



United Nations Development Programme

DEMOCRATIC GOVERNANCE

MOBILE TECHNOLOGIES AND EMPOWERMENT:

Enhancing human development
through participation and innovation

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Abbreviations

ATM	Automated Teller Machine
BRIC	Brazil, Russia, India and China.
CAGR	Compound Annual Growth Rate
CELAC	Collecting and Exchange of Local Agricultural Content (Uganda)
CLO	Civil Liberties Organisation (Nigeria)
CSO	Civil Society Organization
CSIR	Council for Scientific and Industrial Research (South Africa)
DDR	Disarmament, Demobilisation and Reintegration
DISC	Development and Institutionalization Support Center (Egypt)
EiE	Enough is Enough (Nigeria)
GIS	Geographic Information System
GDP	Gross Domestic Product
GPS	Global Positioning System
GPRS	General Packet Radio Service, a mobile data service on the 2G/3G cellular communication system
GSM	Global System for Mobile Communications
GSMA	Global System for Mobile Communications Association
HDI	Human Development Index
IADG	Internationally Agreed Development Goals
ICT	Information and Communication Technology
ITU	International Telecommunications Union
IOM	International Organization for Migration
IVR	Interactive Voice Response
LADE	Lebanese Association for Democratic Elections
LDC	Least-Developed Country
LIC	Low-Income Country
LMIC	Lower-Middle-Income Country
MDG	Millennium Development Goals
MENA	Middle East and North Africa
NATEK	National Alert on Torture and Extra Judicial Killings (Nigeria)
NCC	Net Contributing Country
NeGP	National e-Governance Plan (India)
NGO	Non-Governmental Organisation
OECD	Organisation for Economic Co-operation and Development
PDA	Personal Digital Assistant (hand-held smartphone)
PSA	Public Service Announcement
SDS	Special Development Situation
SIM	Subscriber Identity Module (removable card for the mobile phone)
SMS	Short Message Service
UMIC	Upper-Middle-Income Country

Executive Summary

Mobile technologies are opening new channels of communication between people and governments, potentially offering greater access to public information and basic services to all. No other technology has been in the hands of so many people in so many countries in such a short period of time (World Bank 2008). In fact, globally, more people now have access to a mobile device than to justice or legal services (UNDP 2008). Recent estimates indicate that ICTs could be accessible to everyone by 2015 and bring internationally agreed development targets ever closer to achievement (ITU 2010). Indeed, we are witnessing a new wave of democratization of access to innovative ICT channels, propelled by state-of-the-art technologies and diminishing barriers to entry.

In a global population of nearly seven billion people, the total number of mobile phone subscriptions globally is an astonishing 5.4 billion — and counting.¹ Given that individual subscribers may have multiple and/or inactive SIM cards, the actual number of individual mobile subscribers worldwide is estimated at around 3.9 billion (Informa Telecoms and Media 2011). Latest figures indicate that mobile phone penetration rates stand at almost 45 percent in low-income countries and 76 percent in lower-middle-income countries (ITU 2011a). Given that entire villages in poor and/or rural communities will often share one or two cell phones, it is also estimated that 80 to 90 percent of people in some poor countries have at least minimal access to a cell phone (Zuckerman 2009). Furthermore, close to 80 million mobile subscribers, most of them in developing countries, have no access to the electrical grid — and yet use a mobile phone.

That is in part because mobile technologies offer portable, real-time communication and information access for people who previously had little to no access to affordable communication channels. Mobiles have relatively low physical infrastructure requirements and can reach remote areas in a more cost-effective fashion than other ICTs such as the Internet or fixed phone lines. In some places, mobile devices are simply the only option available. And mobile phones require only basic literacy, making the barriers to entry much lower than with other modern ICTs.

Yet, mobile services for people at the bottom of the pyramid remain high: the price basket for mobile services can amount to 15.75 percent of monthly average per capita income in countries with low human development (compared with 4.86 percent in medium human development contexts). And coverage in remote or marginalized areas is often nonexistent. There are indications that at least ten percent of the global population and 40 percent of people in least developed countries are not covered by a mobile network, entrenching divisions between populations in urban centres and poorer populations in the periphery (Blackman and Srivastava 2011).

However, mobile phone subscriptions in the developing world are rapidly outpacing those in the developed world and costs are coming down. Moreover, public investment and public-private partnerships are becoming essential tools for extending connectivity, services and information.

As a result, mobile technologies are starting to have an indelible impact on human development, enhancing democratic governance and other development areas such as health, education, agriculture, employment, crisis prevention and the environment. For instance, studies have suggested that increased mobile ownership is linked to higher economic growth (Vodafone 2005; Vodafone and ICRIER 2009). It is also likely to have twice as large an impact on economic growth in developing countries as in developed ones because the starting point of infrastructure in poorer countries is so much lower in terms of landlines and broadband access. Leapfrogging of traditional infrastructure requirements such as landlines is possible in low-income countries as mobile technologies have lower investment costs. Other benefits include increased telecom-based tax revenues, greater employment opportunities, and overall increased productivity, not to mention a thriving telecom industry that attracts foreign direct investment.

Within governance, mobile technologies can offer new means for empowering citizens and stakeholders by opening and enhancing democratic processes and mechanisms. M-governance initiatives that

expand access to information and communications channels are creating new venues for people's participation and giving new voice to those who have historically been marginalized. What was once in the domain of official or large private, corporate media channels is now in the hands of anyone with a mobile or an Internet connection — flattening information and broadening the distribution of that information. This in turn can support wider stakeholder mobilization within a much shorter period of time, as witnessed during the so-called Arab spring of 2011 and other political mobilizations happening around the world today.

The simplicity of new mobile platforms requiring only a basic mobile phone with SMS capacity has allowed their adoption all over the world — from South Africa, to India, to Mexico — to monitor elections, track violence and crime, provide logistical support in natural disasters, and oversee inventories. The portability and ubiquity of mobile phones have helped them become an important tool for civil society, enabling local mobilization and networking among geographically dispersed people.

Mobile technologies are also strengthening the demand side of governance by providing people with critical tools to engage with public institutions and demand more and better services. This fosters broader transparency and social accountability. Enhancing service delivery and reform within important governing institutions — from public administrations to parliaments to systems of justice — generates new possibilities for open government. Mobile technologies can reduce bureaucratic holdups for average citizens and streamline work for civil servants. They enable citizens to bypass intermediaries who may take money for facilitating transactions, making service delivery more efficient and transparent.

Significantly for poor people and rural development, mobile technologies can help reduce information gaps and restrictions inherent in marketplaces where consumers and producers have little means of comparing commodity prices between distant markets. Micro-entrepreneurs, for instance, can access market information from remote locations, increasing the speed of trade and reducing travel expenditures.

Mobiles also offer greater independence for women by opening new channels of information and affording greater personal privacy. They can also offer women greater security, not only as emergency tools, but also to report and monitor violence against women. And where once women may have needed male relatives to act as intermediaries, mobile platforms now provide them the chance to make decisions for their economic wellbeing by and for themselves, which in turn can facilitate female entrepreneurship.

Mobile applications are also being used to combat poverty by expanding service delivery possibilities in health care, agriculture, employment and education. In the health sector, there have been many pioneering mobile initiatives improving connectivity and information transmission in areas that are hard to access. As emergency response tools, mobile technologies have helped establish networks of communication between citizens, organizations and government agencies in times of crises. They are also being used to educate and keep citizens and vulnerable stakeholders abreast of environmental and energy-related issues, including weather patterns, climate change and responsible environmental stewardship.

By themselves, mobile phones will neither pull people out of poverty, nor propel democratic governance. Instead they are catalytic tools for enhancing and broadening development programming if deployed strategically. They open new channels for connecting the poor to services, new ways for citizens to have their voices heard, and new opportunities for civic engagement in larger governance processes.

At the same time, to reach historically under-served communities, policies need to be in place to help realize the development potential of this medium. It is important that policies support both broad access to information and service distribution, so that mobile services will reach difficult-to-access (and most times un-lucrative) rural areas. It is also important not to overlook literacy challenges and infrastructure limitations. Yet, even within the constraints, mobile technologies are offering marginalized people new ways to leverage their resources to enter the marketplace and demand public services.

1. Introduction

The rapid diffusion of mobile technologies in the first decade of the new millennium has little precedent in history. No other technology has ever been in the hands of so many people in so many countries in such a short period of time (World Bank 2008). Although the 'hype' has brought with it some exaggeration, it is also true that nowadays more people probably have access to a mobile device than to justice or legal services (UNDP 2008). In fact, whereas four billion people in the world have no access to justice and legal services (UNDP 2008), there are 5.4 billion mobile subscriptions.² And according to a report published by the United Nations University in 2010, more people in India have access to a cell phone than to a toilet and good sanitation (UNU-IWEH 2010).

The Millennium Development Goals (MDGs) have set forth global commitments to foster human development across the world. One of the targets calls for making the benefits of Information and Communications Technologies (ICTs) available to all. If we subscribe to the latest figures on mobile usage and availability then we can argue that this particular target is achievable by 2015, if not before (see figure 1).

But how does this relate to the other 17 MDG targets, if at all, and to all other Internationally Agreed Development Goals (IADGs)?

FIGURE 1: Mobile Subscriptions 2010

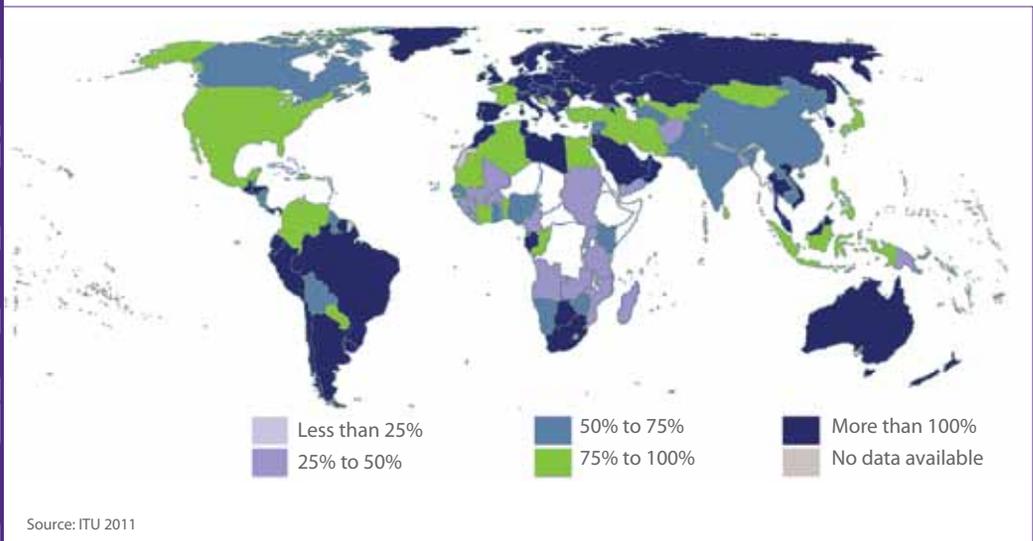
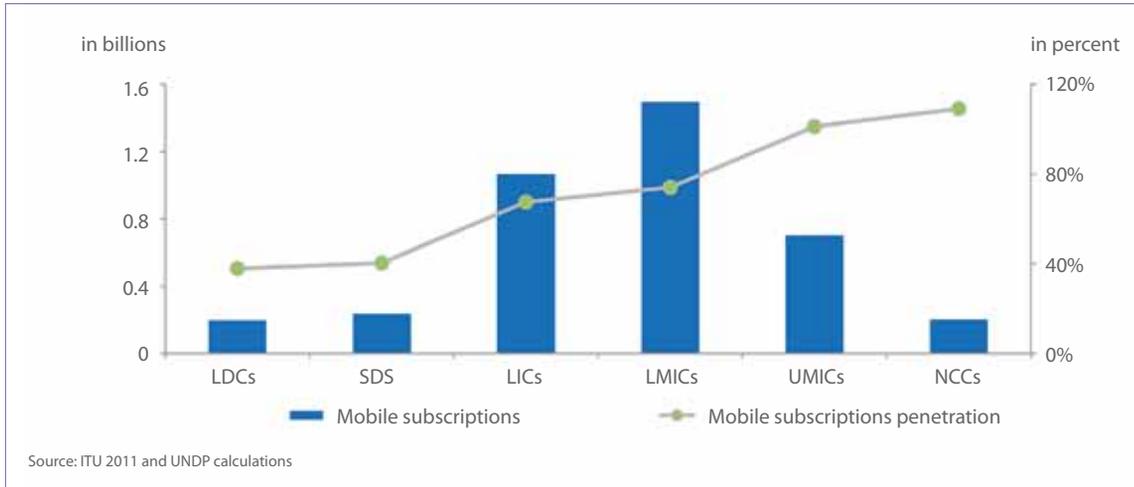


FIGURE 2: Mobile Subscriptions by UNDP Country Categories 2010



In principle, mobile devices can significantly impact development goals in terms of poverty reduction, democratic governance and crisis response (ITU 2010; Castells et al. 2007). Strategically deployed, mobile technologies can open new, interactive communication channels that help governments engage people in policy and decision-making processes, expand stakeholder participation, offer greater access to public information, and foster targeted service delivery to the poor and marginalized. Nevertheless, the question is how to make this happen in real, material terms in ways that will really enhance human development.

