaagd of Michigan State University, in his 2009 paper 'Pervasive Versus Productive: The Case of Mobile Phones in Developing Economies'.

It's also naive to imagine that mobile phones can miraculously make up for bad governments, unemployment, ingrained cultural habits, and the ►

TO MARKET, TO MARKET IN SENEGAL



Farmers in Senegal, as in much of rural Africa, are isolated from the main markets, and have little bargaining power with the traders who buy their crops.

The mobile data services operator Manobi has developed a solution to this problem in the form of XAM Marsé, a market information service that provides access to crop price data collected from markets around the country by Manobi's own price checkers. They upload the data to a central database using WAP-enabled mobile phones.

Farmers receive the crop price information on mobile phones, enabling them to make decisions about where to sell, to whom to sell, and even when to harvest. Manobi's service is available over various connections (GSM, WAP, HTTP, voice) and its content is structured using XML/XSL standards, enabling users to access data through a wide variety of terminals and networks.

In Senegal, thousands of small vegetable growers from the Niayes region have increased their net revenues by more than \$2,200 per hectare per year, according to Manobi. And dozens of very small-scale farmers are bundling their produce to supply large clients directly, tripling their average revenue as a result.



The M-PESA mobile banking system gained more customers in two years than Kenya's traditional banks had in a century

◀ universal human tendency to favour an easy life over hard graft.

Inhambane, for example, is a small provincial capital with a population of around 57,000 in southern Mozambique. Julie Soleil Archambault, an anthropologist at the University of London School of Oriental and African Studies, has been studying mobile-phone use among young adults in the town for years. She says: "In other areas in Africa, phones might play an important role in business, but this is not quite so in Inhambane."

One of the striking things about the town is the low level of entrepreneurship, she says. The biggest employer is the state, but apart from that there isn't much formal employment. Education has gained popularity in recent years but when young people leave secondary school they don't have access to formal employment or the capital to start small businesses. And so they need to find alternative sources of income.

"You might have an uncle working in South Africa, who you can rely on to help with school fees or to bring home consumer goods," says Archambault. "With mobile phone communication, you at the receiving end can play a more active role in the distribution process. So instead of having to wait for your uncle to help you, you can phone him and if he doesn't react, you can phone him again. And it's easy to communicate without spending any money. You can send someone a missed call as a sign that you wish to be called back."

So mobile phones make it easier for unemployed youths to pester better-off relatives.

"While there is a lot of talk about how phones might alleviate poverty, that's only one part of the story," says Archambault.

Mobiles are also increasingly used to manage relationships in the informal sex economy, where people promise (and sometimes deliver) sexual favours in return for material goods.

"Often these are very complex relationships where the terms of the relationship are very loosely defined. Phone communication

makes these relationships easier to manage and accumulate.

There's a lot of secrecy involved, and communicating via the phone allows them to preserve [that]," says Archambault. "So in a way, the impact concerning the spread of HIV/Aids could potentially be disastrous, a point which doesn't really come out in any of these studies."

Kathleen Diga, of the International Development Research Centre in Canada, has been looking at mobile phones and poverty reduction among households in rural Uganda and outlined her findings in an academic paper in 2008. She found that, while there are many positive effects of access to mobile phones, there were also examples of people putting the ownership of a mobile phone before feeding their family or finding improved sanitation and water sources.

"The research shows that people are expressing their true needs versus what one would assume are urgent needs, such as food and sanitation," she writes. "While some members are increasing their use of the mobile phone, the more vulnerable members feel that they are not benefiting from the new technology. For example, some women [in the focus group] were limited in usage of the phone or were put under escalated control by their partners."

Her conclusion is that while mobile phones were useful there were other 'asset accumulating initiatives' that should gain equal publicity, such as communal or cooperative garden plots and the expansion of free education.

MOBILE BANKING

The mobile phone's greatest economic impact on the developing world could be to provide banking services to the billion people who don't have a bank account but do have a phone, according to CGAP, a microfinance group based at the World Bank.

"The mobile banking phenomenon is bypassing the traditional microfinance world, so despite the fact that in Kenya, for instance, you have one of the biggest and best-known

health technology

WEIGHING UP CHILD HEALTH IN MALI



A mobile phone and a set of scales can help track child development

The Pésinet project in Mali uses mobile technology to prevent infant sickness and mortality. The system is expected to save lives: infant mortality indicators during a previous pilot project in Senegal fell from 123 per thousand to 5.3 per thousand.

Managed by the not-for-profit Pésinet Association, the project relies on members of the community who are trained as *Agents de Pesee* – weighing agents – and provided with Java-enabled mobile phones. Each child is weighed and monitored at home once a week, except babies less than one year old who are weighed twice a week. The data, along with other relevant symptoms, such as vomiting or diarrhoea, are transferred over the GPRS network via the mobile

phone to a server holding a database that automatically formats and sorts the information collected in the field.

The health data is made available through a Web interface that enables the local doctor at the community health centre working for Pésinet quickly to identify children who show weight loss or other risk factors and instantly alert the agent. The next day, the agent connects to the GPRS network and accesses the list of children who need to undergo examination by the doctor. The agent can then inform the family and advise them to bring the child to the Pésinet centre for examination.

The project is supported by the Orange Mali Foundation and Alcatel-Lucent.

