

Mobile Phones: Uplifting Weak and Failed States

Mobile telephones are revolutionizing politics and driving political change throughout the developing world. Nothing is so powerful, so transformative. Mobile telephone technology has already changed how people in the developing world cope with their political, economic, and social circumstances. Now, through its ability interactively to transmit verbal and visual (photos or video) information by voice and/or text messaging, mobile telephone technology is poised dramatically to improve human outcomes and life choices for many millions across the globe's weak and failed states. No other recently-introduced technology has been so widely embraced or has so much potential to alter rural and urban outcomes for the better in Africa, Asia, Latin America, and elsewhere.

Mobile phone coverage in sub-Saharan Africa, for example, has grown at staggering rates over the past decade. In 1999, only 10 percent of the population had mobile phone coverage, primarily in South Africa and Senegal. From 2000 to 2008, according to Wireless Intelligence and the Groupe Speciale Mobile Association, persons owning mobile telephones in sub-Saharan Africa increased from 16 million to 376 million. By 2012, that figure was over 500 million, perhaps two-thirds or more of the entire population of the subcontinent. (Individuals sometimes share telephones, thus multiplying the number of users, or some individuals own multiple telephones and multiple subscriber identity

Robert I. Rotberg is this autumn the Fulbright Research Chair in Political Development at the Norman Paterson School of International Affairs, Carleton University (Ottawa, Canada). He is also the Founding Director of Harvard Kennedy School's Program on Intrastate Conflict and President Emeritus of the World Peace Foundation. His latest book is *Transformative Political Leadership: Making a Difference in the Developing World* (Chicago, 2012). He can be reached at Robert_Rotberg@harvard.edu. Jenny C. Aker is Assistant Professor of Development Economics, the Fletcher School of Law and Diplomacy and the Department of Economics, Tufts University.

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module, or SIM, cards.) The wealthier countries of the subcontinent, such as South Africa, Mauritius, Cape Verde, Botswana, and Gabon (and the outliers of Mauritania and the Gambia) show high rates of mobile telephone ownership and penetration. But even in relatively impoverished places such as Mozambique

and Sierra Leone, about 30 percent of citizens own mobile devices. By the end of 2013, even the most remote villages in sub-Saharan Africa will have mobile telephone coverage, and only a handful of countries—Guinea-Bissau, Ethiopia, Mali, and Somalia—will remain relatively (but not completely) unconnected.

This explosion has not only occurred in Africa, but in Asia and Latin America as well. As of 2009, over two-thirds of the population of Asia and three-quarters of the population of Latin America had access to mobile phone coverage. Across the developing world, coverage ranged in 2012 from less than 10 percent in Papua New Guinea and Ethiopia to over 80 percent in such equally poor and fractured places as Haiti and Yemen.

In part, poor land-line telephone service accelerated the adoption of mobile telephones, especially as cell phones became more widespread and comparatively less expensive. A long pent-up demand for communication ability bolstered this rapid migration, despite the costliness of the devices (half a month's wages in Kenya). The supply of time allotments provided by purchased cards, with no billing or accounting issues, also facilitated the spread during the first decade of this century. Today, many more people in Africa's poorest places have mobile telephones than have bank accounts. The constraining factor in the spread of mobile phones has been finding sufficient and reliable electricity for base stations—in Nigeria in 2008 one mobile provider had at least 3,600 base stations together burning 450 liters of diesel fuel every second.

In most cases, the types of mobile phones adopted are relatively simple devices: handsets with only calling, texting, and mobile money capabilities, in some cases limited Internet coverage. Although "smart" phones—namely, those that allow for more sophisticated applications and Internet capabilities—are available throughout Africa, their penetration is primarily in urban areas. This is hardly surprising given the expense of sophisticated mobile devices: most cost well over \$50, ranging from 1-30 percent of annual per capita incomes in the poorer African states. Whether these smartphones achieve the same level of adoption of the simple phones will depend, in part, upon international and local prices for such handsets, their availability on the local market, the diffusion (and speed) of 2G (and above) services, and their ability to provide content that is useful to poor, remote, and partially illiterate populations.¹

Why Mobile Phones?