The main objective of this primer is to provide UNDP programme staff and development partners and practitioners with a practical understanding of how mobile technologies can amplify development programming. By looking at basic concepts, current trends and real life examples, the primer intends to shed light on how development practitioners can harness the potential of mobile technologies to improve development outputs and outcomes at the country level.

The primer first outlines development in terms of the growth of mobile technologies. It then examines some of the currently available evidence on the macro impact of the technology, and presents concrete examples that have had a direct impact on democratic governance. Further examples of the impact of mobiles on other UNDP practices such as poverty reduction, crisis prevention and recovery, and energy and environment are then illustrated. Based on these examples, key challenges and success factors are outlined as well as some of the lessons learned so far. Finally, it offers suggestions on how UNDP can capitalize on mobile technologies to enhance its development programming and development impact.

2. Current Trends

Context

For many years, discussions on the diffusion of new ICTs have centred on the so-called digital divide between wealthy and poor countries, and the haves and have-nots within them. In fact, in the 1990s, closing that divide became the main target of most development initiatives, essentially focusing on access to ICTs and overlooking other critical and underlying development goals. While access to the Internet remains limited in many developing countries, the rise of mobile technology has reframed the debate. Digital technological diffusion appears to be creating more cross-country convergences than divides as devices reach the world's poorest populations (Oh and Kathuria 2010; Kyriakidou, Michalakelis and Varoutas 2009; Rouvinen 2004). Indeed, we are witnessing a new wave of democratization of access to innovative information and communication channels, propelled by state-of-the-art technologies and diminishing barriers to entry.

Mobile Penetration

Latest estimates indicate that out of the 5.4 billion global mobile phone subscriptions, over 483 million subscriptions come from low-income countries and 2.6 billion from lower-middle-income countries (see figure 3). In other words, about 56 percent of the subscriptions are from poorer countries, and with growth rates well over 35% in most developing regions (see figure 5), the potential for extending access to further segments of these populations is promising.

However, subscriptions do not reflect actual ownership, for which precise information is difficult to ascertain. Mobile penetration figures are based on SIM cards sold, not on the number of users or the number of cell phones distributed. For instance, one subscriber may have multiple and/or inactive SIM cards or many people may share one SIM card; shared access is particularly common in poor and/or rural communities where an entire village may have access to just one or two phones (Zuckerman 2009). Recent research indicates that there are 1.39 SIM cards per every mobile subscriber which translates into 3.9 billion total mobile subscribers globally (Informa Telecoms and Media 2011).

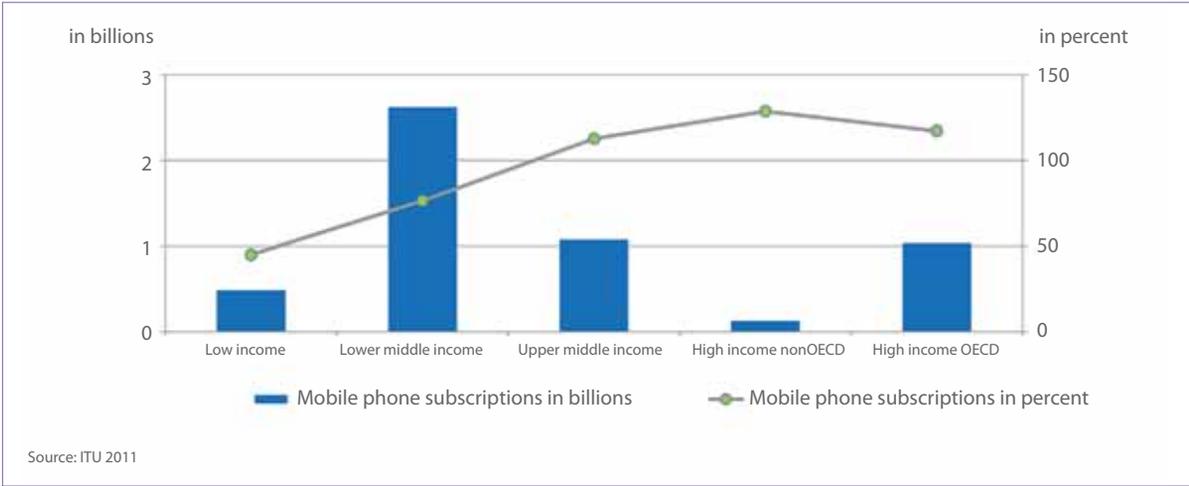
Historical Evolution

Beginning in 2005, mobile phone subscriptions in the developing world began to rapidly outpace those in the developed world. Along with market saturation in the North, falling costs have made the rapid expansion of mobile technologies possible in the South. Today, South Asia — comprising Afghanistan, Bangladesh, Bhutan, India, Sri Lanka, Maldives, Nepal, Pakistan (ITU 2011a) — is the world's fastest growing market for mobile phone subscriptions, with a compound annual growth rate from 2000 to 2010 of over 70.6 percent, as illustrated in figure 4. Sub-Saharan Africa, and Middle East and North Africa follow, with 42.0 and 38.2 percent growth respectively (see figure 5).

There are many reasons why mobile technologies are expanding at such a rapid pace in developing countries. Mobiles offer real-time, interactive voice communication, short message service (SMS) and access to information for people who previously had little to no access to any affordable communication channels. Mobile phones are also portable, which is important in many developing country contexts, and among otherwise marginalized populations such as migrant or rural workers.

Mobile phones can bolster personal security by keeping people in touch with each other in precarious situations such as natural disasters, conflicts, criminal or gender-related violence. Mobiles also have relatively low physical infrastructure requirements and can thus easily reach areas in a more cost-effective fashion than other ICTs such as the Internet or fixed phone lines. In some places, mobile devices are simply the only option available. And where there are no electrical grids, base stations are sometimes powered with low-cost generators that require low-energy inputs.

FIGURE 3: Mobile Phone Subscriptions Across Income Categories Percent and Absolute Terms



In addition, unlike other digital devices, mobile phones only require basic literacy, and therefore can be used by a larger segment of the population than say, computers, which usually demand higher skill sets. Furthermore, mobile devices are user friendly, and require few special skills for their use — further lowering the barriers to entry, compared to other modern ICTs. Finally, mobile access is relatively affordable and for many households offers an efficient use of limited resources, while significantly enhancing their capacity to communicate and access public services (Donner 2010; Rashid and Elder 2009; Hellstrom 2008).

In the global South, while early adopters of mobile technology were among the wealthiest citizens, the growth of mobile networks and the introduction of prepaid subscriptions and related pricing schemes have accelerated access for those at the bottom of the pyramid. Still, large segments of the population are yet to see the benefits of mobile technologies. In fact, in least developed countries (LDCs), just ten percent of the population has an individual mobile phone subscription — although in some countries it is estimated that 80 to 90 percent of people could have access to a cell phone in their village or community (Zuckerman 2009), though this data is approximate and local environments vary.

FIGURE 4: Mobile Subscriptions Growth, South Asia 2010

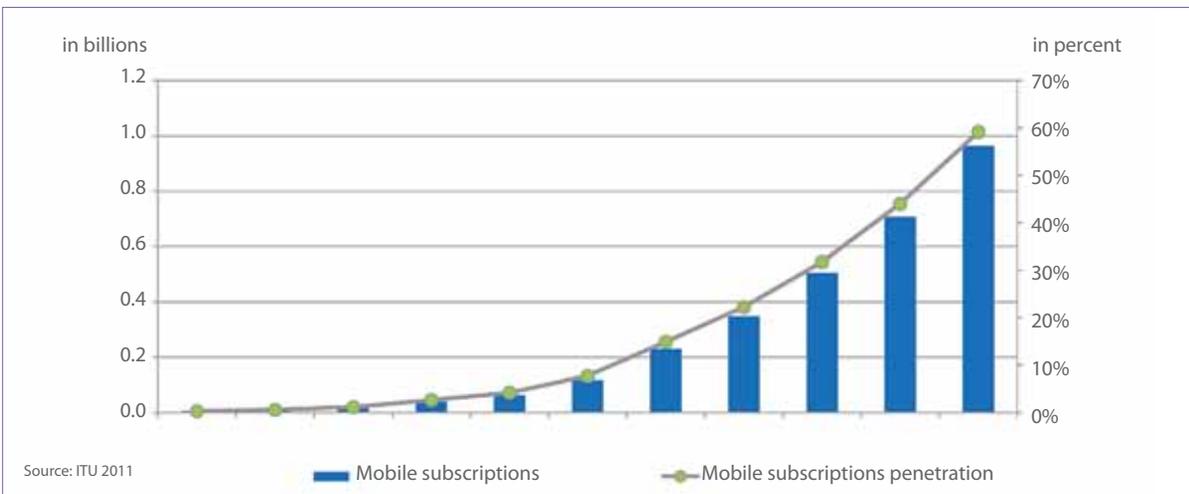
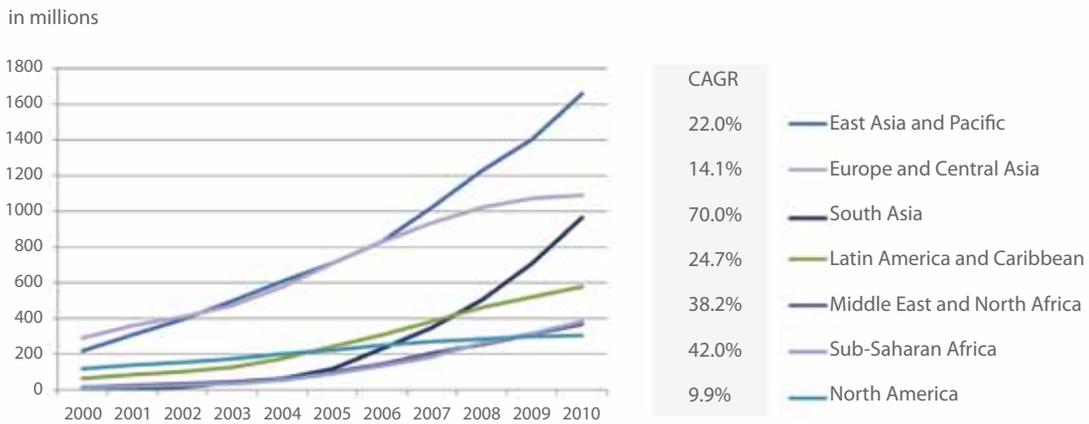


FIGURE 5: Mobile Subscriptions Trend By Region 2000-2010



Source: ITU 2011 and UNDP calculations

Access Costs and Coverage

Even though prices are decreasing, the cost of mobile services for the poor does remain high. Data reveals that the price basket for mobile services can amount to 15.75 percent of monthly average per capita income in countries with low human development, compared with 4.86 percent in countries with medium human development. In these environments, without careful consideration of cost-impact, mobile phones could actually undermine development if they only create further expenses for poor people (Horst and Miller 2006). The good news is that prices are continuing to drop. Since 2008, the prices for mobile access have halved in places such as Côte d'Ivoire, Sri Lanka and Venezuela for example, and this trend is anticipated to continue (ITU 2011b; UNDP calculations).³

Another significant limitation is coverage in remote or marginalized areas. Indeed, estimates indicate that over ten percent of the global population, and 40 percent of people in LDCs are not covered by mobile networks (Blackman and Srivastava 2011). Given that the mobile industry is essentially driven by the business sector, areas that are not financially lucrative for operators, such as very remote and poor areas, could remain uncovered, further entrenching divisions between populations in urban centres and poorer populations in the periphery. It is here that public investment and public-private partnerships are essential to extend coverage and to ensure not only connectivity but also services and information.

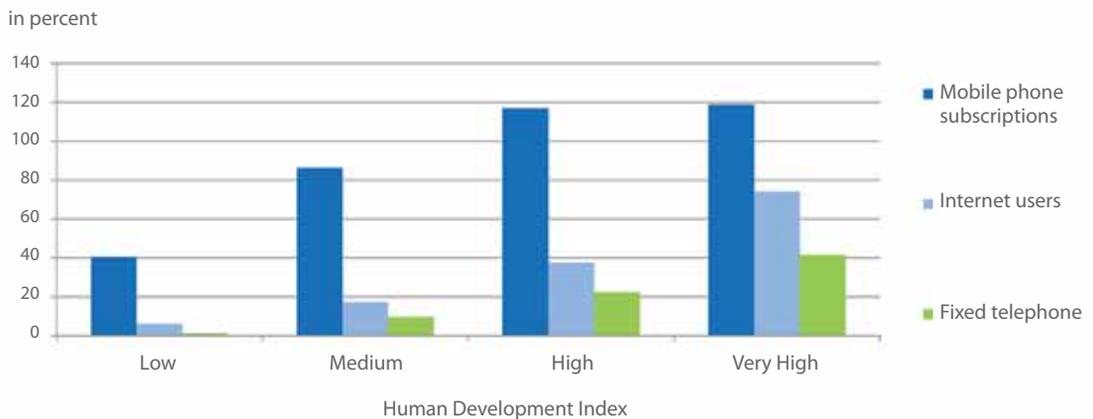
Development Role and Innovation

Alone, mobile phones will neither pull people out of poverty, nor propel democratic governance. They must be part and parcel of broader development agendas. And what they can do is help poor people leverage their resources and knowledge to enter the marketplace, demand public services and have a voice in governance processes. It is here where simple human adaptation and innovation is driving mobile penetration in the South, with people finding the means and mechanisms to get access.

