

## Eureka moments

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### How a luxury item became a tool of global development

Reuters



What, no network?

HOW did a device that just a few years ago was regarded as a yuppie plaything become, in the words of Jeffrey Sachs, a development guru at Columbia University's Earth Institute, "the single most transformative tool for development"? A number of things came together to make mobile phones more accessible to poorer people and trigger the rapid growth of the past few years. The spread of mobile phones in the developed world, together with the emergence of two main technology standards, led to economies of scale in both network equipment and handsets. Lower prices brought mobile phones within reach of the wealthiest people in the developing world. That allowed the first mobile networks in developing countries to be set up, though prices were still high.

The next big step was the introduction of prepaid billing systems, which allow people to load up their phones with calling credit and then talk until the credit runs out. When mobile phones first came in, subscribers everywhere talked first and paid later (a model known as postpaid), so they had to be creditworthy. Prepaid billing saves operators sending out bills and chasing up debts. It helped the spread of mobile phones among teenagers in Europe in the late 1990s because it offered parents a way of preventing their children from running up huge bills. It also dramatically expanded the market for mobile phones in poor countries.

Themba Khumalo of MTN recalls the firm's launch of mobile services in South Africa in 1994, using the postpaid model. "Mobiles were initially perceived as a niche product, for business people, unaffordable by ordinary people," he says, so this seemed the obvious method to adopt. But the launch of prepaid services "changed the landscape", he says, by reducing the cost of owning a mobile phone. Top-up vouchers, in denominations as small as \$0.50, are now routinely sold by agents in small shops and on street corners across the developing world. "Mobile phones could not work in Africa without prepaid because it's a cash society," says Mo Ibrahim, the Sudanese businessman who established Celtel, a pan-African mobile group now owned by Zain, based in Kuwait. The prepaid model requires systems to accredit and support thousands of resellers, as well as handling the actual

top-ups, says José María Álvarez-Pallete, general manager for Latin America at Telefónica, a Spanish telecoms giant that transferred its prepaid expertise from Spain to its Latin American subsidiaries.

## **From luxury to commodity**

Once the switch to prepaid was made, the biggest barrier to broader mobile access became the cost of a handset, which was still an expensive item in the late 1990s. But the price of a basic model steadily fell, from around \$250 in 1997 to around \$20 today. As handset-makers became aware of the scale of the opportunity in the developing world, they turned their minds to producing low-cost models. And for those who still could not afford their own handsets, help was at hand in the form of microfinance. Popularised by Grameen Bank in Bangladesh, this involves making small loans, mainly to the rural poor. In a typical example, a woman borrows money to buy a cow and then repays the loan from the profits she makes on selling its milk. That way she gets an income, and her neighbours are able to buy milk.

Iqbal Qadir, a Bangladeshi who moved to America and became an investment banker, looked at this model and had an epiphany: "A cellphone could be a cow." In 1997 the resulting effort to combine microfinance and mobile phones brought forth a Bangladeshi mobile operator called GrameenPhone, a joint venture between Grameen Bank and Telenor, a Norwegian telecoms firm. GrameenPhone pioneered the idea of the "telephone lady", extending loans to women in rural villages to enable them to buy a mobile handset, an antenna and a large battery so they could sell calls to other villagers. Taking a small cut on each call, they were able to pay off the loan and thereafter to use the proceeds to pay for health care and education for their families and to develop other businesses. This "village phone" model quickly extended mobile coverage to thousands of villages in Bangladesh.

Although telephone ladies now make up only a small proportion of GrameenPhone's customers—around 220,000 out of a total of 8.5m—they account for as much as one-third of all calls because their phones are used by many people. The Grameen Foundation, a not-for-profit organisation set up by Muhammad Yunus, the founder of Grameen Bank, has since replicated the village-phone model in Cameroon, Indonesia, Rwanda and Uganda, and it has been widely copied elsewhere. In Afghanistan telephone ladies take an average of eight months to pay off the microloan required to buy their equipment and then earn \$50-100 a month, says Karim Khoja, chief executive of Roshan, the country's largest operator.

The village-phone model is a good way to introduce people to the advantages of telecommunications and provide access to start with, but it may soon have had its day. With prices continuing to fall, the vast majority of mobile users in the developing world now have their own handsets. Mr Khumalo says MTN recently placed an order with a Chinese manufacturer to supply handsets at \$13 each. Still, demand for shared phones has not dried up completely. Calling from a village phone costs less than buying a top-up, so even people with their own handsets may sometimes make calls from shared phones if they have run out of credit, notes Eric Cantor of the Grameen Foundation's Uganda office. And Mr Khumalo points out that some of MTN's village-phone operators now make more money selling airtime than phone calls.