In the developing world, knowledge is power. Land telephone lines, now rather antique and obsolete (and costly) never delivered the real-time, multiple-user empowerment that is now available through the ubiquity, reach, and simplicity of mobile telephones and text messaging. Radio provides news (and some ancillary information about markets, prices, medical assistance, and so on) almost everywhere in the developing world, but it is not interactive. Often it is government controlled. Newspapers and television are available predominantly in urban areas, but once again, they were not developed for two-sided communications. In some countries, government action severely limits the quality and accuracy of information that newspapers and television provide. Moreover, newspapers are expensive and inaccessible to illiterate populations. A mobile telephone can receive information and its user can then cross-examine the conveyer of that information. In the absence of other low-cost communication devices, it is hardly surprising that mobile telephones have been widely adopted across the developing world.

The Internet may eventually become as central to African life as mobile telephone technology. But for now, the developing world, especially sub-Saharan Africa, has not fully adopted the Internet because of its expense, bulk, and spotty availability.

Indeed, despite the data-driven conclusion that digitization and growth are highly correlated, the Internet has yet to transform the lives of sub-Saharan Africans. This is partially because the Internet is more unwieldy to use, especially for illiterates or the marginally literate.²

The major drawback to relying on the Internet to spur social, economic, and political change in Africa is the fact that it is only sparsely available. According to the Digitisation Index—which tracks 21 measures including speed, coverage, reliability, and utilization of networks and mobile telephones—sub-Saharan Africa scored 36 out of 100 in 2010, whereas Western Europe and Asia scored near 60 and North America just under 60. Hong Kong has 40 fixed broadband connections per 100 people, Kenya less than 1. Senegal's broadband coverage reaches about 30 percent of the population, but only 1 percent use broadband.³

Overall, only about 5 percent of all sub-Saharan Africans own or have access to a computer. That number is expanding rapidly, however, and many researchers assert that the Internet, once it is more available and less expensive, will have a transformative impact on businesses, governments, civil societies, and farmers. Admittedly, mobile phone users can and do download data off the Internet to

The Internet is only sparsely available in Africa.

their mobile handsets, but collecting data in that way is much more expensive than doing so by voice or text.⁴

In contrast to utilizing the Internet for information gathering in the wealthier and more industrialized parts of the globe, in the least favored parts of the world—where poverty is common and life is mean, short, and brutish—information acquisition depends primarily on mobile telephones. The increasingly widespread availability of mobile telephone coverage and devices in most parts of the developing world thus gives a new power to persons whose horizons have hitherto been limited by circumstance, isolation, and lack of resources. In other words, mobile telephones possess instant communication and reporting abilities which possess the power to unlock a vast human potential in weak and failed states.

Benefits in Weak and Failed States

This concept—that knowledge is power—is particularly vital in weak and failed states. Weak and failed states are those places where most people live on less than \$2 a day, with GDP annual per capita incomes ranging from \$150 to \$800. Failed states in particular are political entities in international politics that supply deficient qualities and quantities of political goods and, simultaneously, no longer exercise a monopoly on the legitimate use of force within their territories.⁵

The weaker the state, the greater the need for ordinary citizens to gain access to and control information that directly affects and impacts their lives. Such information, if deployed adroitly, offers ordinary citizens a chance to check or expose flaws in the usual comprehensive power of dominant regimes. The more information, and the more accurate and more timely that information is, the greater the potential for poor populations to benefit. In combating despotism and inequality, knowledge is power; mobile telephones now offer considerable new capacities to moderate regime-imposed abuses or, conceivably, to affect lasting social and economic change.

There are several mechanisms through which mobile phone technology has already advanced the economic, political, and social development of people who live in weak and failed states. First, mobile phones have reduced the cost of communication over long distances—individuals can interact more easily and frequently with members of their various social networks, making it easier and faster to ask for help when and where it is needed.