The following are some examples:

- Sharing devices: Sharing mobile devices between family, friends, and neighbours (Burrell 2010; Steenson and Donner 2009) or using multiple SIM cards on a single mobile device helps people get optimal rates in mobile networks, particularly where pricing schemes change with the time of day.

FIGURE 6: ICT Penetration by HDI 2010



Source: ITU 2011 and UNDP 2010

- **Beeping or flashing:** This is a practice where the caller hangs up after one or two rings to signal the receiver to call back (Donner 2007).
- **Buying or selling airtime:** This is a method where people buy airtime for other phone numbers, thereby transferring value to them, a practice which can be used as a method of distance payment. Often, people have informal agreements with merchants to resell their minutes in exchange for cash. It is likely that the idea for mobile remittances — such as m-PESA (see box 6) — stemmed from these practices.
- **Prepaid service vouchers:** Use of prepaid service vouchers is a flexible way of paying for airtime minutes compared to being on a phone plan with a fixed monthly post-paid fee (Sey 2011). Vouchers for airtime can cost as little as \$0.50 and have spurred a micro-economy of ‘telecom voucher’ vendors in many countries.
- **SMS instead of voice:** In many countries, SMS (or ‘texting’) is much less expensive than voice calling, leading to the growth of the ‘thumb culture’ (Glotz, Bertschi, and Locke 2005).
- **Receiving calls:** In places where providers do not charge for incoming calls, mobile phones are used to receive calls only.
- **‘Call me’ messages:** Some telecom companies, such as Digicel in Haiti, provide ‘call me’ messages free of charge.

Summary

Given the still relatively high cost of mobile phones and services in developing countries, especially in LDCs, projects targeting broad development goals should not fall into the digital divide trap and emphasize ownership of devices or access to the networks. Instead, the focus should be on new and innovative ways of integrating mobile technologies into development agendas as their lower cost potentially increases scalability. It is worth restating that without strategic thinking, mobile phones can become an extra expense for the poor with no significant development achievements. Yet opening new opportunities to connect the poor to services via mobile phones offers a promising means of reaching historically underserved communities while also opening platforms that give them a voice in broader governance processes.

3. Early Evidence of the Impact of Mobile Technologies on Developing Countries

There has been an upsurge in the number of studies and research projects on mobile technologies in recent years shedding light on the way mobiles can positively affect human development.

GDP Growth

A 2005 study suggested that increased mobile ownership could be directly linked to GDP growth. The report indicated that between 1996 and 2003 developing countries with an average of ten or more mobile phones per 100 people enjoyed a 0.59 percent higher per capita GDP growth than identical countries with less mobile penetration (Vodafone 2005). Moreover, the study emphasized that the positive impact of mobile technology on economic growth was likely to be twice as large in developing countries compared to developed countries due in part to the low starting point of communications infrastructure within poorer countries. In a more recent report from 2009, an econometric analysis of the Indian telecommunications market shows a close relationship between higher mobile penetration rates and higher economic growth (Vodafone and ICRIER 2009). According to the study, Indian states with high mobile penetration are expected to grow faster than those states with lower mobile penetration rates; every ten percent increase in mobile phone subscriptions positively influences economic growth by 1.2 percentage points a year.

Taxes, Investment and Job Creation

Other benefits for developing countries include increases in tax revenue from the telecommunications industry — usually a country's most profitable sector — as well as better employment opportunities, a more investment-friendly climate and overall increased productivity. A multiple-country analysis conducted in 2008 shows that direct tax contributions from telecom providers outnumber those from indirect tax payers, with mobile operators accounting for about 26 percent of total tax revenues (Deloitte 2008).⁴

Mobile operators also positively influence job creation in other formal sectors, such as retail sales, and informal sectors such as mobile phone repair. World Bank research suggests that the internal rate of return generated by telecom operators could be up to 20 percent in developing countries (Coyle 2005). A thriving telecom industry is likely to help attract a range of foreign direct investments. Kenya is a good example, where the growth of the telecom sector has attracted new businesses and is transforming Nairobi into one of Africa's most innovative ICT hubs.

Mobile infrastructure can also help in leapfrogging infrastructure development: lower income countries benefit by not having to invest in expensive parallel infrastructures for landline telecom services, for instance. They also benefit when public services — such as health care — can be provided at lower costs. For instance, a recent study estimated that the remote monitoring of chronic diseases in the health care industry in BRIC and OECD countries could save about \$175 to \$200 billion annually (GSMA 2011).

Market and Information Access

Mobile phones can be used to check informational asymmetries — stimulating investment and the growth of new markets (UNCTAD 2007) — and improving trade for both consumers and producers. For example, a 2007 study on Indian fisheries showed that the introduction of mobile phones made fish markets more efficient by enabling fishermen at sea to check by text or voice call which markets were offering the highest prices for their catch. As a result, fishermen reaped eight percent higher profits and consumers paid four percent less (Jensen 2007). A similar study of Niger grain markets concluded that the introduction of mobile networks reduced grain prices for consumers and increased profits for producers (Aker 2008; Jensen 2007).

Other research has also shown that micro-entrepreneurs can increase the speed of trade, reduce time expenditures toward travel, and eliminate waste by using mobile phones (Jagun, Heeks, and Whalley 2007).⁵ And a recent study on agriculture estimates that mobiles can lead to an increase in revenue, up to \$138 billion in selected markets, by improving access to financial services, agricultural information and existing markets and by promoting supply chain efficiencies (Vodafone and Accenture 2011).

Significantly for poor people and rural development, mobile technologies are reducing information gaps and restrictions inherent in marketplaces where consumers and producers have little means of comparing commodity prices between distant markets. Google's [trader marketplace application](#) (See Annex 1 for link), for instance, connects customers and providers in Uganda via SMS to exchange goods and services.

On the other hand, not all rural farmers and micro-enterprises are able to utilize market information. Farmers for instance may have no other option but to sell produce or goods at the local price in their local markets — regardless of whether they are aware of the 'real price level' — because transport and/or access restrictions prevent them from sending their goods to more lucrative markets. This points to larger infrastructure issues which mobiles cannot fix. It also shows the importance of ensuring that mobile applications are linked to poor people's realities on the ground (DeMaagd 2008).

Studies have also noted that mobile communication has not de-localized trade or completely removed the role of middlemen in market exchanges; in fact, intermediaries have typically been the earliest



adopters of mobile phones as a means of taking advantage of price differentials in prices across markets. Mobile technology has not replaced the need for human-to-human interaction in establishing trust relationships in the marketplace, and this further highlights their role as a means in development, not an end in themselves.

Inclusive Sharing and Coverage

In 2011 alone, it is estimated that eight trillion SMS messages were sent by mobile subscribers (Portio Research 2011). That is close to 1,500 messages on average per mobile subscriber. Although this does not necessarily imply information access or sharing, it does reflect the potential that SMS could have if used strategically.

Furthermore, a recent study indicated that there are close to 80 million mobile phone users in poor countries who do not even have access to the electrical grid — yet still manage to use a phone (Cisco 2011) — showing the rapid diffusion of the technology to areas otherwise still lacking in basic infrastructure. All of this research is helping us to understand that mobile phones are providing new forms of access to ICTs for billions of people who were previously excluded.

4. Mobile Technologies and Democratic Governance

Overview

From the vantage point of m-governance, the important change taking place is the expanding equality of access to information and communications channels triggered by new personalized ICTs. This shift in access to new communication channels is opening and enhancing democratic governance processes and mechanisms in ways we are only beginning to understand, offering new potential for empowering people, stakeholders and end users. Access to and the use of mobile technologies opens the possibility of new communication channels and gives ‘voice’ to those who previously had none.

BOX 1: What is M-Governance?

Mobile governance, or m-governance, is the use of mobile technologies to support governance processes — within government, between the state and civil society, and within civil society. M-governance thus enhances the older notion of e-governance and is essential to both governance and to the area of ICTs for development. Given the fact that in most developing countries the diffusion of mobile technologies is greater than that of the Internet, many of these countries are increasingly turning to m-governance to deliver public and private services, to reach marginalized populations, to enhance access to public information and to increase people’s participation.

M-governance complements more mainstream e-governance initiatives by potentially providing greater inclusion and fostering broader participation. One clear value of m-governance is its potential to strengthen the ‘demand’ side of the governance equation by giving people the opportunity to demand better services, while governments act as suppliers of both services and information. M-governance can thus provide people with critical tools to better engage with public institutions, and to participate in fostering broader transparency and social accountability.

These changes are best illustrated with real examples from around the world demonstrating where and how mobile technologies are augmenting governance and opening up new venues for citizen participation.

4.1 Inclusive Participation

For years, development practitioners have promoted participation and participatory models in both policy advice and programme implementation, with varied degrees of success. These days, mobile technologies are doing just that — offering new opportunities for enhancing access and participation for greater numbers of people. Mobiles are allowing citizens to be engaged in political and socio-economic decision-making processes, offering new avenues for achieving key governance goals related to elections, civic engagement and access to information via ICTs.

Electoral Processes

One of the first and most well-known platforms for collecting and mapping inputs from citizens is **Ushahidi** — an open source platform first developed in Kenya to **report eyewitness accounts** of post-election violence and human rights abuses following the disputed 2007 elections.

The simple open-source software, pairing geographic information system (GIS) and mobile technology, allowed Kenyans to submit eyewitness reports of riots, rapes, deaths and stranded refugees via email and text message, locations of which were then plotted on a map on the website. In the end, over 45,000 reports were submitted in real time, collecting more testimony than reporters and elections monitors combined. The platform also helped create a database and historical archive of election incidents, which can now be referred to and accessed for election-based research and for future election planning purposes.

Its design — requiring only a basic mobile phone with SMS capacity — has allowed it to be widely adopted in other monitoring systems like [mapping community needs](#) in Chisinau (Moldova), [plant disease tracking](#) in Argentina, and [corruption tracking](#) in Egypt.⁶ It has also been adopted in South Africa to [track reports of xenophobia](#), in India where it was used to run a citizen-driven election monitoring platform, [Vote Report India](#), and in Mexico where it was used to [monitor elections](#).

The [Cuidemos el voto](#) platform in Mexico, for instance, allowed citizens to report irregularities in that country's 2009 elections via text message, email, Twitter and the Cuidemos el voto website. Reports were then mapped and became the first formal electoral observation platform in Latin America. In East Africa it has been used to inventory drug stocks and in the Democratic Republic of Congo and South Africa, it was used to track violence. It was also used by Al Jazeera in the Gaza strip to collect eyewitness accounts of violence there in 2008 and 2009.

When the earthquakes struck in Haiti and Chile in 2010, Ushahidi joined forces with several universities, civil society organizations (CSOs) and UN agencies to assist humanitarian relief efforts. In New Zealand, Ushahidi was used to create the Christchurch Recovery Map to help earthquake survivors find food, water, toilets, fuel, ATMs, and medical care. And in Japan as well, after the 2011 earthquake and tsunami, a Japan Recovery Map was developed to help with humanitarian efforts there.

For elections, mobile phones and innovative mobile platforms have been critical tools in monitoring fraud and engaging citizens. Whether through systematic, organized monitoring carried out by trained volunteers, or through informal, citizen-generated data collection, mobile platforms are daily being created and refined to help improve electoral processes around the world (Cullum 2010). Even though crowd-sourced information cannot replace an 'official' verification of facts, citizens on the ground can now capture election events while they are happening, and distribute stories, photos and video instantly, via text messages and voice calls.

For the Nigerian elections in 2011, for instance, the project [Swift Count](#) recruited and trained 8,000 observers to send what amounted to around 35,000 SMS reports a day from 4,000 polling stations. These messages kept the elections commission and international observers informed about the voting process and potential incidents of corruption. This in turn helped validate the elections and provided statistically significant data for analysis.⁷ The reVoDa application, designed by Enough is Enough (EIE), also allowed Nigerian citizens with more sophisticated GPRS-enabled phones to act as election observers, allowing them to [report online via their phones](#) to the [reVoDa site](#). Mobiles have also been used in [election reporting in Benin](#), in [Lebanon](#), and [Afghanistan](#).⁸

In Estonia, a mobile operator created the first [mobile identification service](#) enabling citizens to cast their vote in the parliamentary elections of March 2011 via their mobile phone — a first in the world. The mobile ID enables users to verify their identity over the Internet, allowing a 'legally binding' digital signature to replace the handwritten signature. At the same time, there are ongoing discussions about increasing the use of e-voting. While it is already widely used in the private sector and in unofficial polling, [national elections and referendums](#) have different requirements in terms of security and verification, including the guaranteeing of free and secret voting, and the authentication of voters.⁹ Mobile voting should be improved before it can be effectively adopted for national elections.

