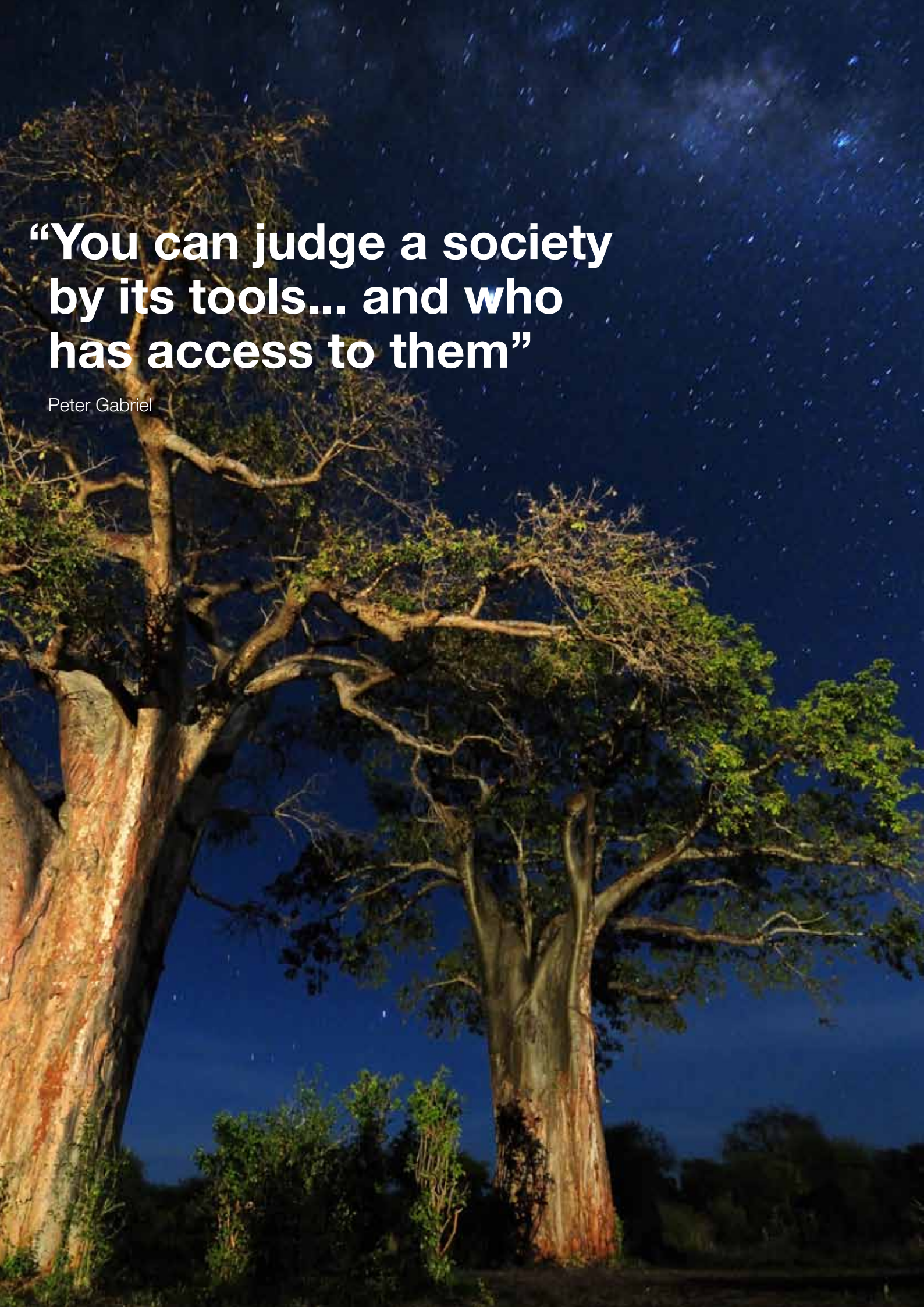




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# Scaling Opportunity: Information and Communications Technology for Social Inclusion



A large, ancient baobab tree stands prominently in the foreground, its thick, textured trunk illuminated from below. The tree's branches spread out against a deep blue night sky filled with numerous stars. In the background, another similar tree is visible, and the ground is dark with some low-lying vegetation.