These reductions in communication costs simultaneously improve access to information. In countries where credit and insurance market failures abound, communicating within a social network can play a crucial role in smoothing consumption problems and enhancing investment, especially in response to

natural or political shocks. A poor, rural, semi-literate farmer can now obtain almost instant information on the likely impact of a flood, a drought, or a cholera epidemic by pulling in information via phone. He or she can usefully discover for what prices maize or rice crops are selling in distant or nearby markets. For example, in Niger and Colombia, the introduction of mobile phone coverage in rural grain markets has allowed traders to move grains from low-price to high-price areas. In India, fishermen have been able to find markets offering higher prices, thereby reducing their losses and allowing producers more easily to match consumer demand. In Kenya, a pioneering program called iCow “enables small scale farmers to access agricultural information and services over the mobile phone, thereby acting as a farmer’s mobile management tool.”⁶ In many countries, agricultural extension services are now supplied exclusively by voice and text messaging, reaching more farmers than prior methods. The availability of employment opportunities can be discovered from afar, saving time, opportunity cost, and shoe leather. Such improved access to critical information allows households to make better daily decisions, improve coordination among agents (buyers and sellers), and increase market efficiency. Thus, mobile phone technology provides a major new economic advantage for the weak and the poor everywhere.

This advantage extends to improving overall financial communication. The introduction of mobile money services (first in Kenya and now almost everywhere) enable households and firms privately to transfer electronic money via all but the most primitive mobile phones. The ability to move money now permits even those who are distant from cities to deposit their earnings in a bank rather than in mattresses. People can receive remittances from overseas (or from the cities) directly and convert them into cash. For example, M-Pesa in Kenya has teamed up with Western Union to facilitate transferring funds from forty-five countries into Kenyan mobile deposit accounts. A platform called CurrencyFair makes buying and selling money across borders (whether sending remittances or purchasing foreign exchange) much less expensive than regular methods through established banks. Credit is thus easier to obtain and to manipulate, and commerce accordingly enhanced. This innovation has reduced high transaction costs associated with moving money, giving persons well outside of the banking system control over their finances, and enabled a host of further innovations (such as coupons, donations, and surveys) that build on the mobile telephone as a financial transaction device.

Mobile phones also aid in education for primary school-aged children and illiterate adults. Children in Niger have learned to read on their mobile telephones. A mobile phone-based adult education experiment showed that mobile phones increased adults’ test scores in the short- and long-term by

25 percent as compared to normal adult education classes, and that these impacts were solely due to the mobile phone intervention.⁷

The new connectivity through mobile telephones could also help Africa take advantage of surging population growth and help to produce a welcome demographic dividend. Sub-Saharan Africa, the poorest part of the developing world, faces a population growth scenario in the next three or four decades that promises to double and triple numbers of people in countries such as Nigeria, Tanzania, Ethiopia, and the Congo (K), and in very poor places such as Malawi. Mobile telephone capacities may enable wildly more populous and congested countries to overcome infrastructural and energy limitations by providing communication alternatives that overcome the absence, say, of road access to officials, law enforcement, markets, or big cities.

Although telephonic capabilities in themselves do not necessarily provide conclusive remedies to societal ills, mobile phones still have an untapped capacity to reflect and introduce positive social changes. Indeed, the new widespread availability of mobile hand-held devices and inexpensive SMS texting provides major tools capable of affecting meaningful betterment, especially where peoples' pursuit of livelihoods and happiness are harassed by state neglect or state-imposed constraints. Several areas in particular could benefit, such as improving governance and inhibiting corrupt practices, ensuring free and well-run elections, deterring violence against persons, and improving health care.

Inhibiting Corrupt Practices

The prevalence of corrupt practice in a country may not be known exactly. However, mobile text reporting can provide a better sense than we now have of

the level and pattern of corruption within a state, and of what kinds of people are giving and taking bribes. Such crowd reporting (texts from numbers of unscreened people) has its limitations since verification is difficult and names are usually omitted for fear of slander suits or physical retaliation. Yet, the accumulation and mapping of incidents

allow patterns to emerge and pressures to increase on governments and offenders.