Civic Engagement and Access to Information

Due to their portability and pervasiveness, mobile phones have become an important tool for civil society organizations, advocacy groups, and individual activists. Not only fostering local mobilization, they also support networking among geographically dispersed people, less rooted in a particular area and yet connected to many people at the same time (Wellman 2002). What was once in the domain of 'official channels' is now in the hands of anyone with a mobile or an internet connection, creating a flattening of information and a broader distribution of that information, which in turn supports wider stakeholder mobilization within a much shorter period of time.

Civic campaigning and mobilization are being enhanced by new mobile platforms that allow individuals and organizations to reach large numbers of people with new information with a simple SMS subscription. Developments during the Arab spring and mobilizations across Europe and the United States around the global fiscal crises illustrate the potential of mobile communication in supporting people's movements. Across North Africa and the Middle East, CSOs were supported with variations on the Ushahidi platform, such as in Egypt, where **U-shahid maps** — meaning 'you witness' in Arabic — were produced by the Development and Institutionalization Support Center (DISC) in Cairo to monitor events during and after the January 2011 uprising.

In Libya, the Ushahidi platform was adapted immediately at the start of protests there in 2011, at the request of the UN Office for the Coordination of Humanitarian Affairs (OCHA), to allow citizens and observers to submit information about conditions on the ground, as protests and violence expanded. In China in 2007, one million people in Xiamen **gathered to protest** the building of a proposed toxic



BOX 2: UNDP Madagascar: Engaging Youth Through M-Governance

Started in 2009, the programme supports youth participation in discussions about development in Madagascar using mobile tools. Due to the recent growth in the use of mobile phones in both rural and urban areas — which have a much higher penetration than the Internet — the mobile device is more present in young people's everyday lives and offers a simple and easy tool for access and participation. This m-governance platform enables young people to express their views, talk about their vision for the future, and take part in a national public debate through SMS. The expected output is that the views and aspirations of Madagascar's young people will be collected and processed and subsequently included in the country's new development policies. The programme is part of a larger e-governance initiative which is expanding from developing online public services to developing mobile public services. The initiative calls for awareness of the importance of participatory governance in public policies — from design to implementation and monitoring. Key stakeholders include the Government of Madagascar, UNDP, UNICEF, UNFPA and the National Youth Institute.

chemical plant after receiving a text message warning them of the dangers of the plant, forcing the suspension of the construction. The Chinese government itself employs similar methods to lobby against popular demonstrations, and blocks SMS and online communications; yet, even in these situations, committed activists can sometimes creatively outsmart the government, using synonyms and clever codes to evade censorship (Yu 2011; Kidder 2011).

Location-aware applications — generally for more sophisticated smart phones — are also another tool in the civic arsenal for crisis reporting, citizen journalism and election monitoring. Using built-in GPS sensors to pinpoint physical location, 'geo-tagging' platforms such as FourSquare, Brightkite, Loopt and Google Latitude allow mobile phone users to transmit their precise location for tracking and coordinating movements, and find important gatherings (Cullum 2010). During the 2009 violence in Gaza, for example, **citizens reported the exact location of violent incidents** using SMS and phone-based GPS.

Not only for mobilization and information, mobile applications are also offering new venues for dialogue, locally and globally. For instance, UNFPA and UNEP have joined forces in the **7 Billion Actions** campaign, to collect the stories of people all around the world who are making a difference, in an effort to promote global co-operation on health, environmental sustainability, poverty and inequality, and urbanization. Through several interactive venues — websites, social networks and mobile phones — the campaign is encouraging people everywhere to submit ideas for creating a fairer and more sustainable global society. By sending a text message from their mobile phone, participants are able to submit a snapshot of their daily life and highlight the development issues that matter to them.¹⁰

4.2 Responsive Institutions

Mobile technologies can enhance service delivery and reform within important governing institutions, from public administration to parliaments to systems of justice. They can also establish a dialogue between stakeholders and their governing institutions. This generates new possibilities for 'open government' and 'sousveillance', whereby citizens and stakeholders are able to monitor and survey their governments and state agencies, counterbalancing state surveillance with civic vigilance (see Mann in Joyce 2010).

Public Sector Modernization and Local Governance

Two examples from Kenya help illustrate this growing openness and dialogue. Kenya's new **Budget Tracking Tool** connects communities directly with the national development agenda. The project publishes data on constituency-based budget allocations, showing how much money is invested in basic services such as health, education, water and infrastructure, and disseminates the information via its website and over SMS. The system receives around 4,500 SMS messages a month, and more than 5,700 hits on its website which suggests that the demand for the service is just starting to grow. Significantly, the project has fostered the creation of committees to represent local leaders, women, youth, and school teachers to oversee budget implementation processes. It has highlighted cases in which allocations were not translated into intended expenditures — leading, in some cases, to the resignation of officers meant to be overseeing those projects. The project is currently collaborating with Transparency

International to [develop a hotline](#) providing legal aid and counselling to help citizens. And another platform — [Huduma: Fix my constituency!](#) — channels concerns, suggestions and complaints from citizens regarding public service directly to service providers and policy makers.

Both platforms have started to bring regular Kenyan citizens from both urban and rural areas into the process of improving service delivery and creating responsive institutions. As platforms like these disseminate around the world, more citizens will have the chance to monitor their governments, law enforcement agencies, and corporations with new mobile applications, and the misuse of funds, corruption, police brutality, and business-related crimes will be harder to conceal. Now, anyone with a mobile phone can potentially be a watchdog. This kind of accountability helps improve democratic governance, service delivery, and anti-corruption efforts.



Mobile technologies can reduce bureaucratic holdups for people and streamline work for civil servants. In the Philippines for example, the Bureau of Internal Revenue offers taxpayers the option of paying their income tax returns by SMS. The Bureau has forged a partnership with Land Bank of the Philippines as the accredited agent bank, and Globe Telecom as the taxpayer agent, utilizing the mobile money service application 'G-Cash' to make tax payments on behalf of its subscribers (Blackman and Srivastava 2011). The Philippines further capitalized on the broad availability of G-Cash and now also offers 'social protection' cash transfers to the country's poorest families via the mobile phone from the Department of Social Welfare and Development's [Pantawid Pamilyang Pilipino Program](#).¹¹ Pantawid Pamilya is targeted at chronically poor households with children and now covers about 30 percent of those eligible — around one million households as of January 2011. Similarly, Brazil's cash transfer programme [Bolsa Familia](#) is looking into linking with new m-payment systems and the country's Mobile Network Virtual Operator to find more innovative options for reaching the poor.¹²

Local governments are also turning to mobile innovations to streamline and improve their services. For instance, an [m-governance project in Kerala](#) (India) is attempting to integrate advancements in mobile technology with around 90 government departments to create accessible information systems and a comprehensive service delivery platform (see box 3). Along the same lines, the local government in South Africa's Gauteng province adopted mobile and Internet-enabled services for their Police and Emergency Medical Services to ensure faster, more effective emergency service. As part of the initiative, emergency-response vehicles have been equipped with mobile tracking devices so that the nearest available ambulance can be redirected to the location of an incident (Waema and Adera 2011).

BOX 3: M-Governance in Kerala (India)

Through India's National e-Governance Plan (NeGP), the state of Kerala is pioneering a centralized, [mobile governance platform](#) to improve service delivery. Kerala has consistently registered some of the highest human development scores — both in comparison with other Indian states and internationally.¹³ According to Kerala's statistics, many citizens are already accustomed to using mobile phones, with upwards of 85 percent of its population having access to or using a mobile phone; the government of Kerala anticipates this will reach 100 percent in 2011. There are as many as 24 million mobile telephones in the state with a population of 31 million. With these statistics in mind, the state is piloting a system to allow citizens access to government information, and eventually even make it possible for them to pay bills using their mobile phones. At the moment, they are working on offering around 20 m-government services from eight departments, but the centralized service delivery platform may eventually integrate all of the state services. Three mobile communication channels (voice, SMS and data) and a range of application technologies are being used. The core platforms are entirely open source, and are designed with the expansion of m-governance in mind. Some of the core components include: an SMS gateway — eSMS — used for all intra- and inter-departmental communication and notifications; bluetooth kiosks for information dissemination in bus stations, railway stations and airports; and a Mobile Crime and Accident Reporting Platform devised for the police force to improve crime and accident prevention. Recently, the platform has started allowing citizens to [check their voter ID details via SMS](#) too.¹⁴

Access to Justice

The infrastructure for justice is being augmented by new ICTs as well — for example, [virtual courts](#) in Kenya — and has opened up venues for m-justice to improve access to and the provision of justice. A recently launched initiative of FrontlineSMS — a company that builds and distributes free open-source software — is [FrontlineSMS:Legal](#), a public platform designed to help strengthen judicial communication systems and access.

In India, there is a plan in the works to use FrontlineSMS:Legal to inform citizens of when mobile courts will be in their community (mobile courts are itinerant courts that travel from community to community in an effort to disseminate justice systems from urban centres). The intention is that FrontlineSMS:Legal will facilitate, among other things, better follow up, the sharing of digitized files, and easier contact between public defenders and their clients. And in Turkey, the IT Department of the Ministry of Justice developed an [SMS-based judicial information system](#) that provides case-related notifications for citizens and lawyers, and notifies people of upcoming court dates.

Parliamentary Development

Another area opening for mobile innovation is in parliamentary development and communications. In Georgia, Transparency International has helped [establish a system for sending SMS updates](#) to citizens on recent parliamentary activities to help hold governing officials accountable, including summaries of significant meetings, as well as updates on committees covering issue areas such as the state budget or agriculture (Ulbricht 2011).¹⁵

In Kenya, a programme launched in July 2011 by the National Council for Law Reporting relays all parliamentary proceedings to [www.kenyalaw.org](#) — reporting all questions raised by MPs and ministers' responses — and allowing constituents to monitor parliament via Internet portals and mobile platforms. In addition, the programme is digitizing more than 1,750 editions of parliamentary debates from over the past 50 years.¹⁶

4.3 International Principles

In opening new venues for information sharing, dialogue and monitoring, mobile technologies have shown promise in advancing development goals grounded in international principles, such as transparency and accountability, human rights and gender equality. As with the other practice areas, mobiles are useful for helping to promote these facets of democratic governance because as tools they can help citizens take a more active role in fostering accountable governing institutions.

Anti-Corruption

Anti-corruption is a significant example. India's **I Paid a Bribe** initiative, undergirded by civil society efforts such as **India Against Corruption**, helped to pressure the government into passing long sought after **anti-corruption laws** and to deliver more open governance. Also, **Bribe Bandh** was a campaign started by I Paid a Bribe to pressure the government to ratify the UN Convention against Corruption which generated a lot of interest among citizens; the government ratified the convention in May 2011. I Paid a Bribe allows citizens to report via SMS and smart phone the nature, pattern and frequency of acts of corruption. It was started by Janaagraha's **Centre for Citizenship and Democracy** to help confront issues of transparency and accountability in India's governance.¹⁷

There are similar global initiatives, such as **Bribespot**, a global crowd-sourcing application identifying situations in which people have been bribed or were forced to bribe in venues all over the world. It is important to note that some applications like these are designed for people with a smart phone or Internet access, meaning that it has limited reach in poorer communities, but nevertheless shows the growing mobilization for anti-corruption efforts.

Opening channels to services via mobile platforms can also help citizens bypass intermediaries who may take money for facilitating transactions, particularly as mobile access spreads to poorer, marginalized sectors of society, making service delivery more efficient. In Cameroon, **NoBakchich** gives consumers the latest information on the cost of public services, from birth certificates to health care, with an expanding database of service areas augmented by the participation of users. What's more, people can report demands for bribes via SMS so that other citizens are aware of the issue.

Another tactic used in anti-corruption efforts and civic awareness-raising is the use of ring tones unique to particular social or political events. An example of this is the **Hello Garci** campaign from TXTPower in the Philippines in which a snippet of an illegal conversation between the president and the election commissioner was recorded and turned into a mobile ring tone, becoming one of the most downloaded ring tones ever (Cullum 2010). This type of anti-corruption effort requires very little in the way technical skill and complex technology and yet can do a lot to highlight political corruption.

Mobile financial services are also helping to eliminate middlemen by allowing payments to be completed directly to mobile devices. For instance, the Afghan telecom operator Roshan offers the **m-Paisa** application that converts cash into e-money. E-money is stored on the phone and sent through mobile networks as payment, under regulations set forth by Afghanistan's central bank and e-money laws. According to some estimates, a fully scaled up m-Paisa system could save more than \$60 million a year in corruption prevention alone (Himelfarb 2011).

Human Rights

Human rights monitoring, reporting and protection are areas also supported by innovations in mobile technologies. In Cambodia when human rights activists were being arrested in late 2005 and early 2006, CSOs **used SMS messaging to mobilize public support** to demand the release of those arrested. Today, practically any citizen with a mobile phone has the capacity to report or record human rights violations by creating photo and video documentation as supporting evidence. **Citivox**, for example, helps map the harassment of women in Egypt with data collected via text messages, photos, audio



reports and video, allowing citizens to describe incidents in detail. And in Nigeria, the Civil Liberties Organisation (CLO) introduced the use of mobile phones into their ongoing project, the National Alert on Torture and Extra Judicial Killings (NATEK), allowing NATEK and CLO members to **report human rights abuses directly** to the government and police via SMS.