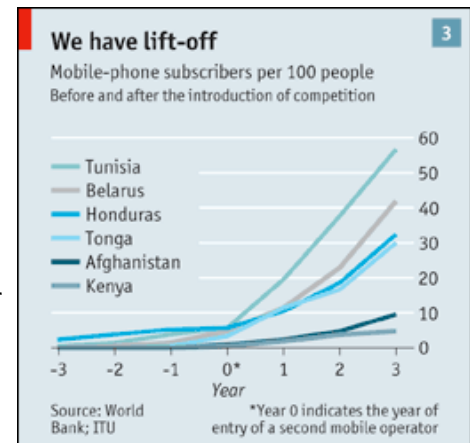
Prepaid billing and affordable handsets on their own are not enough to ensure a rapid adoption of mobile phones, however. Another vital factor has been the liberalisation of telecoms markets and the issuing of licences to rival operators. As those operators compete for customers and try to recoup the cost of building their networks, calling charges fall and mobile adoption increases.

There is clear evidence that liberalisation drives adoption (see chart 3). The most vivid illustration comes from a comparison between two African countries: Ethiopia and Somalia. Ethiopia is one of the few remaining countries where mobile telecoms remains a government-run monopoly. By the end of 2008 the country had a "mobile teledensity" of 3.5% (ie, 3.5 mobile phones per 100 people), compared with 40% for Africa as a whole. By contrast, in war-torn Somalia, a similarly poor country with no functioning government and a completely unregulated telecoms market, more than a dozen operators have sprung up to meet demand, and mobile teledensity is 7.9%. Even warlords want their phones to work,

notes Mr Ibrahim, so they leave networks alone: Celtel launched its networks in Sierra Leone and the Democratic Republic of Congo during civil wars, and both prospered.

## Calling for growth

Does the spread of mobile phones promote economic development? At first the evidence was anecdotal. There were stories about farmers and fishermen phoning around to see where they would get the best price for their produce, for example. Mobile phones also unlock entrepreneurship: porters, carpenters and other self-employed workers can advertise their services on lamp-posts and noticeboards and ask potential clients to get in touch with them. Mr Quadir likes to tell the story of a barber in Bangladesh who could not afford the rent for a shop, so he bought a mobile phone and a motorbike instead, scheduling appointments by phone and going to his clients' homes. This was more convenient for them and he was able to serve a larger area and charge higher fees.



Globally such micro-entrepreneurs account for 50-60% of all businesses, and in Africa nearly 90%, says Jussi Impio, the head of Nokia's African research arm, based in Nairobi. Mobile phones make micro-entrepreneurs vastly more productive: a plumber no longer has to return to his shop to pick up messages from clients, for example. Mr Impio says he recently met an entrepreneur with a roadside kiosk who sold underwear and ice cream, "an interesting combination". He had conducted a detailed study of his company's fortunes and found that his income had increased by 70% in the six months after he started using a mobile phone in 2006, because basic activities such as stock handling and negotiating prices with suppliers become much more efficient with a mobile phone.

It is also clear that mobile phones create new jobs, stimulate investment and provide tax revenues for governments. Roshan is Afghanistan's largest private company, largest investor and largest taxpayer, and with its network of 25,000 agents who sell top-up vouchers it is one of the country's largest indirect employers. Roshan's success in Afghanistan attracted MTN and Etisalat, two big foreign operators, who provided further investment and created more jobs. By generating taxes, creating jobs that are not related to opium production and promoting prosperity, says Mr Khoja, the telecoms industry provides "a bubble of hope for Afghanistan".

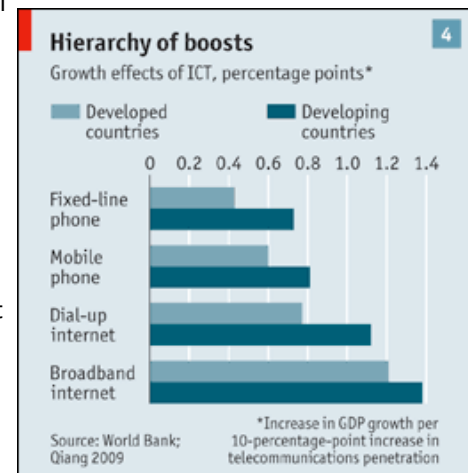
In the past few years the anecdotal evidence has been backed up by studies that measure the economic impact of mobile phones directly. One example is the analysis of fish prices on the coast of Kerala, in southern India, carried out in 2007 by Robert Jensen, an economist at Harvard University. By examining historical price data as mobile-phone coverage was extended down the coast between 1997 and 2001, Mr Jensen was able to show that access to mobile phones made markets much more efficient. Fishermen could call several markets while still at sea before deciding where to sell instead of taking their catch back to their home market and throwing it away if there were no buyers for it. This eliminated waste, dramatically reduced the variation in prices along the coast, brought down consumer prices by 4% and increased fishermen's profits by 8%. Mobile phones paid for themselves within two months. Mr Jensen concluded that "information makes markets work, and markets improve welfare."