A more systematic reporting of bribes by trained observers would be even better than crowd-sourced texting. Results of the two approaches would reinforce each other and permit the aggregated knowledge, in the right hands, to deter corruption simply because accumulated knowledge would exist.

Mobile text reporting can provide a better sense of corruption within a state.

Prosecutions are more likely, too, if patterns and suspicions are verified. Certainly such new repositories of information will challenge the state and its highest officials, no matter how corrupt.

Several countries are experimenting with these approaches. In India and Kenya, “I Paid a Bribe” sites collect anonymous but telling reports. The Kenyan organizer of this site wants to have a network capable of instantly reporting vote-buying during the 2013 national elections. These powerful new ideas can help reveal who is bribing, and can thus give ordinary victims at least some agency. “In the past,” said a Transparency International program director, “we tended to view corruption as this huge, monolithic problem that ordinary people couldn’t do anything about . . . Now, people [can] . . . identify it and demand change.”⁸

In addition to combating bribery, mobile phone technology can also help make governance generally fairer, more efficient, and more transparent. First, central or local entities may upload official rules and regulations to hand-held devices, thus offering a new layer of accountability and transparency to transactions between a government and its citizens. Until now, citizens (especially rural inhabitants) often have been kept in purposeful ignorance to give bureaucrats and bureaucracies enhanced levels of power. Second, mobile telephones could help in obtaining licenses and permits of all kinds, thus saving time and opportunity costs for citizens and, again, removing arbitrary discretion from bureaucrats. Third, citizens could complain directly to official ombudsmen or to other designated officials about issues arising in their home areas, such as missing street lights or road signs. In South Africa’s KwaZulu-Natal, a villager plagued with frequent sewage overflows from a nearby river used mobile telephones and attached videos to complain to leadership; once the district municipal manager saw the evidence, he had the main broken pipes repaired and the overflows prevented. Indeed in many areas, citizens already use mobile phones to complain directly to a government official about issues arising in their home areas (such as dangerous driving in Kenya or water shortages in India). Similarly, as in Mozambique, citizens could tell a newly-elected administration what it hoped it would do for them via a call-in hotline.⁹

Deterring Violence against Persons

Violence against persons has many variations and ramifications, and affects as many of the poor and dispossessed as corruption but with much more direct and greater personal impact. Violence against persons is the scourge of weak and failed states because violent acts—maimings, rapes, random attacks—are usually perpetrated in order to deprive citizens of their own sense of purpose and power. Victims in these situations cannot easily report or counter such painful deprivations of freedom directly because of the power disparities between themselves and the attackers. Hence, an ability first to report and second to

initiate actions capable of limiting brutal acts can serve to level the field of power between helpless citizens and the overweening state (and its agents). Providing that mobile phone access and coverage exists, perfecting ways to bear witness through SMS mechanisms is an important first step; it could lead to mechanisms capable of obtaining redress and preventing future brutalities.

Almost everywhere in weak and failed states, the ruling classes and/or governments prey on their own people. Whatever the underlying causal factors, innocent civilians are too often caught in the crossfire—between state actors and non-state actors, rebels and soldiers, among marauding militias from different sides, and between one criminal gang and another. Many of the 4 million or so Congolese and the 3 million or so Sudanese who have lost their lives since 1990 in civil war have been bystanders, not combatants. Likewise, the 40 women who are raped daily in the chaotic conflict zones of the Eastern Congo are all presumed to be innocent victims of wars that are resource-driven, ethnically-denominated, and largely anomic.¹⁰ In Zimbabwe today, as in so many other similar weak and failed situations, ruling party thugs attack supporters or presumed supporters of the opposition in order to intimidate them, and in order to demonstrate the long hand of the despotic state prior to national elections in 2013.

In these kinds of brutal situations, anecdotal reports of violent outbreaks in remote rural areas, in much more accessible townships, and even in the cities have always been available for much later compilation, but not in real time. Too often, the data obtained from monitoring violence and intimidation have been generalized, suitable for advocacy but insufficient for either legal action or election petitions. Better are data that directly implicate behavior or retail incidents that can be shown to affect an election result. To do so requires verifiable and, if possible, material evidence of the kind that trained observers can supply using SMS texting and mobile phone photographic capabilities.