This type of grassroots, crowd-sourced information is providing vital data for analysing trends in violence and aggression, and crafting appropriate interventions and policies. Properly used, it can help governing institutions improve law enforcement and social protection decisions. Crowd-sourcing applications can also link into other kinds of social networking platforms, allowing for a broader dissemination of information.

Gender Equity

In the Democratic Republic of Congo, where human rights violations against women are extensive, a **mobile justice initiative** is underway to help women collect evidence, and record and transmit testimony via a mobile device, in an effort to bring perpetrators to justice.¹⁸ So even in regions of the DRC where courts do not exist, victims of violence can send text messages to towns with a functioning judiciary, and have hope that their cases will be heard and justice delivered.

Mobiles are empowering women in other ways too. They can facilitate female entrepreneurship — like the **Grameen village phones** in Bangladesh that allow local entrepreneurs to buy mobile phone service through Grameen Telecom and resell it within their village (Cohen 2001). Women micro-entrepreneurs in Mumbai — such as beauticians or tiffin-wallahs (people who deliver cooked meals in 'tiffins' to working people in offices) — use mobile applications to build their customer base, thereby allowing them to be independent from salon or restaurant owners who would normally take a portion of their profits.

BOX 4: Voix des Kivus: Crowd-Seeding in Democratic Republic of Congo

Human rights abuses in remote areas of the Congo usually go unnoticed, as war and poor infrastructure keep help from reaching areas where it is needed most. Voix des Kivus is a pilot crowd-seeding system built on open source FrontlineSMS software which utilizes mobile phones to gather real-time information on events occurring in hard-to-access areas of DRC. Crowd-seeding works by restricting who can send information, thereby providing some validation for information sources.¹⁹ In pilot villages, three representatives — a traditional leader, a woman and an elected person — each hold a mobile phone, and are given monthly credit, a 'code sheet' of potential breaches of human rights, and training in how to send and use SMS. Data which comes in goes into a database, and every week a bulletin is generated and disseminated to organizations, government and policy-makers showing what happened where in the previous week. During the pilot phase, phone holders sent thousands of text messages recording attacks, abductions, crop diseases and flooding, demonstrating not only the wide interest of participants, but also the possibilities for gathering high quality data from remote locations. The success of the project suggests that obtaining verifiable, real-time data in areas that are hard to reach is less expensive and requires less oversight than anticipated.

These new platforms can help women be more independent by opening new channels for direct access to information and greater personal privacy. Where once women may have needed male relatives to act as intermediaries, mobile platforms afford women the chance to make decisions by and for themselves. For instance, the Self Employed Women's Association ([SEWA](#)), a trade union of over 1.1 million women who work in the informal sector in India, is using SMS to send informal agricultural workers up-to-date information on commodity prices every day, helping them determine when and where to get the best price for their produce, and expanding their ability to plan crops and make informed harvesting decisions. So far, at least 20,000 women have used the SEWA SMS system. SEWA also posts prices on computer 'notice boards' in villages for those without a mobile phone, and is pilot-testing a mobile-based management system utilizing an interactive voice response system to help members who are not literate or technology savvy.²⁰

The UN-backed [Business Call to Action](#) is partnering with the private sector across Africa and South Asia to offer access to low-cost mobile phone numbers, allowing recipients to log in to any mobile phone with a unique number. Instead of sharing phone numbers, which limits access to private information and critical services, users can make and receive calls on their own. This helps millions of poor people, particularly women, who have historically faced barriers to access.²¹

5. Mobile Technologies and Human Development

Mobile phones can enhance pro-poor development in sectors other than governance, such as health, education, agriculture, employment, crisis prevention and the environment. Following are some examples of mobile innovations — organized around UNDP core practices — that are helping to improve human development efforts around the world.

5.1 Poverty Reduction

Mobile applications have opened new avenues for fighting poverty by expanding service delivery possibilities in health care, agriculture, employment and education. In the health sector in particular, there have been many pioneering mobile initiatives improving connectivity and the transmission of information from remote and hard to access areas of the world.

Health

Projects like Peru's **Nacer** programme and Rwanda's **TRACnet** programme give health workers the ability to exchange critical health information such as patient records, by storing health data in central databases accessible by mobile phone and the Internet. UNICEF Malawi has been using a similar SMS system called **RapidSMS** which speeds up health data collection and feedback in order to monitor child malnutrition trends (see box 5).²²

The use of mobile phones to record, retrieve and disseminate health information is improving the quality of health care by providing health workers access to important information, including medical advice from far away experts. Mobile connectivity can also facilitate the collection of accurate and timely health data, which, for instance, can be used in epidemiological mappings to study the spread of disease over geographic regions. For instance, **EpiSurveyor** enables researchers to collect data on a mobile device and then transfer this data to a computer for rapid analysis.

BOX 5: UNICEF and the Use of RapidSMS

RapidSMS is an open-source framework developed by UNICEF for data collection, logistics coordination, and communication which allows mobile phones to interact with databases via SMS. The platform was designed to be customizable and has been adapted for a broad array of specialized needs, from remote health diagnosis to supply chain monitoring. In Ethiopia, for example, UNICEF used RapidSMS technology to coordinate the logistics of their **food distribution programme** supplying high-protein food to undernourished children in more than 1,800 feeding centres around the country during the recent drought. In **Malawi**, RapidSMS was deployed to address constraints within the national Integrated Nutrition and Food Security Surveillance (INFSS) System, which was facing problems with slow data transmission, incomplete and poor quality data sets, high operational costs and low levels of stakeholder ownership. Health workers are now able to enter a child's data, and through an innovative feedback system, instantly alert field monitors to a child's nutritional status. In **Kenya**, UNICEF supported the Millennium Villages Project by customizing RapidSMS to address under-five mortality rates at the community level through a better system of providing information. In **Nigeria**, UNICEF is using RapidSMS to monitor the supply and distribution of bed nets. And in Senegal, UNICEF and NGO Tostan launched the **Jokko Initiative**, a RapidSMS Community Forum that forwards text messages sent by members to all phone numbers belonging to the network. This helps facilitate communication among a large number of people and introduces mobile phones as pedagogical tools to reinforce literacy as well as organization and management skills taught in Tostan's Community Empowerment Program.

Mobiles are also being used to monitor supplies of critical medical goods in countries with limited infrastructure. For instance, Kenya's Ministry of Health is currently using a text messaging platform to monitor the supply of vaccines at stock houses.²³ And in Ghana, a project entitled **m-Pedigree** has developed a system that allows users to check the authenticity of their medication via text message in order to combat the counterfeit drug trade.

Agriculture

In agriculture, mobile applications are being used to deliver advice, education, pest/disease early warning and marketing information to small-holder farmers. In Uganda, the Collecting and Exchange of Local Agricultural Content (CELAC) project uses SMS to send farming tips to small-holder communities. The project uses mobile access to advise farmers on new and potentially lucrative micro-agro-enterprises, such as livestock and export crops (such as coffee, cotton, tea, tobacco and sugar). Mobile applications like the one used by CELAC make it possible for farmers to network and share knowledge and experiences with other small-holders on best practices, appropriate crop varieties, and good pest management tools (including tracking disease and pest outbreaks). In turn, farmers can improve crop yields, expand market possibilities, and improve their overall food security.

Job Creation and Education

Mobile phones can also facilitate employment and help coordinate the informal job market by opening up new venues such as mobile employment platforms for people seeking permanent work as well as day-to-day contractual work (Mariscal 2009). In Palestine, for example, the Souktel project connects employers and job seekers through text message services without the need for an Internet connection.

M-education initiatives using simple text-based applications can help with tutoring, open communication channels to libraries, as well as notify and provide scheduling information and progress reports to students and parents. In South Africa, a mobile mathematics tutoring programme, Dr. Math, uses the Mxit instant messaging platform to allow students to submit math problems to tutors (Butgereit 2009).²⁴ Developed by the Council for Scientific and Industrial Research (CSIR) in South Africa, project leaders indicate that around 12,000 pupils have used Dr. Math with assistance from over 100 tutors.

The Bridgelt project in Tanzania and the Philippines provides teachers in primary school with access to digital video content for use in classrooms in mathematics, science, English and life skills. And mobile





platform [m-Vaayo](#) allows Indian students to receive their exam results via the phone. Mobile technologies, in connection with Internet access, can help customize learning by supporting the creation of wireless communities, study groups and educational networks.

Mobile phones can also support people with limited hearing or visual capacity through audio-to-text or text-to-audio applications (Datta and Mitra 2009). For instance, the Interactive Voice Response (IVR) system used by the [Freedom Fone](#) platform can potentially be used by illiterate or semi-literate people as it provides information and support on a number of issues via voice. Callers can navigate through a voice menu, select the type of information needed and leave voice messages in order to report incidents. In Zimbabwe, the NGO [Kubatana](#) is utilizing Freedom Fone to disseminate and receive information from across the country. People leave emergency reports and listen to breaking news using this service. However, cultural issues — such as discomfort or inexperience with leaving messages — need to be factored in when considering voice-messaging options.

5.2 Crisis Prevention and Recovery

Mobile phones are proving critical as emergency response tools, establishing networks of communication between citizens, organizations and government agencies in times of crises.

In Cambodia, the Ministry of Health has initiated the Innovative Support to Emergencies, Diseases and Disaster programme ([InSTEDD](#)) to improve knowledge sharing and collaboration in crisis situations. Utilizing the collaborative communications tool GeoChat, the ministry can use the platform to alert

BOX 6: Mobile Money and M-PESA

In 2007, Kenyan telecom operator Safaricom launched M-Pesa ('pesa' means 'money' in Swahili), a mobile financial service that allows Kenyans to convert cash into mobile money.²⁵ M-Pesa was piloted in 2005 with support from Vodafone and the UK's Department for International Development (DFID) — first as a tool for loan repayment, and then as a person-to-person money transfer service, providing remittances from urban workers to their relatives in rural areas (Mas and Radcliffe 2010). Prior to M-Pesa, less than a fifth of the population (18.9 percent) had access to formal financial services, whereas by 2011, over 70 percent of Kenyans reported using M-Pesa, making the service the most popular money transfer service to date (Jack and Suri 2010; Stone, Johnson and Hayes 2010; Gakure-Mwangi 2011). There are now around 17.3 million registered mobile money users in Kenya, 14 million of whom are M-Pesa customers.²⁶ And Safaricom has around 28,000 registered agents for money conversion (Safaricom 2011). It is estimated that M-Pesa conducts around US\$650 million a month in transactions; Safaricom and World Bank projections have estimated that M-Pesa could move up to \$10 billion in 2011, up from \$7 billion in 2010 (Fengler, Joseph and Mugenyi 2011).

Today, Kenyans can deposit, store and withdraw money, purchase airtime, pay their utility bills and school fees, and buy groceries with their phone. Users can also [receive remittances](#) from abroad directly on their phone (in a partnership with Western Union), [earn interest](#) on their mobile account (in a partnership with Equity bank in an initiative called M-KESHO) and [buy clean drinking water](#) (in partnership with Grundfos LIFELINK). By allowing users to cash out in registered M-Pesa agent shops, the mobile money system has helped to double the use of non-bank financial institutions (up from 7.5 percent in 2006 to 17.9 percent in 2009) and has brought millions of previously excluded people into the financial system (FSD Kenya 2009).

Building on the lessons from M-Pesa, there are now over 124 mobile money systems around the globe, according to the database [Wirelessintelligence.com](#), and it is anticipated there will be somewhere between 500 million and a billion people worldwide using mobile money by 2015, mostly in the Asia Pacific, the Middle East and Africa (GSMA 2011; MobiThinking 2011). Some examples of other mobile money services include [WING](#) in Cambodia, [MTN Mobile Money](#) in South Africa, [G-Cash](#) in the Philippines, [M-PAISA](#) in Afghanistan, [Easypaisa](#) in Pakistan, [Oi Paggo](#) in Brazil, [TchoTcho Money](#) in Haiti, and [UnionPay](#) in China.

and send reports to citizens of disease outbreaks. These communications are then visualized on an interactive map giving an overview of what is happening on the ground. GeoChat has also been used in [Thailand](#) and [Haiti](#) among other places.

In the natural disaster-prone Caribbean, the Caribbean Disaster Emergency Management Agency has launched the Tsunami Public Awareness and Education campaign utilizing SMS as a key tool for disseminating information and education.²⁷ And in [Pakistan](#), the FrontlineSMS platform was used by the International Organisation for Migration (IOM) with support from the telecom operator Zong, to send bulk text messages to people about sanitation and hygiene as part of the response to the severe floods of 2010. The IOM — which is coordinating all communications in Pakistan for the UN's humanitarian response organizations — developed over 50 public service announcements (PSAs) in Pashto, Sindhi and Punjabi on a broad range of topics including diarrhoea and malaria prevention, water purification methods, maternal and child health and child protection issues, snake bite treatments, construction of durable shelters and fire safety in temporary camps. The organization first started using FrontlineSMS in the north in 2009, when nearly three million people were displaced by conflict. The organization estimates a savings of over \$15,000 using FrontlineSMS compared to what it would have cost to develop a mass texting system using a commercial supplier.²⁸

The key components in crisis response — registering, warning and/or monitoring populations, analysing data, and strengthening decision-making — can all be supported by mobile applications (Amailef and Lu 2008). Increasingly, governments and disaster relief agencies are using mobile networks to collect critical information during emergencies to assist them in making rapid, informed decisions.