**“You can judge a society  
by its tools... and who  
has access to them”**

Peter Gabriel

## Introduction:

Utilizing Information and Communications Technologies (ICT) as a catalyst for social and economic progress is an opportunity long held in high regard by the international development community. Impacting society at both the micro and macro levels, the **tools of ICT** equip us to help address our greatest **social, economic and environmental challenges**.

But delivering on the promise of ICT to help achieve the goals of international development has been an ongoing challenge. Failure to fully understand the needs of individuals, overly complex solutions and limited support are just some of the reasons for decades of mixed results.

But **there's been a change** in the last few years. Technology's centrally defining attribute — **its ability to scale** — has blossomed. New cost structures and capabilities have resulted in **four billion people** having connections to the global fabric of communications.<sup>1</sup> Opportunities of unprecedented magnitude are emerging **for an inclusive networked society**.

**The agent of change? Mobile phones. Robust market competition, affordable pricing, liberalized regulation and bottom-up innovation are coalescing to close the “connectivity gap” at a rate of approximately two million new subscriptions per day.<sup>2</sup>**

As new geographies and population segments connect, the “center of gravity” defining the communications landscape is shifting.<sup>3</sup> Emerging economies now represent 80 percent of worldwide mobile phone subscribers — most of whom are from lower incomes.<sup>4</sup> India, Africa, Brazil and China alone accounted for more than 300 million new subscriptions in the past twelve months.<sup>5</sup>

But as former luxury items become daily necessities, it is important to ask the question: “What’s next?” While the adoption of mobile communications in emerging economies has shown to have a material economic impact, it’s not enough. Access to the broader Internet can yield even greater results.<sup>6</sup> With less than 10 percent of those living in emerging economies having access to the Internet — far below the global average of 23 percent — the leapfrog opportunity for fully connecting the unconnected is extraordinary.<sup>7</sup> Indeed, the “next billions” are estimated to represent approximately \$US 2.3 trillion in annual spending with untapped potential as producers, consumers and entrepreneurs.<sup>8</sup>

This discussion guide, the third in a series examining the transformative impact of communications technologies, addresses some of the key factors for ensuring the balanced evolution of the ICT ecosystem. Within the context of emerging economies, it will share thoughts on connecting remote geographies as well as delivering value-added services for those living in extreme poverty. The intent is to reinforce the notion that a commitment to inclusion creates opportunities for all.

## Scaling the Foundation

While there are a number of factors which have contributed to the rapid uptake of mobile communications amongst the poor, perhaps the most influential is pre-paid billing. Because most developing economies are cash-based, pre-paid billing allows service offerings to be broken down into “pocket-sized” amounts. These small amounts are an ideal match given

individuals with the ability to save money during off-peak hours and can yield a big increase in aggregate usage. In Tanzania for example, operators are seeing an increase between 20%-30% in off-peak volumes when prices are reduced.<sup>10</sup>

“Virtualizing” the handset with software deployed in the network is another innovation aimed at providing low-cost access for

### *Understanding the Opportunity:*

- *Know the end-user and develop specific offerings which explicitly improve the lives of individuals.*
- *Segment and tailor offers accounting for local conditions and constraints — price for real-world budgets.*
- *Develop offerings in a flexible and decentralized manner for unique and sustainable offerings.*
- *Innovate from the edge and discard models of centralized command and control.<sup>38</sup>*

the very limited purchasing power and unpredictable nature of the poor’s cash flow.

From the operators’ perspective, flexible, low-cost distribution models are central for successfully competing on razor-thin margins. As such, many mobile network operators have built their rural distribution strategies around “hub and spoke” configurations using hundreds of thousands of distributors and retailers. Bharti-Airtel, the largest mobile operator in India for example, utilizes more than 600,000 local retailers and 28,000 distributors to sell their services. This ensures that individuals at all economic strata and in diverse socio-geographic settings are provided with a localized and personal experience.<sup>9</sup>

Along with “hub & spoke” organizational designs, another trend for reducing end-user costs is dynamic pricing. This provides

individuals. By promoting the use of shared devices, individuals can “log on” using almost any phone yet still receive the personal benefits of having their own unique phone number and billing arrangement.<sup>11</sup>

Despite much progress in making baseline voice and data services affordable, significant uncertainties remain as operators in emerging nations begin to offer broadband Internet connectivity. Along with illiteracy, limited local content, fluctuating operational costs, limited backhaul capacity and a host of other issues, the economics of ubiquitous broadband are complex and challenging.