The power of verifiable real-time awareness of such depredations could make a significant impact in countries such as Afghanistan, Burma, the Congo, Nigeria, Papua New Guinea, and Zimbabwe. First, it could help warn people and areas at risk and reduce the duration and intensity of an episode of violence. Second, allies could come to the aid of victims and could pose a countervailing power capable of limiting the scope of violence. Third, the authorities could be informed, instantly, and police and other official bodies could at least be asked to intervene (even if they refused or were lax). Finally, the awareness that citizens could report violent actions of desperadoes, militias, criminal gangs, and rogue groups could serve as a deterrent, conceivably causing tactical and strategic reassessments and dampening intensified conflict.

Crowd-sourcing, already employed in some situations for the reporting of violence, could offer early warnings, cause potential victims to flee, and might in

certain circumstances provide enough information for *post hoc* preventive assessments and retribution. But the reliability of such reports is difficult to ascertain. An SMS support mechanism could remedy such a disability. Victims or observers could send a message to a local, trained middleman who could vouch for the sender's reliability. The middleman could then upload one or more community text messages to a server in the cloud, using simple codes to avoid revealing sources. This central collecting depot could then aggregate and map all of the arriving information and transmit warning messages to persons or areas in danger, to the authorities (if they were likely to oppose violence), to international bodies such as the United Nations, to a regional or sub-regional body such as ASEAN (the Association of Southeast Asian Nations) or SADC (the Southern African Development Community), and to the media. Later, too, the incidents could be analyzed and their distribution displayed for all to see.

As an additional form of deterrence, the verifiable quality of this kind of SMS reporting allows targeting individual attackers by name. Photographs or recordings of intimidating statements could even accompany the SMS accounts. Then, if someone were associated with a violent attack at X place, and later at Y, a case could be made against a specific individual, or that individual could be observed closely and deterred by such revealing publicity.

Text messaging could even help deter external bombing and cross-border violence, such as in Sudan and South Sudan. Suspected attacks are currently noticed by satellite photographing, but on-the-ground verification is difficult, if not impossible. If and when SMS texting

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capabilities reach these affected areas, the existing on-high surveillance can be buttressed from the ground and results reported to the UN and both governments in a timely manner for remedial action. Thus, information supplied by calibrated and credible SMS texts will counter violence and free poor, defenseless, and individually vulnerable citizens from the scourge of conflict in weak and failing states.

Ensuring Free and Well-Run Elections

Throughout the developing world, the process of holding elections and counting votes has, more often than not, been manipulated, rigged, and frequently subject to accusations of theft. For example, Turkmenistan's recent election to re-anoint its president was blatantly illegitimate (he gained 97 percent of the vote). Voting fraud is especially prevalent in weak, failed, and authoritarian states where accountability is weak and media oversight hampered; those in power use

elections to ratify the hold of existing regimes. In Zimbabwe, for example, the results of the national electoral contests of 2000, 2002, 2005, and 2008 (twice) were all heavily manipulated by the ruling party of President Robert Mugabe.¹¹ He perpetrated violent acts against his opponents on the polling days themselves as well as during the long pre-electoral phases of each of the campaigns. His people also stuffed ballot boxes, changed or attempted to change the counts from each polling station, and then delayed issuing the results for weeks in order to massage the finally released, hardly believable, totals that kept Mugabe in contention for the presidency.

Fortunately, the availability of SMS texting capabilities can help to make such election processes much fairer. During Senegal's 2000 presidential poll, radio stations sent reporters with mobile phones to text results as the ballots were counted, making it difficult for authorities to change the final count. In 2012, also in Senegal, even more sophisticated texting methods were used to report on the results from 11,000 stations. Similarly, a vote in Sierra Leone in 2008 briefly threatened to disintegrate amid rumors of violence—also spread through text messages—but quickly returned to order when 500 observers at the various polling stations sent text messages across social networks saying that the rumors were false.