Mobile phones are also useful as tools for early warning to prevent incidents related to conflicts and natural disasters. In Haiti for example, relief organizations are starting to pre-register people who could be highly vulnerable in emergencies, such as during hurricanes or earthquakes. With pre-collected health information and a mobile phone, vulnerable populations can be contacted and cash aid provided immediately in a crisis.

Cash transfer aid in post-disaster situations is slowly starting to scale up as the mobile phone is proving to be the best viable option in difficult environments (Jackelen and Zimmerman 2011). And in China,



BOX 7: UNDP and DDR in Central African Republic

UNDP's **DDR** programme (Disarmament, Demobilization and Reintegration) in the Central African Republic in 2011 piloted an innovative mobile-based **data collection system** for conducting arms and munitions inventories and baseline socio-economic profiles of combatants from mobile field units. Data-collecting systems usually rely on expensive, awkward laptops that need a reliable power source, skilled enumerators, and customized software, making mobile data collection difficult, if not impossible in remote and/or conflict-ridden areas. Yet, this pilot project uses open-source **KoboToolbox** software and low-cost Personal Digital Assistants (PDAs) that need minimal technical expertise and electrical power (usually needing to be charged only once a day). Data entry is relatively simple, meaning fewer errors, and results are immediately available — making it quicker than either paper-based data collection or computer forms. The platform is fast, can be rapidly deployed, installed and dismantled pretty much anywhere and can be adapted to shifting field conditions. To date, 6,400 ex-combatants have been verified and 5,000 disarmed at 21 sites in the Central African Republic.

the government used SMS to alert citizens during typhoon season, reaching millions of villagers and fishermen (Bodeen 2006).²⁹

Mobile phones can also be used for data collection and monitoring — even without citizen input — through tracking text responses. Mobile phone usage leaves a 'digital trail' that can be captured by telecom operators and analysed by relief agencies. This so-called 'data exhaust' can be used as a tool for crisis response, such as in Haiti in 2010, when the movements of two million anonymous mobile phone users were reported directly to humanitarian relief organizations on the ground (Bengtsson et al. 2011). Of course, policies need to be instituted to regulate the use of this data to protect people's privacy and ensure its reasonable use (i.e., in times of need as opposed to marketing or surveillance purposes). Yet, it shows the potential mobile phones have for helping governments and relief and development organizations to better deliver much-needed support on the ground.

5.3 Environment and Energy

Mobile technologies are being used to educate and keep citizens and vulnerable stakeholders abreast of environmental and energy-related issues including weather patterns, climate change and responsible environmental stewardship.

For instance, **Weather Info for All** collects and distributes critical weather information to people most affected by climate change throughout the African continent. The project aims to provide rapid and accurate climate information to vulnerable farmers, fishermen, and marginalized communities. Two other similar projects, **DatAgro** in Latin America and **Avaaj Otalo** in India enable agricultural workers to gather local climate information via mobile devices which is then redistributed to other farmers to help them in crop planning and food security (Patel et al. 2010).

Mobile phones can be used to help manage scarce natural resources, such as in Egypt, where the **Blue Line mobile application** helps farmers in the Nile Delta to manage limited water resources more efficiently. With text messages and hotlines, the government's water management experts can communicate with the Delta farmers on water supplies and allocation, enabling farmers to practice more sustainable irrigation.³⁰

Mobile phones can also help raise public awareness of environmental issues, such as rainforest destruction, desertification and water management and, significantly, can help mobilize citizens to lobby for environmental protection. **Greenpeace Argentina**, for example, used **mobile phone advocacy tools to lobby** for the passage of the country's Forest Law by collecting petition signatures via text messages (Gulezian 2009).³¹ Moreover, SMS-based tools can be used to help citizens make ecologically responsible and ethical decisions about consumption. For instance, the South African-based mobile application **FishMS** allows people to query the origins and environmental implications of different seafood selections via SMS.

One of the most useful applications of mobile phones in environmental management is in enabling more thorough environmental data collection. With **mobile sensing** applications, sensory devices can be attached to mobile phones to track multiple data points and collect dynamic information about environmental trends like air pollution quality. In **Ghana**, for example, mobile sensing was used to collect data on air pollution using a carbon monoxide sensor and global positioning system (GPS). Participants tracked air quality during their everyday routine, and the data led to the creation of heat maps of air pollution across Accra (Kinkade and Verclas 2008).³²

BOX 8: Rural Electricity Through SharedSolar

With small-scale solar micro-grids and an SMS-based crediting system, **SharedSolar** — a research project at Columbia University in the United States — is linking poor people with more affordable sources of energy. 'Micro-grids' piloted by SharedSolar connect people to localized power sources, such as solar power, which are activated and credited using SMS. Up to 20 consumers in a 50 to 100m radius — from individual households to schools and small business — can be connected to these grids. The pre-paid metering gives rural households the chance to buy smaller units of electricity, and the remote, SMS-based crediting saves billing, collection, and management costs.³³ SharedSolar first piloted the project in Mali in 2010 and is currently establishing another 24 systems across Mali, Tanzania and Uganda.³⁴

6. Challenges and Opportunities in Using Mobile Technologies for Development

Mobile technologies are proving to be a fast-paced and complex arena that is rapidly evolving in most countries under a wide variety of circumstances and conditions. In spite of the apparent hype around mobiles, there are still a number of critical challenges that need to be addressed if their use in development programming is to be successfully accomplished. On the other hand, there are already a plethora of mobile technology-based projects and applications that focus on human development across the globe — and the results are mixed. Yet, all initiatives have contributed to a broader and deeper understanding of the potential of mobile technologies and have helped practitioners to gather good practices and key success factors.

6.1 Policy

Policy environment

Since the use of mobile technology and the increased demand for public access to information are forging new territory for many governments, there are often few regulations and standards in place to deal with new information management needs across the public sector. For instance, there is little to no legislation in place to deal with the privacy and security challenges posed by new mobile applications and activities. Inadequate or poor regulation, sometimes driven by competing political agendas, can hinder innovation and prevent further expansion of mobiles networks. Finally, lack of ICT governance policies that prevent authorities from shutting down mobile networks and/or Internet access on a national scale should be in place to prevent the use of the so-called “Internet kill switch.”

Access to information and ‘open government’

The public sector has to be committed to maintaining openness and good quality data in the documents and information that can be accessed easily by citizens. Information needs to be in presentable formats and made publicly available through a variety of channels, such as via SMS, micro-blogging or other mobile platforms, websites or email. People also have to be made aware that the information is available for retrieval and educated about ways to access and use the information provided. Lack of right to information acts and legislation can hinder these processes as well as prevent fully-fledged Open Government initiatives.

Urban/rural gaps

In most countries, mobile phone usage is significantly higher in urban than in rural areas in developing countries, even when comparisons are made between urban slums and rural regions on the whole (Castells et al. 2007). While mobile technologies have been championed as a means of overcoming the difficulties of reaching remote populations, rural areas still have large gaps in wireless network coverage. Some countries have attempted to overcome this challenge by regulating that network providers must provide equal coverage. Whether or not rural areas will be better integrated into mobile communication networks over the next several years depends not only on cost/benefit analyses but also on policies that can facilitate the emergence of local providers that can cater to local users in areas where profit margins are slim and large network operators might have little to no incentive to make direct investments.

6.2 Infrastructure

Lack of basic infrastructure

Beyond the limitations of mobile network coverage, poor infrastructure remains a fundamental obstacle to deploying mobile initiatives for development. Lack of available and consistent electricity sources

has been a major stumbling block for many projects to date. Implementers should not take for granted, for instance, that participants will have a reliable electricity source to charge their mobile devices. Some initiatives have attempted to address the problem by providing solar-powered mobile phone recharging devices to project participants. Frequent power outages can also obstruct data collection flow to and from central servers. And a lack of reliable Internet connectivity and service provision can also be a challenge for mobile projects working off web-based platforms. Even if mobile networks are operating smoothly, a breakdown of Internet connection can hinder planned outcomes.

Costs of mobile services in developing countries

Any successful implementation of mobile technology will need to take into careful consideration the pricing structures for mobile services in local contexts. The cost of voice calls and text messaging can vary widely between developing countries and prices tend to be highest in the LDCs. Varying levels of taxation and the liberalization of telecommunication markets may drive costs up beyond the reach of citizens with average incomes. In such circumstances, it is important to design projects around access as opposed to ownership of mobile devices. It is also advisable to provide alternate methods of data collection. Thus, if the cost of voice calls is high, then SMS may be a more affordable option.

6.3 Capacity Development

Lack of skills, low acceptance levels and gender inequality

Many development projects involving mobile technology reach an impasse when it becomes clear that there is not sufficient local capacity to maintain the ICT infrastructure necessary for successful implementation. The best infrastructure and funding initiatives amount to little if the end user is unable to use a device. Poorer and less literate communities may find mobile platforms overly complex; literacy and technological ability is usually determined by social status and gender. And many people simply do not know what is available, how to access and use what is there, what rights and risks are involved and what can be achieved with mobile applications and other digital technologies (Joyce 2010).

What's more, mobile devices are often seen as being for conversation and entertainment, rather than as a potentially empowering tool. There is a need to raise awareness and to educate people on the many possibilities generated by new mobile technologies, such as in m-governance and service delivery (Zefferer 2011). The level of literacy is particularly important for text functions, and it varies among populations. Project designers should consider the negative implications of using text message applications in contexts where literacy may denote privilege or gender inequality. Implementers should consider using voice-based systems in contexts where there is low or uneven literacy.

6.4 Project Design

Keep development targets at the core of implementation

Despite the recent excitement about mobile applications in development circles and the news media, these technologies are not a magic bullet for addressing the complex issues of development. Any deployment of mobile technology for development should be done in the context of new or ongoing development programming that targets the poor and promotes democratic governance. Mobile tools are a breakthrough in the sense that they have placed many of the world's poorest on the global communication grid for the first time, empowering previously unheard populations with a voice to speak back. People can now draw attention to human rights violations, government corruption, and lack of basic services on the world stage by simply sending a text message or taking a picture on their mobile phone. Yet, the real issue is how well policy makers and development workers can respond to the needs of the poor at a macro level.

In addition, applications and services should be furnished with end users in mind, and be utilized as a means to an end, rather than as ends in themselves. That is, mobile projects should not be centered on

promoting technology per se but should instead be leveraged to meet larger project objectives. Mobile technology and new ICTs can and are transforming the way in which traditional development aid is furnished at the ground level, reducing transaction costs and increasing productivity, but to be truly effective they must be part of a platform of robust human development initiatives.



Closely consider local contexts

The design of any mobile initiative should accommodate the infrastructure and economic constraints faced by potential users in a particular context. The same goes for local human resources and existing human networks in communities. All these, and political situations, should be carefully evaluated. Questions to consider include: What are the costs associated with SMS and voice calling relative to local incomes? Is there reliable electricity available for users to charge their phones, or are options available for recharging phones by other mechanisms (i.e. manually)? Can rural subscribers expect to have consistent network coverage? What is the literacy rate among intended participants?

Develop partnership strategies from the outset

Local mobile network providers should be engaged in dialogue early in the design of any large mobile technology project to find clear win-win situations. They will most likely be one of the key partners in the development of mobile projects. Many mobile companies, especially in sub-Saharan Africa, are eager to expand networks into rural markets and may be willing to negotiate bulk rate discounts for development projects and/or simply support projects on a corporate social responsibility basis. Partnering with local technology companies will also help with ensuring effective and appropriate ap-

plications, and back-end content and support, and make it easier for projects to manage, integrate and sustain applications. In doing so, however, projects should also ensure accountability mechanisms are in place so that local beneficiaries and local governments can monitor implementation and keep development targets at the core.

6.5 Project Implementation

Start small, adjust on the go, and gradually scale up

Large-scale implementations of mobile technology initiatives should be thoroughly tested in a smaller pilot stage before being scaled up. A pilot phase will yield valuable knowledge of any programme design flaws, including technical glitches, human requirements and cost considerations that may need to be adjusted before the project is implemented on a larger scale. Investing this time into preliminary research and testing will go a long way towards preventing project failures and escalating costs later on.

Use participatory project design methods

The viability of any development initiative is usually dependent on its ability to address the needs of a variety of stakeholders. For this reason, implementation should include careful research (interviews and focus group discussions) with participants at every level of involvement before adhering to a particular project design. Consultations with participants who yield the least power over development decisions will often provide the most important insights into sustainable project design.