Similarly, Jenny Aker of the University of California at Berkeley carried out an analysis of grain markets in Niger, published in 2008, to see how the phasing-in of mobile-phone coverage between 2001 and 2006 affected grain prices. She found that it reduced price variations between one market and another by a minimum of 6.4%, and often more in remote and hard-to-reach markets. As a result, prices for consumers were lower and profits for traders higher. During a spike in food prices in 2005 grain was 4.5% cheaper in markets with mobile coverage.

Such microeconomic studies provide support for macroeconomic analyses that suggest a link between mobile phones and economic growth. In a much-cited study in 2005, for example, Leonard Waverman of the London Business School found that an extra ten mobile phones per 100 people in a typical developing country added 0.6 percentage points of growth in GDP per person. Critics say that it is difficult to tell whether mobile phones are promoting growth, or whether growth promotes the spread of mobile phones as more people become able to afford them. But detailed analyses of micro market data, such as Mr Jensen's study, demonstrate that phones

really do make people better off. As Grameen Bank's Mr Yunus, who won the 2006 Nobel peace prize, once put it: "When you get a mobile phone it is almost like having a card to get out of poverty in a couple of years."

The most recent macroeconomic study, carried out by Christine Zhen-Wei Qiang, an economist at the World Bank, examined the effect of fixed-line and mobile phones, as well as dial-up and broadband internet access, on GDP per person for 120 developed and developing countries. She found that an increase of ten percentage points in mobile-phone adoption in a developing country increased growth in GDP per person by 0.8 percentage points, consistent with Mr Waverman's earlier result. According to Ms Zhen-Wei Qiang's research, mobile phones were more effective at promoting growth than fixed-line phones, but less effective than internet access or broadband (see chart 4). Since mobile phones have the greatest penetration, however, "the aggregate impact is highest for mobile," she says. She also found that all telecoms technologies promoted growth more effectively in developing countries than in developed ones. This is because telecoms services help make markets more efficient, reduce transaction costs and increase productivity—all areas in which developing countries have further to go than developed ones.



## Wireless freedom

But the benefits of mobile phones are not just economic; there are political and social advantages too. FrontlineSMS, a system that allows groups to communicate via text messages, is being used to report human-rights violations and co-ordinate aid and conservation projects, among many other things. Ushahidi (Swahili for "testimony"), a website set up in response to the post-election violence in Kenya in 2008, allows mobile phones to be used for crisis and disaster management. In India's election this year voters were able to use their handsets to call up information about candidates, such as their educational background and any criminal charges they might be facing.

Mobile phones have been used for election monitoring in countries including Nigeria, Kenya and Sierra Leone. Reporting vote totals by phone from polling stations to local radio stations makes it harder to fiddle the results later. And text messaging has been used to co-ordinate political protests in many countries. "Mobile phones play a really wonderful role in enabling civil society," says Mr Ibrahim, who has set up a foundation to improve transparency and governance in Africa. "As well as empowering people economically and socially, they are a wonderful political tool."

Mr Impio cites the popularity of call-in radio shows in Kenya as another example of how mobile phones can make politics more transparent. "People have phones, and when politics is being discussed they can call anonymously and say things journalists cannot discuss," he says. "Newspapers have started to quote them, and journalists say it has given them more freedom to discuss corruption."

Mobile phones can also be used to root out corruption in more direct ways. For example, Zubair Bhatti, a Pakistani bureaucrat, asked all clerks in the Jhang district who handled land transfers to submit a daily list of transactions, giving the amount paid and the mobile-phone numbers of the buyer and the seller. He explained that he would be calling buyers and sellers at random to find out whether they had been asked to pay any extra bribes or commissions. When charges were subsequently brought against a clerk who had asked for a bribe, the others realised that Mr Bhatti meant business, and buyers and sellers reported a sudden improvement in service. Mr Bhatti extended the scheme to other areas, such as cracking down on vets who demanded bribes from farmers, and has proposed that the Jhang model, as it is now known, be adopted in other districts. "It could easily be institutionalised with a call centre," he says. "It could have big vote-getting influence."

Again, these are just a few anecdotal examples, but they illustrate the myriad unseen ways in which mobile phones are improving people's lives across the world, and in the developing world in particular. New data services that provide agricultural advice and price information, improve the provision of health care and allow quick and

easy money transfers hold out the promise of extending the benefits of mobile phones still further.

Ericsson's Mr Svanberg draws an analogy with the internet: only when it had been widely adopted in the rich world were websites such as Facebook and YouTube able to take off. Similarly, he says, once poor countries have established comprehensive mobile coverage, and a reasonable proportion of the population owns a handset, they have a platform from which new services, such as farming advice and mobile money, can be launched. This second wave of mobile-driven benefits, however, will reach its full potential only if access can be extended even further. That, in turn, will require mobile operators in developing countries to find new ways to cut the cost of ownership even more.