Mobile telephone technology can expand on these methods. For example, people can report acts of intimidation and violence well before an election, or on election day, including incidents of voter interference or ballot manipulation. Immediate publication of such incidents—to national and international observers, to regional supervisory bodies, to the media—could deter, if not rule a result invalid. At the end of the specified voting day, an independent body could upload, verify, and announce the results, thus creating one or more separate paths to ascertain results. Doing so would make rigging results after the fact difficult.

The Carter Center and other international observers have long utilized a so-called “quick count method” to sample voter actions as they leave the polls. One could gather these preliminary representative returns, upload them to a central station, and leak or announce them in order to test official results. This has already been done in Ghana and Nigeria, where such a parallel reporting mechanism (called PVT for Parallel Voting Tabulation) helped to ensure the validity and broad acceptability of their 2009 and 2011 polls.

The method of using a trained middleman and a central reporting depot could also work well here. Local networks of observers could report upwards to the middleman whatever seems out of place or egregious. The middleman could then transmit in simple code to a regional or a central location the collected reports of persons known to her/him, thus assuring the credibility of that person and the reports that follow. Others can then view the reports via the Internet to look for

patterns of reproachable brutal incidents, pre-electoral intimidations, election-day violence, and so on. Such reports can name individual intimidators, and their depredations can be tracked from community to community in powerful ways. Once this method becomes fully utilized, it will likely deter violent or illegal acts.

If not, *post hoc* retribution is also available. No other method of dealing with the myriad potential abuses that an authoritarian regime can heap on its people is more powerful than SMS texting.

This method does depend on secure text messaging. If a chain of transmitters (as above) is created, and if simple codes are employed to disguise the names of informants and relaying personnel, then the potential weakest link is the place where all of the collected information is retained and analyzed. There is a need, consequently, for the chain of transmission to end in a cloud—the servers to which the data are sent should reside outside the weak or failed state, preferably in a neighboring strong and democratic state with robust privacy safeguards. This was the method employed in Uganda: data from smartphones were transmitted immediately to servers at the University of California, San Diego.¹² In Senegal, the 2012 vote counts were uploaded to a secure server outside of the country, probably in France.

Certain kinds of regimes will retaliate under any circumstances. But SMS respondents can be comparatively free of retribution if their identities are masked (known only at the first relay point), if the simple codes are strong, and if everything is encrypted and stored externally on secure servers linked to an encrypted cloud. The ultimate goal is an election which faithfully expresses the real will of the people. Text messaging capabilities make such a goal more realizable today than ever before.

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Health Care and Medical Treatment

Weak and failed states, and the nations of the developing world more generally, are unhealthy at the best of times. Most lack physicians and nurses. For example, Europe has between 2.1 and 3.9 physicians per 1000 people; the United States has 2.3; and Singapore, Mauritius, and the Seychelles each have slightly more than 1 physician per 1000. Meanwhile, South Africa has but 0.77 physicians per 1000, Botswana 0.4, and Nigeria 0.3. All other sub-Saharan countries have fewer than the Nigerian ratio, and in Malawi one physician serves a full 356,000 people.¹³ The populations of tropical nations, again especially in Africa, suffer from rampant malaria, tuberculosis, schistosomiasis, leishmaniasis, diarrheal

complaints, cholera, pneumonia, and much more. Malnutrition is a common debilitation. For obvious reasons, then, it is important to help improve medical outcomes and life chances.

Mobile telephones have already permitted many meaningful advances in the medical field. They sped up reporting medical emergencies in Mexico, offered critical technical knowledge to physicians and nurses in the Democratic Republic of Congo, and consistently and regularly remind HIV/AIDS and tubercular patients in Kenya, Malawi, South Africa, and many other developing countries to take their medicines, morning and night. They can summon persons to clinics and distribute alerts when epidemics or other crises occur. In Ghana, mobile technology is even used to facilitate breastfeeding via personalized counseling; text message encouragements and coaching are sent to women in hard-to-reach, low-income areas. Rwanda has distributed free mobile telephones to thousands of community health workers so that they can keep track of pregnant women, send emergency alerts, call ambulances, and offer updates to local clinics on emerging health issues. “Text to Change” in Uganda has been alerting a broad public on various medical issues for more than five years. M-Pedigree, a new drug monitoring system in Rwanda, Kenya, Nigeria, and Ghana, also permits health workers and consumers to send a text code to a central hotline quickly to verify whether a particular medicine is counterfeit or genuine.