While the value of broadband Internet connectivity for everyone — and everything — is widely acknowledged, there are significant economic uncertainties centered on the question of “who pays.” Currently little if any incremental revenue

accrues directly to emerging nation operators for providing access to web-based content residing outside their local / regional domain. Additionally, the economic incentives for mobile network operators to fully transition to Voice over Internet Protocol (VOIP) services are unclear. Arriving at second generation, win-win business models that address the economics of inclusion is fundamentally important for an accelerated migration to pure Internet-based services.

Given the complex economics, it should come as little surprise therefore that broadband Internet access within emerging economies is evolving at different rates in different regions. A variety of technical configurations are blossoming: some are planned upgrades to existing infrastructure; others are emerging organically using a variety of component technology.

For rural and remote geographies, one interesting approach is the “occasionally connected” architecture which marries locally stored Internet content with asynchronous applications (e-mail, voice messaging, bulletin boards and document libraries).<sup>12</sup> While not a broadband solution in a strict technical sense, by intermittently linking to the Internet to update and transfer files — often times via a retrofitted school bus which provides local connectivity and then visits the next village — a flexible, scalable and valuable end-user experience can be created.

Initial evidence suggests that the economics of this approach are also quite compelling. Configurations of this nature can deliver far greater savings than traditional landline solutions.<sup>13</sup> These models can also serve as an incremental pathway for scaling end-user demand. Social services (i.e. health, education, finance, e-governance) can be initially funded

by local governments and then evolve to support ubiquitous coverage — that local users would pay for — as local economies grow.<sup>14</sup>

In more densely populated urban geographies however, the growing concern is less about stimulating demand than on serving it. In developing (and developed) economies, there are uncertainties as to whether there is sufficient wireless spectrum to meet the rapidly increasing volumes of wireless data traffic.

In general, the consumption of wireless data has become an externality. Few are aware of the shared resources consumed when they run a wireless application. Consequently, as more individuals connect via wireless technologies (and as devices become increasingly sophisticated), the aggregate volume of mobile data grows exponentially.<sup>15</sup>



Left unchecked, inefficiently managing how individuals and applications wirelessly connect to the communications infrastructure could lead to a “tragedy of the commons.”<sup>16</sup>

To avoid this scenario and meet the burgeoning demand, operators will need to more efficiently manage spectrum utilization as well as optimize their networks. Governments will also need to accelerate the pace at which they allocate spectrum for civilian use so that affordable mobile broadband solutions can continue to scale.

As they allocate new frequencies, it will be important for government regulators to coordinate locally, regionally and globally so that economies of scale can occur. For example, if multiple bands of spectrum are allocated across different countries and not harmonized, the unit costs for handsets will increase due to greater device complexity.

Another infrastructure challenge faced by many operators in emerging nations is reliable access to the electrical grid and, in some cases, the reliability of the grid itself. An estimated 75,000 new off-grid base station sites will be built each year in developing countries through 2012.<sup>17</sup> For mobile network operators serving off-grid geographies, the operational complexities and costs can be quite daunting. Keeping base station diesel generators secured and regularly fueled is not easy. From a balance sheet perspective, off-grid base stations have an unpredictable cost structure driven mostly by fluctuating fuel prices. Rapidly changing fuel prices can wreak havoc on already thin margins.

From an alternative fuel perspective, solar and wind-based solutions are becoming economically viable but their widespread deployment will take time. While nearly all operators in the developing world have green power initiatives underway (39% with trial sites, nearly all have plans for green power), the additional capital and operational expenditures are extending the planning horizons.<sup>18</sup>

In regions where the electrical grid is available but simply not reliable enough, the use of machine-to-machine (M2M) wireless communications can serve to more efficiently manage energy consumption and distribution. By adding a layer of intelligence over legacy electrical systems, grids can be optimized and more effectively measured, controlled and automated. As a way of increasing economic productivity and quality of life, the impact of increasing the reliability of electrical grids within emerging economies cannot be understated.

From the perspective of an end-user, having limited access to electricity while trying to keep a mobile phone charged is an ongoing struggle. Along with the cost and inconvenience of finding someone with a working charger (often times hooked up to a repurposed car battery), there are threats of having phones stolen and/or damaged while being charged.