'Mobile phones make it easier for unemployed youths to pester better-off relatives'



EpiSurveyor software helps gather health data

microfinance organisations [Equity Bank] they are still figuring out how best to make mobile banking part of their expansion programme," says CGAP's Gautam Ivatury.

He is referring to the biggest mobile-banking success to date, Vodafone and Safaricom's M-PESA service, which has accumulated more accounts in two years than the rest of the Kenyan banking system managed to in a century. M-PESA was launched two years ago with £1.5m from the UK Department for International Development. M-PESA customers can make payments by text message and then access a network of agents in petrol stations, supermarkets or small stores across Kenya to deposit or withdraw cash.

According to a forthcoming survey on mobile banking by CGAP and the GSMA, M-PESA is 45 per cent cheaper than other money transfer services and 83 per cent of users say not having M-PESA would have a "large negative impact" on their lives.

There are good reasons why M-PESA happened in Kenya and not in other places, says Ivatury. "In Kenya, unlike in, say, the Philippines, there are relatively few good ways for people to send money from place to place. In most small towns there aren't money transfer operators on every street corner, like in other countries," he says. "Also, the Kenyan payment system regulators allowed M-PESA to start and grow in the early days without overly constraining it. In India, on the other hand, there have been plenty of mobile banking initiatives and a lot of energy in the market but regulation has constrained the ability of some of those projects to grow."

Ivatury also credits Safaricom

and the team at Vodafone who developed M-PESA because they focused on one idea – money transfer – and made one pitch to customers, "send money home".

But whether mobile banking is a tangible benefit to people's lives is difficult to measure at this stage. Looking at transaction costs – how much cheaper it is for a person to do a simple deposit of 50 Kenyan shillings with mobile banking – the results are encouraging. "We think it might be 50 to 80 per cent cheaper than everything from the cost of travelling to the bank branch, the time away from work, the actual waiting time, and any fees that a bank charges," says Ivatury.

MOBILE HEALTH

Health is considered integral to economic development and poverty reduction: improve health and you may improve the economy; improve the economy and you may improve health. But can you improve both with a mobile phone?

Certainly there's plenty of hype around 'mobile health' – a term that covers health hotlines, SMS vaccination reminders, telemedicine, diagnostic phones, and applications to collect public health information. One source is the Mobile Health Alliance, a partnership between the United Nations, Vodafone and the Rockefeller Foundation, to maximise the impact of mobile health in the developing world. The Alliance already has supporters including Cisco, Google, Microsoft, Nokia, Qualcomm, the Earth Institute, MIT and the UN World Health Organization (WHO).

There's also a new report ('Health for Development: The Opportunity of Mobile

Technology for Healthcare in the Developing World', commissioned by the UN and Vodafone Foundation Technology Partnership), which looks at mobile health projects such as the use of an SMS campaign in Uganda to raise awareness about HIV/Aids. That project led to a 40 per cent increase in people coming in for testing.

Whether such initiatives are sustainable and scalable remains to be seen, but one at least is gaining some traction with the WHO. The organisation has adopted EpiSurveyor, a mobile health data collection application, as a standard, and is already using it on PDAs in ten or so African countries. It will introduce it to ten more countries this year on mobile phones.

"Without being able to collect data in good time, we don't know which diseases are killing people or to what extent they are improving or getting worse or whether our cures are working or our programmes are effective," said Joel Selanikio, a founder of not-for-profit consultancy Datadyn, which developed EpiSurveyor.

Selanikio, a practising doctor who used to work at the US Centers for Disease Control and Prevention, believes that the advantages of mobile health data collection are obvious. One of the biggest challenges in public health in Africa, for example, is checking that the fridges used to store vaccines in clinics are at the right temperature. "We haven't done any large-scale study that shows a percentage drop in mortality from having taken six months or a year off the delay in fixing clinic fridges, but I think it's reasonable to assert that it's helping," he said.

Selanikio is probably right about the benefits of mobile health data collection but it's reasonable to question the effectiveness of mobile-for-development programmes when the tone and message is so relentlessly upbeat and self-congratulatory. And it is doubly so when this 'success' is linked to global companies whose mandate is to shift product for profit in these countries. ■

infrastructure

GOING CHEAP



Cambridge Consultants' Tim Fowler

Building mobile infrastructure is expensive. One way of cutting costs is to share anything from towers and other facilities to entire networks. A more radical option is to slash GSM base-station costs by re-using designs developed for 3G femtocells – the home wireless access points that connect mobile devices to a mobile operator's network using broadband.

Cambridge Consultants has developed a GSM PHY reference design, called Centaur, based on PicoChip's PicoArray processor, the main baseband platform for femtocells and software-defined basestations. Since 3G femtocells are expected to cost around \$100, this approach could cut the cost of building GSM infrastructure as well. A GSM base-station suitable for a village will cost more than \$100, because it needs a high-quality radio, but it would still be cheaper than other base-stations on the market, said Tim Fowler, commercial director at Cambridge Consultants' wireless division.

"Base-stations tend to get deployed where they can make money. If one costs £20,000, you need to ensure it's on the tallest building in town, and you need the maximum number of customers. If it costs £2,000, you don't need the most expensive site. If you can get it down to less than £1,000, then you can put them into villages."