Ensure adequate expertise and project management capacity

There are many organizational challenges that come with adapting and implementing m-governance applications (Hellstroem 2008). Content has to be created, kept up to date and managed competently. Target groups have to be carefully defined and suitably addressed. Due to size display limitations of mobile devices, issues related to usability have to be tackled. Applications have to be marketed and distributed through appropriate channels. The sharing of expenses and liabilities between private and public actors must be defined up front. Another challenge is to untie mobile services from specific operators and manage interoperability and compatibility issues between operators and platforms.

Limit project complexity

At the launch of an initiative, services should not require users to gain new skills but instead build on existing skill sets. The provision of new and expanded information and services should be done slowly, starting with simple applications and easily manageable tasks and slowly extending the complexity of platforms, once users are adapted to and confident with earlier applications (Donner, Verclas and Toyama 2008).

7. Typology of Countries for UNDP Programming

UNDP should continue to expand its use of mobile technologies to support programmes and projects that promote human development. From the start, it should be clear that mobile technologies are not a panacea nor can they alone have substantial development impact. On the other hand, both new and ongoing development programmes can benefit from their use if the introduction of the technologies is not done at the expense of planned or established development outputs and outcomes. Finally, investments in mobile platforms for development will pay off better if they can piggyback on ongoing ICTD and e-governance programmes that can directly benefit from innovations that bring services and information to stakeholders.

A careful examination of the current status of many developing countries in terms of their position in the HDI, their progress on the MDGs, and the cost of mobile phones and coverage can help identify entry points for deploying mobile technologies in development programming (see figure 7). In general, there are clear opportunities to strengthen ongoing programming and introduce innovations that can make a critical difference in countries with conditions such as:

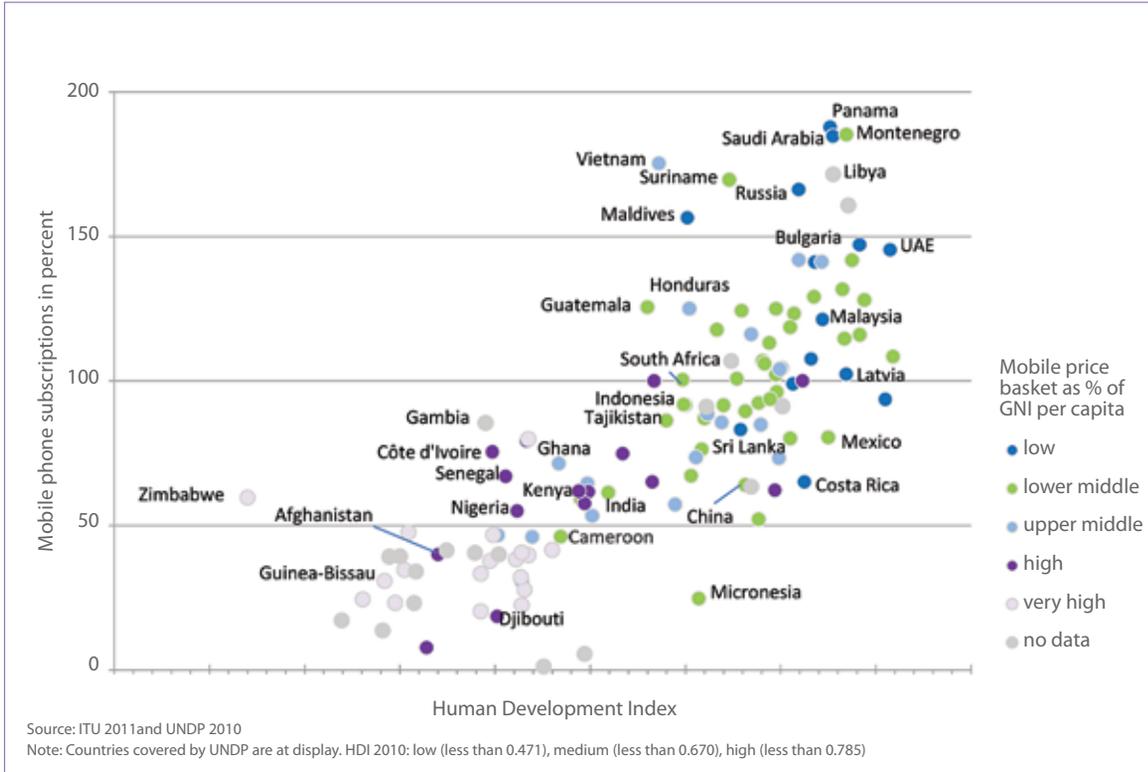
- Low to medium ranking on the HDI
- Low levels of transparency and accountability
- Crisis and post-conflict situations
- Poor logistical coordination of data collection and supply chains
- Medium to high mobile telephony coverage
- Low to medium price basket for mobile services in proportion to average income
- Low calling and SMS costs
- Positive trade-off between potential impact and costs/infrastructure constraints
- Have ongoing UNDP or other development-related projects and programmes

As expected, it is usually the case that countries (and communities) with the greatest need for development assistance are also those that face the highest mobile usage costs and poor network coverage — as illustrated in figure 7 — although there are also plenty of exceptions. For example, Gambia has an HDI of less than 0.4 but has about the same mobile phone subscription rate as the United States. Hence, not all LDCs are necessarily 'less developed' in terms of mobile technologies. Finally, there is also evidence that when it comes to access to communication and information networks, the costs for mobiles globally continue to fall in real terms.

7.1 Programming in Low Human Development Contexts

Countries with low human development present a complex cost-benefit analysis, given the relatively high expense of mobile telephony and the potential impact of the use of mobiles on critical development problems. Although, mobile services in this group of countries are relatively costly, projects employing mobile technology can reduce operational expenses by reducing fuel-and-cost-dependent travel and labor-intensive processes. Projects in these contexts should be designed to emphasize citizen access to services through facilitators trained to operate mobile technology, as opposed to assuming that citizens need to own an individual mobile device.

FIGURE 7: Mobile Phone Access and Human Development 2010



- Relatively low mobile service costs (less than 15 percent of average income): Djibouti, Ethiopia, Guinea, Ghana, Senegal, Yemen
- Relatively high mobile phone subscription (over 60 percent of population): Benin, Cote d'Ivoire, Gambia, Ghana, Kenya, Mauritania, Senegal
- Ongoing UNDP ICTD programmes in low human development context in 2010: 67 projects in 29 countries spending \$79 million (excluding Afghanistan)

7.2 Programming in Medium Human Development Contexts

A number of countries within the medium human development spectrum are well-positioned for mobile phone development initiatives. Since these countries also maintain moderate rates of income, literacy, and mobile device ownership, projects designed for mass participation, such as crowd-sourcing, are appropriate in these contexts, in addition to projects where citizens can access public services via a mobile device.

- Relatively low mobile service costs (less than three percent of average income in 2009): Botswana, China, Maldives, Sri Lanka, Thailand
- Relatively high mobile ownership (more than 100 percent of population): El Salvador, Maldives, Morocco, South Africa, Surinam, Thailand, Vietnam
- Ongoing UNDP ICTD programmes in medium human development context in 2010: 70 projects in 33 countries with expenditures of \$38 million

8. A Glimpse Ahead

There is indeed potential in the use of mobile technologies to support and enhance development outcomes. Yet, most of this potential is only starting to be tapped while mobile technologies and applications are rapidly evolving, and a number of challenges still have to be overcome.

It is essential not to lose sight of the fact that mobile technologies are enabling tools that can support the work of and interaction between people and public actors. Certainly, they do not replace the need for appropriate policies and programmes and stable governance systems. But they do offer new alternatives to address traditional development gaps and specific development targets. Mobile technologies can also transform the way in which governments interact with citizens, stakeholders and people in general, and vice-versa, while offering new mechanisms to enhance public service delivery, and increase transparency, accountability and trust in public institutions.

The mobile usage explosion in the South has been accompanied by a comparable shift in the direction in which innovation is taking place in the social use of mobile technologies. Until recently, the main path of innovation diffusion was from the North to the South, but this is changing. Nowadays, social innovators (both for-profit and non-profit) are working at the local level, developing and deploying local solutions to local development issues. And in some cases, such innovations, Ushahidi and M-PESA for example, are flowing not only across the whole South but also to the North. This is yet another fundamental difference with the traditional Internet model, and with the advent of the large social networks that today dominate such arenas. This emerging trend can have a critical impact in fostering local governance and local development, and further localizing the IADGs.

Many of the mobile technology initiatives already underway have tended to remain small in scale, are limited to one-time shots, and are heavily dependent on funding (public or private). That said, local CBOs, NGOs, CSOs and small and medium entrepreneurs are well ahead of local and national governments as well as many development organizations and practitioners. Thus, the entry points for supporting the use of mobiles for development must factor this in and build on what is happening on the ground — and this should lead to new ways in which development assistance can be provided. UNDP and other UN agencies must understand this clearly to be able to use mobile technologies effectively.

Sustainability and scalability are still the main challenges to the strategic deployment of mobile technologies for development. Scalability issues are partly the reflection of a gap between what social innovators are doing on the ground and the lack of government action and the need to step in and support such initiatives. Here, it is essential to distinguish between the provision of private and public goods and services, the former having taken off faster than the latter thanks to the involvement of the private sector and the creation of new markets where latent demand was already in existence. For sure, broadening the scope of public administration and service delivery to reach the poorest and most marginalized takes far more than smart mobile applications.

In addition to sound and open regulatory environments, governments need to put in place policies, structures and, where appropriate, programmes that can lead to scalable mobile-based initiatives that target the most vulnerable and foster human development, while partnering with social entrepreneurs and civil society actors already on the ground. Without this interaction, the potential for mobile technologies for development will remain just that: potential.

9. Endnotes

- 1 At the time this primer was being published in January 2012, ITU estimates for mobile subscriptions increased to six billion. Seventy five percent of subscribers are in the developing world. See: <http://www.itu.int/ITU-D/ict/statistics/>
- 2 ITU estimates have now increased to six billion. Please see footnote 1.
- 3 These figures are based on data from the ITU Mobile price basket 2010 linked with UNDP's HDI data for 2010.
- 4 Bangladesh, Malaysia, Pakistan, Serbia, Thailand, and Ukraine are the six markets of the mobile operator Telenor, for whom Deloitte prepared the study.
- 5 For examples of applications, see Infodev 2011: <http://www.infodev.org/en/Publication.1093.html>.
- 6 To read about all the latest Ushahidi deployments, see: <http://blog.ushahidi.com/>.
- 7 <http://demgov.gbiportal.net/2011/08/03/texts-and-balances-nigeria%e2%80%99s-2011-election>.
- 8 The Afghanistan example is from Michael Callen and James Long. 2011. "Institutional Corruption and Election Fraud: Evidence from a Field Experiment in Afghanistan." The paper reports the results of an experimental evaluation of Quick Count Photo Capture, "a monitoring technology designed to detect the illegal sale of votes by corrupt election officials to candidates" - by taking pictures of election results with mobile phones. The documents go through a lot of hands before reaching the national election centre in the capital; when original results were digitized as proof, it reduced theft and tampering of election materials. It was carried out in 471 polling centres across Afghanistan during the 2010 parliamentary elections. The intervention "reduced vote counts by 25% for the candidate most likely to be buying votes and reduced the stealing of election materials by about 60%." To see the article, go to: <http://www-igcc.ucsd.edu/assets/001/502329.pdf>.
- 9 Suggestions for improving mobile voting security include using a PIN (Personal Identification Number), a TAN (Transaction Number) or a digital signature.
- 10 Submissions can come in via an online tool, or via SMS. The diverse actions pledged by campaign participants will be displayed on a visual mosaic on the 7 Billion Actions website. Other projects include a smartphone application (7 Billion and Me), film competitions, photo exhibitions and a song, United, which can be re-interpreted by web users worldwide and re-submitted to the campaign website. UNEP is participating in the campaign by sharing research, reports and news via social networks, the media, UNEP's Tunza youth network and NGO partners. See: www.7billionactions.org.
- 11 See also Fernandez, Luisa and Rosechin Olfindo. 2011. "Overview of the Philippines' Conditional Cash Transfer Program: The Pantawid Pamilyang Pilipino Program (Pantawid Pamilya)." World Bank: Manila. Accessed October 2011, http://www-wds.worldbank.org/servlet/WDSContentServer/WDSP/IB/2011/07/08/000333038_20110708021205/Rendered/PDF/628790BRI0Phil0me0abs tract0as0no010.pdf.
- 12 See also: <http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/LACEXT/BRAZILEXTN/0,,contentMDK:20754490~pagePK:141137~piPK:141127~theSitePK:322341,00.html>. And see: <http://www.prepaidmvno.com/2011/09/14/govt-studying-entering-mvno-market-to-serve-bolsa-familia-beneficiaries-bnamericas/>. And: <http://www.proyectocapital.org/index.php/en/documents-en/302-mobile-banking-and-conditional-cash-transfer-programs>.