Smartphones will soon be capable of acting as sensors. The computing power of smartphones will take blood pressures, monitor blood sugar, hear heartbeats, and even (using photographic capacities along with text capabilities) look down throats, into ears, and at body lesions. Distant diagnosticians will receive clinically transmitted or self-sent medical tests and images. They already do so to some extent in Nigeria. With support from the Bill and Melinda Gates Foundation, a British innovator has designed a mobile phone-powered surface acoustic wave device to diagnose malaria remotely.¹⁴ A simple otoscope could someday connect to a smartphone and investigate problems in Eustachian tubes, or a stethoscope could link to a smartphone to “hear” a suspect heart and send the results to a physician in a capital city. The results of such do-it-yourself medicine, uploaded to smartphones and sent to health providers, can reduce the complications of distance and time that now reduce effective care in poor and developing countries. The possibilities for observation, transmission of such information, and a returned diagnosis by text message are vast and potentially uplifting and liberating.

Hand-Held Devices and the Greater Good

If the leaders and followers of the developing world want to strengthen human outcomes, protect vulnerable populations, enhance the potential prosperity of

individuals, and bolster transparency and accountability, then SMS texting is a resource to develop. It provides an essential, powerful, and remarkably innovative tool capable of enhancing information flows to both the poor and the rich. Doing so might help to level existing playing fields and empower the weak against the strong. Medical diagnostic capabilities could grow, as could other medical interventions that SMS texting makes possible. Similar kinds of technological advances could help to redress injustices and ensure the credibility of electoral and other democratic exercises. Despotism could meet its match. Even bureaucratic obfuscation could be undermined or taken to task. The possibilities are endless, powerful, and exciting.

Fully harnessing this mobile telephonic technological revolution for developing countries, however, depends ultimately on national policy decisions as well as on the individual adoption of the devices themselves. In some countries, commercial and bureaucratic obstacles still inhibit the easy purchase of telephones and SIM cards. Some of the more tightly controlled countries demand that subscribers of air time register each time they add minutes. Others are loath to license mobile telephone providers in order to bolster the profits of state-run monopolies or because of back-door corrupt dealings. Some countries prohibit the transmission of Internet data to mobile telephones. Some try to eavesdrop on conversations.

Major, life-changing advances will come in those countries where leaders embrace these new technologies—introducing them for literacy enhancement in schools; for health improvements in hospitals, clinics, and in rural settings and villages; for commercial and agricultural economic enhancements; for reporting on such

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non-controversial matters as rainfall amounts, drought incidence, food shortages, infrastructural problems and needed repairs; and so on. Mobile telephone messaging systems can also facilitate helpful informational updates from official sources such as central or provincial governments; local councilors, teachers, and nurses; the police; and any other official sources with news to impart.

Every politician in a developing country, especially in a weak and failed one, carries at least one if not several mobile telephones. Few politicians are unaware of the power of mobile telephones. If they understand how this technology is capable of improving the lives of their citizens, they ought to scour the globe to gather and adapt the best possible betterment schemes using mobile telephonic technology and bring them home. The widespread invention and adoption of the best kinds of mobile telephonic innovations may make it possible for

sub-Saharan Africa, for example, with its exploding population numbers, to transform its developmental prospects and leapfrog decades of slower growth.

As in so many other areas of the developing world, political leadership and acceptance of innovation matter. The mobile telephone revolution has already swept over much of the globe. It will continue, willy-nilly, whatever regimes do. But it will achieve much greater force and direction if leaders explicitly recognize the mobile telephonic potential for positive change, and embrace it fully and publicly.

Notes

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