To address these concerns, operators and manufacturers have committed to implementing a universal charging standard for new mobile phones.<sup>19</sup> Along with reducing standby energy

consumption and simplifying the end-user experience, the industry-wide standardization to charge mobile phones via the micro-USB interface could have an interesting second order impact. Mobile phones could, in fact, accelerate the adoption of community-based PCs as shared charging hubs.<sup>20</sup>

New types of “green” handsets have also been recently launched. Using solar panels located on the back of the handset, the phone can be recharged by resting it in sunlight. While these solar mobiles hold promise for those living with limited access to reliable sources of electricity, it will most likely be a number of years before these devices reach favorable unit cost volumes for wide-scale adoption.

### Scaling Value-Added Services

With the assumption that connectivity will evolve by utilizing a continuum of technologies, the focus now shifts on what can be done to accelerate usage of value-added information services.



In general, the success to date for most mobile applications can largely be attributed to the utility of helping people coordinate.<sup>21</sup> Getting the right resources, to the right place, at the right time goes a long way in making phones useful. A second factor is the network effect; as more and more individuals connect, the overall value and ease of coordinating increases exponentially.

Because of the personal utility of mobile applications, however, their impact is felt primarily at the local or regional level. Deploying mobile applications globally is quite difficult. Multiple device types, disparate operating systems, limited interoperability and a general lack of user awareness of new applications create a highly fragmented platform with limited incentives to deliver services on a global scale.

One of the fundamental differences between the wired and mobile Internet is standardization. For the wired Internet, applications generally work regardless of the hardware or transport provider. In contrast, the mobile Internet has various national and regional standards along with a number of technical incompatibilities. Consequently, the relative ease with which an individual can create and globally share information on the wired Internet is not yet possible on the mobile platform.

Over time as device functionality and the deployment of “cloud-based” services expands, globally scaling mobile-applications will become easier. As this emerging technology landscape unfolds, ensuring openness and interoperability among mobile applications will be important for continued growth and adoption.

Although it may sound obvious, the first step for ensuring widespread adoption of value added services is to solve real-life issues. The history of ICT is littered with failures rooted in a lack of customer understanding. Too many times the needs of sponsoring institutions have been placed before those of end users.

## Recognizing the Challenges

*Although it is difficult (and dangerous) to generalize about those living in extreme poverty, a few salient characteristics can provide a better understanding of the challenges they face:*

**Low and Unpredictable Incomes:** *The difficulty of living on very low income is compounded by high degrees of unpredictability. As such, individuals exhibit highly complex behaviors for managing their cash flow across a variety of formal and informal mechanisms. Money management is a fundamental and well-understood part of everyday life for the poor and a key factor in determining their success for improving their lives.<sup>36</sup> Every cent counts and individuals are unlikely to spend on things they don't understand or trust.*

**Coping with Difficult Conditions:** *There are a number of domestic constraints with which the poor must cope on a daily basis. Chief among these are limited access to food, electricity, health care and clean water. Additionally, the poor are often inefficiently served in the market and often frustrated at having to pay higher prices for inferior goods and services.*

**Looking for Trusted Advice:** *With limited access to information sources, low literacy rates and lack of direct experience, the poor generally need extensive consumer education, product trials and demonstrations to understand the benefits of goods and services. Communities of trusted friends, relatives and neighbors will often play a significant role in shaping opinions and adoption behaviors.*

**Smart Shoppers:** *Because every cent counts for low-income individuals, they are highly skeptical of things they don't understand or trust. They are also willing to pay a premium for products which provide reliability and security.<sup>37</sup>*

Designing for inclusion entails the need to focus on human-centric value creation in all phases of the lifecycle. Given the highly personal nature of mobile communications, in-depth market sensing, rapid prototyping, community-lead distribution and sound feedback loops are all needed to ensure that services are appropriately tailored to meet the complex and changing needs of the poor. As mobile communications ethnographer Jan Chipchase notes, “The careful use of real-world analytics combined with contextual qualitative understanding has the opportunity to reveal not only *what* people are doing but also the nuances of *how* and *why*.”<sup>22</sup>

Clear positioning of an offering is an attribute strongly correlated with early adoption. In that light, mobile financial services (especially those in the Philippines, South Africa and Kenya), provide an example of how a simple and direct message drives positive results.