- 13 For example, India's own version of the Human Development Report - prepared by the Institute of Applied Manpower Research - placed Kerala on top of the index in 2011 for having the highest literacy, quality health services and consumption expenditures. See: http://www.moneycontrol.com/news/wire-news/human-development-index-rose-21-per-cent-kerala-tops-chart_603650.html. And: <http://www.firstpost.com/india/hdi-in-india-rises-by-21-kerala-leads-gujarat-far-behind-114044.html>
- 14 See also Vijayakumar, Sanjay, Sabarish K and Gokul Krishnan. 2010. "Innovation and M-Governance: The Kerala Mobile Governance Experience and Road-Map for a Comprehensive M-Governance Strategy." Accessed October 26 2011. <http://w3cindia.in/conf-site/Sanjay%20Vijaykumar%20mobme%20--Innovation%20and%20M-Governance%20-%20The%20Kerala%20Mobile%20Governance%20Experience%20and%20Road-Map%20for%20a%20Comprehensive%20M-Governance%20Strategy.pdf>.
- 15 See also <http://parliament.transparency.ge/subscribe/?lang=en>.
- 16 Africa Technology and Transparency Initiative. 2011. "Public to get parliamentary debates via mobile phone and Internet." Accessed October 2011. <http://www.africatti.org/archives/286>.
- 17 There have been over 10,000 reports between August 2010 and August 2011. Smartphone users can stay connected to the movement via several apps from India Against Corruption: one developed by Juvenis Tech for the Android and Symbian platforms provides news updates, streaming videos, polling and information; the other is Lokpal Messenger, developed by Sastra University students to provides news updates from popular political blogs about Lokpal.
- 18 See also <http://www.mwomen.org/News/mwomen-launched-by-hillary-clinton>.
- 19 For more, see the Ushahidi blog <http://blog.ushahidi.com/index.php/2011/05/16/voix-des-kivus-a-crowd-seeding-system-in-drc/>. The project has been led by Peter van der Windt and Marc Cartan Humphreys from the Center for the Study of Development Strategies at Columbia University.
- 20 See also GSMA. 2011. "Women and Mobiles: A Global Opportunity. A study on the mobile phone gender gap in low and middle-income countries" http://www.mwomen.org/wiki/Women_-_amp_-_Mobile_Report.
- 21 One recent initiative is with the technology firm Movirtu in the UK which has partnered with the UN. See: <http://www.un.org/apps/news/story.asp?NewsID=39231>.
- 22 http://www.unicef.org/infobycountry/malawi_52308.html?q=printme. See also the UNDP case study on UNICEF's RapidSMS in Malawi (for UNDP staff only) http://ictdegov.org/undpwiki/RapidSMS_Malawi.
- 23 See RapidSMS in Nigeria, <http://www.rapidsms.org/case-studies/nigeria-monitoring-supplies-in-a-campaign-setting/>.

Also see UNDP case study on HealthTrack in Kenya (for UNDP staff only) http://ictdegov.org/undpwiki/HealthTrack!_Vaccine_Stock_Monitoring_in_Keyna and the Kenyan HealthTrack blog, <http://kenyahealthtrack.blogspot.com/>.
- 24 <http://researchspace.csir.co.za/dspace/handle/10204/3529>. See also <http://www.comminit.com/africa/content/dr-math>. And <http://www.southafrica.info/business/trends/innovations/drmath-090611.htm>.
- 25 http://growinginclusivemarkets.org/media/cases/Kenya_MPESA_2008.pdf; and <http://www.safaricom.co.ke/index.php?id=250>.

- 26 There are 25.3 million mobile subscribers in Kenya, which is greater than the total adult population. http://whatmatters.mckinseydigital.com/social_innovation/mobile-money-a-game-changer-for-financial-inclusion?utm_source=email1&utm_medium=marketing&utm_campaign=socinnovation.
- 27 http://www.cdema.org/index.php?option=com_content&view=article&id=898%3Anational-disaster-management-agency-nadma-implements-a-tsunami-public-awareness-and-education-campaign&catid=35%3Apress-releases&Itemid=1
- And: http://www.cdema.org/index.php?option=com_content&view=article&id=896%3Ajamaicas-national-tsunami-awareness-campaign-launched&catid=35%3Apressreleases&Itemid=1.
- 28 FrontlineSMS has been used in many conflicts and post-conflict settings, including Afghanistan (<http://www.frontlinesms.com/2009/02/11/frontlinesms-peacebuilding-in-afghanistan/>), Iraq (<http://frontlinesms.ning.com/photo/irex-iraq-handicap-training?context=popular>), Madagascar (<http://r1lita.wordpress.com/2009/07/07/foko-ushahidi-and-frontlinesms-for-an-sms-alert-system-in-madagascar/>) and Zimbabwe (<http://www.frontlinesms.com/2011/01/19/vote-pray-advocate-2011-sms-resolutions-in-zimababwe/>) among other places.
- 29 "China text-messages millions on typhoon." USA Today.com, http://www.usatoday.com/tech/news/2006-07-27-china-text-typhoon_x.htm.
- 30 <http://www.internationalpeaceandconflict.org/profiles/blogs/mobile-changes-in-the-arab>.
- 31 <http://mobileactive.org/text-messaging-save-trees>.
- And: <http://www.greenpeace.org/international/en/news/features/argentina-forest-law/>.
- 32 <http://mobileactive.org/urban-sensing-mobile-phones-data-collection>.
- And: <http://www.urban-atmospheres.net/ParticipatoryUrbanism/index.html>.
- 33 For a more detailed description of how the billing works, see <http://www.txchnologist.com/2011/john-mcarthur-sharedsolars-pay-as-you-go-power-in-africa>.
- 34 See <http://www.mobileactive.org/case-studies/SharedSolar-mobiles-and-micro-grids> and <http://www.earth.columbia.edu/articles/view/2126/>.

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- Agrotestigo - plant disease tracking in Argentina: <http://agrotestigo.crowdmap.com/>
- Alerte - mapping community needs in Chisinau, Moldova: <http://alerte.md/>
- Al Jazeera and Gaza conflict 2009: <http://labs.aljazeera.net/warongaza>
- Bolsa Familia and cash transfers in Brazil: <http://www.mds.gov.br/bolsafamilia>
- Bolsa Familia, Brazil: <http://go.worldbank.org/QCZI04L470>
- Bolsa Familia, Brazil: <http://www.prepaidmvno.com/2011/09/14/govt-studying-entering-mvno-market-to-serve-bolsa-familia-beneficiaries-bnamericas>
- Bolsa Familia, Brazil: <http://www.proyectocapital.org>
- Bribespot: <http://bribespot.com>
- Bridgelt project, Tanzania: <http://blogs.worldbank.org/edutech/checking-in-with-bridgeit-in-tanzania>
- Budget project, Kenya: <http://blogs.worldbank.org/publicsphere/node/5737>
- Budget Tracking Tool, Kenya: <http://www.opengovernance.info/BTKenya/index.php>
- Cambodia: <http://futurechallenges.org/local/the-rise-of-citizen-media-via-mobile-phone-in-cambodia>
- CELAC, Uganda: <http://celac.or.ug>
- China and controls on SMS: <http://www.rfa.org/english/news/china/controls-01062011123855.html>
- China and SMS protest: <http://www.china.org.cn/english/environment/212373.htm>
- China and typhoon SMS warning: http://www.usatoday.com/tech/news/2006-07-27-china-text-typhoon_x.htm
- Chinese activists use language to evade censorship: <http://www.movements.org/case-study/entry/using-language-to-evade-online-censorship-in-china>
- Citivox: <http://www.citivox.com>
- Cuidemos el voto, Mexico: <http://www.cuidemoselvoto.org>
- DatAgro, Latin America: <http://www.datadyne.org/programs/mip/datagro>
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Digital data collection, DDR, Central African Republic: <http://www.peacebuildingdata.org/car>

Disaster management, Caribbean: http://www.cdema.org/index.php?option=com_content&view=article&id=898%3Anational-disaster-management-agency-nadma-implements-a-tsunami-public-awareness-and-education-campaign&catid=35%3Apress-releases&Itemid=1

Disaster management, Jamaica: http://www.cdema.org/index.php?option=com_content&view=article&id=896%3AJamaicas-national-tsunami-awareness-campaign-launched&catid=35%3Apress-releases&Itemid=1

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Dr. Math: <http://www.southafrica.info/business/trends/innovations/drmath-090611.htm>

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Election reporting in Afghanistan: <http://www-igcc.ucsd.edu/assets/001/502329.pdf>

Election reporting in Benin: <http://mobileactive.org/benin-sms-election-observation>

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Electronic voting in Estonia: <http://www.itu.int/ITU-D/ict/newslog/Estonians+Vote+In+Parliamentary+Election+By+Mobile+Phone.aspx>

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Farmers, Egypt: <http://www.internationalpeaceandconflict.org/profiles/blogs/mobile-changes-in-the-arab>

FishMS, South Africa: <http://www.wwfsassi.co.za/?m=5&s=4&idkey=1193>

FishMS, South Africa (about): <http://mobileactive.org/case-studies/fishms>

Freedom Fone platform: <http://www.freedomfone.org>

Freedom Fone, Zimbabwe: http://kubatana.net/html/ff/ff_cont.asp

FrontlineSMS in conflict/post-conflict Afghanistan: <http://www.frontlinesms.com/2009/02/11/frontlinesms-peacebuilding-in-afghanistan/>

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GeoChat, Thailand: <http://instedd.org/map/thailand-chiang-rai-surveillance-rapid-response-teams>

GeoChat: <http://instedd.org/our-work/projects>

Google trader marketplace application: <http://www.google.co.ug/africa/trader/home>

Grameen phones, Bangladesh: <http://www.grameenphone.com>

Greenpeace Argentina: <http://mobileactive.org/text-messaging-save-trees>

Greenpeace Argentina: <http://www.greenpeace.org/international/en/news/features/argentina-forest-law>

Grundfos and purchasing clean drinking water, Kenya: http://www.grundfoslifelink.com/int/03_how_we_do_it_payment_system.html

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Human rights, Democratic Republic of Congo: <http://www.mwomen.org/News/mwomen-launched-by-hillary-clinton>

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I Paid a Bribe initiative, India: <http://ipaidabribe.com>

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Janaagraha and Bribe Bandh, India: <http://janaagraha.org/files/Janaagraha-Q1-2011-12-report-fin.pdf>

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KoboToolbox software: <http://www.kobotoolbox.org>

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RapidSMS Jokko Initiative: <http://www.rapidsms.org/case-studies/senegal-the-jokko-initiative>

RapidSMS, Malawi: <http://www.rapidsms.org>

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SharedSolar: <http://shedsolar.org/>

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SharedSolar: <http://www.mobileactive.org/case-studies/SharedSolar-mobiles-and-micro-grids>

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Ushahidi, post-election violence in Kenya: <http://legacy.ushahidi.com>

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WING, Cambodia: <http://www.wingmoney.com>

Zabatak - corruption tracking in Egypt: <http://www.zabatak.com/>

Photo Contributions

Cover photograph: Women demonstrating in Tahrir Square, Cairo, Egypt
(Emad Karim/www.emadkarim.com)

Photograph 1: A street merchant sells phone cards and polishes shoes in Port-au-Prince, Haiti
(Stephanie Ludwig/UNDP)

Photograph 2: Protesters use cell phones to record demonstrations in Tahrir Square, Cairo, Egypt
(Emad Karim/ www.emadkarim.com)

Photograph 3: A pilgrim calls her family back home while she and her fellow travelers take a rest in Kolkata, India
(Amitava Chandra/UNDP)

Photograph 4: Young woman using her phone during recent demonstrations in Cairo, Egypt
(Emad Karim/www.emadkarim.com)

Photograph 5: A micro-entrepreneur in his phone charging station in Ptoyo, West Pokot, Kenya
(Stephanie Ludwig/UNDP)

Photograph 6: An M-PESA agent shop in Kibera, Nairobi, Kenya
(Stephanie Ludwig/UNDP)

Photograph 7: DDR data collecting teams with their equipment in the Central African Republic
(Tino Kreuzer/UNDP)

Photograph 8: A monk in Laos holding two phones in the market
(JZ/UNDP)

Mobile technologies are opening new channels of communication between people and governments, potentially offering greater access to public information and basic services to all. No other technology has been in the hands of so many people in so many countries in such a short period of time. In fact, globally, more people now have access to a mobile device than to justice or legal services. Recent estimates indicate that ICTs could be accessible to everyone by 2015 and bring internationally agreed development targets ever closer to achievement. Indeed, we are witnessing a new wave of democratization of access to innovative ICT channels, propelled by state-of-the-art technologies and diminishing barriers to entry.

The Millennium Development Goals (MDGs) have set forth global commitments to foster human development across the world. One of the targets calls for making the benefits of ICTs available to all. If we subscribe to the latest figures on mobile usage and availability then we can argue that this particular target is achievable by 2015, if not before. But how does this relate to the other 17 MDG targets, if at all, and to all other Internationally Agreed Development Goals (IADGs)?

The main objective of this primer is to provide UNDP programme staff and development partners and practitioners with a practical understanding of how mobile technologies can amplify development programming. By looking at basic concepts, current trends and real life examples, the primer intends to shed light on how development practitioners can harness the potential of mobile technologies to improve development outputs and outcomes at the country level.



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