In Kenya, positioning Safaricom's M-PESA money transfer service with the simple message of “send money home” has led to impressive results. Launched in 2007, M-PESA now has nearly 7 million users or roughly one out of every four adult Kenyans. Rural individuals who have adopted it are reported to have increased their household income between 5%-30%. Along with the convenience and cost savings

## Lessons Learned for the Mobile Internet

- Position offerings with a simple and clear value proposition
- Use low-prices and promotions to stimulate demand and build future usage
- Make devices affordable and the user experience enriching
- Ensure discoverability and usability.
- Develop local content with native language support

for sending domestic remittances, M-PESA's ability to provide users with a safe way to store money has been another key factor for its success.<sup>23</sup>

In Bangladesh, Grameenphone's BillPay provides another example of clarity in service positioning. This offering is a "no-frills" way to securely and conveniently pay utility bills through either an authorized centre or via phone. Less than 10 percent of the population in Bangladesh has access to conventional banking and bill payment is associated with a number of inconveniences such as standing in long queues, travelling, limited payment hours and various post-payment hassles. Launched in the Chittagong region of Bangladesh in 2006, the service now has now paid more than 100,000 bills.

But while remittances and electronic bill payment can serve as catalysts for the early adoption of mobile financial services, a broader suite of available capabilities should also be explored. Along with domestic and international remittances, using mobile money for the receipt and payment of loans, interest bearing savings accounts, insurance, wage deposit and a host of other financial services represent powerful opportunities for banking the unbanked.

There is reason for optimism that many of these opportunities will be pursued. The World Bank's Consultative Group to Assist the Poor (CGAP) estimates that in 2009 the number of mobile-money offerings in developing countries (estimated at 120) has more than doubled from 2008. By 2012, CGAP also notes that 1.7 billion people will own a mobile phone but will not have a formal bank account.<sup>24</sup> With more than 300 million unbanked individuals expected to use some form of mobile money during this time-frame,<sup>25</sup> the G20 has made the continued adoption of emerging financial services a global priority.<sup>26</sup>



As noted by a recent World Bank report, the continued health of the mobile money ecosystem will require continued levels of cross-industry cooperation and competition. The nature of these interactions will evolve along an arc where each phase of growth has a differing set of requirements. The table below highlights some of the key characteristics for each stage of evolution.

### The Challenges of Illiteracy

Broad in scope, the literacy challenges of the poor present yet another unfortunate hurdle for widespread adoption of information services. Along with the inability to read text, numeric and financial illiteracy often combine and compound to create end-user difficulties.

Because of their highly personalized nature, mobile phones can act as a unique starting point for tackling the challenges of illiteracy. Every day millions of illiterate individuals use their mobile phones to make and receive calls.<sup>28</sup> One common strategy is for individuals to leverage the concept of proximate literacy – delegating parts of the process they don't understand.<sup>29</sup> In this way, agents, family members,

	Emerging	Expanding	Mature
Actors	Small-scale mobile money operations emerge from mobile network operator-led, bank-led, 3rd-party models. Many require subsidies from parent companies, main businesses, donors, etc.	Base revenue from urban markets to support rural market operations. Some players start to provide mobile money revenue segment information in their financial reports. Several large domestic players. Many global mobile network operators spin off mobile money operations. Some begin to have initial public offerings.	Lots of mergers and acquisitions. Some very large international players act as independent payment service providers.
Level of Regulation	Regulators encourage emergence of the actors in the ecosystems.	Regulators modestly control yet nurture the actors in the ecosystem.	Regulators impose robust control over the actors in the ecosystem.
Number of Users (per provider) and Frequency of Use	10k-10m users, but not using regularly; only "early adopters."	1m-30m users, majority using regularly, large scale uptake.	10m-100m users, more than 70% adult penetration in most developing markets and 90% in developed markets. Widespread normal usage as part of daily life.
Payment	Mostly person-to-person (P2P) remittances and pre-paid value storage.	Regular payments, e.g. payroll, utility bills, government-to-person, P2P, etc.	Any type of payments.
Characteristics Level of Interoperability	Limited interoperability.	Users start to demand substantial interoperability.	Full interoperability.

Source: International Finance Corporation, World Bank Group 2009

## mHealth

*The impact of mobile communications for radically improving health and wellness cannot be understated. Health challenges represent, arguably, the most significant barrier to sustainable global development. Some areas demonstrating concrete benefits include:*

- *Increased access to healthcare and health-related information, particularly for hard-to-reach populations*
- *Improved ability to diagnose and track diseases*
- *Timelier, more actionable public health information*
- *Expanded access to ongoing medical education and training for health workers.<sup>39</sup>*

friends, kiosk operators, etc act as trusted infomediaries and play a critical role for gaining the trust and acceptance of local populations.

Understanding the multi-step adoption process and the need to strengthen trust amongst “mediators” holds unique promise. In the case of agents, their ability to complete complex or inconvenient tasks for others lies at the heart of their local business value proposition. Acting as a mediator increases customer loyalty, reduces error rates and often creates repeat business.

Voice-based applications (using contact centers or interactive voice response systems) provide another way to address the hurdles of illiteracy. From an interface perspective, voice applications are a more intuitive and inclusive way for individuals to access information. Not only do voice-centric applications have an efficient interface for *distributing* information, they are also highly efficient at *collecting* information. This real-time, and often very rich, feedback can be analyzed and shared to improve and adapt service offerings.

The effective use of voice applications and live agents can be seen, for instance, as a way to supplement healthcare delivery for hard-to-reach populations and rural areas.<sup>30</sup> A number of contact center solutions which provide first-line medical assessment, advice on medication, interpretation of test results and

emergency information now exist in developing nations throughout the world.<sup>31</sup>

### Community Trust

For socially-inclusive information services to achieve scale, not only is it necessary to have a deep understanding of individual needs, but also to engage and educate at the community level. Top-down, centrally controlled approaches are rarely successful in meeting the complex needs of the poor.

From a demand-generation perspective, engaging at the community level helps gain local trust and positive word-of-mouth. It also helps increase awareness and create feedback channels to ensure an offering is reliable and of sufficient quality. Community engagement is also essential for fostering local entrepreneurship and innovation.

A well-known example for leveraging local communities is GrameenPhone in Bangladesh. At its inception, GrameenPhone extended microfinance loans to women in rural areas to buy a mobile phone so they in turn could sell telephone calls to others. Over time, the scope of the services provided by these community resources has expanded. GrameenPhone’s Community Information Centres (CICs) now offer the ability to make calls and inexpensively access the Internet via PCs.<sup>32</sup>

Another example of deep community engagement can be seen in many agriculture information services. Access to mobile technology in rural India has enabled farmers to share pricing information on their produce with nearby markets. One particular project empowers 3.9 million rural farmers with five free voice messages every day covering prices, farming techniques, weather forecasts, animal husbandry, rural health initiatives and fertilizer availability. It is delivered through more than 40,000 Indian Farmers Fertilizer Cooperative societies.<sup>33</sup>

### Incremental and Proportional: New Models for Public-Private Partnerships

Regulators and policy makers have played an invaluable role in establishing an enabling ICT ecosystem. In general, liberalized regulatory frameworks which are transparent, consistent, pro-competitive and technology neutral have encouraged market entry and robust competition. Consequently, this competitive landscape has helped drive lower price points to ensure the benefits of ICT extend to all levels of income.

While the optimal regulatory framework remains elusive, there is a growing recognition that in order to achieve the benefits of affordability and inclusion, policy frameworks should embrace the notions of incrementality and proportionality.<sup>34</sup> As many mobile-based applications are in their initial phase of development, there is a growing consensus that regulations should be implemented gradually and with the flexibility to adapt to risks as they emerge. Once risks are identified, the regulatory response should be pragmatic and proportionately framed.

Governments not only have a role in shaping policy and regulations; they are also huge market makers for the adoption and usage of services. As it relates to e-governance, governments can play a significant role as a demand-side stimulator and/or market maker. In fact, a whole range of government programs

## mPedigree

*New models for public-private partnership can be seen in Ghana and Nigeria with the mobile service mPedigree. This offering — an SMS-based solution designed to address the issue of counterfeit drugs — provides individuals with the ability to text a special number found on a drug’s packaging to verify whether or not the medicine is counterfeit. mPedigree puts the power of counterfeit detection in the hands of individuals, augmenting existing government efforts. By tapping into the “wisdom of the crowds,” new levels of decentralized and pervasive fraud detection can occur.*

of offerings need to be delivered; new classes of assets need to be shared; and greater amounts of knowledge need to be exchanged. Serving the extreme poor will, simply put, require new ways of working together.

To ensure ICT’s potential for increasing social and economic inclusion is met, it is important that all players in the ICT ecosystem rethink, redesign and re-energize their efforts to address this opportunity.

and processes can utilize the mobile platform. In the area of mobile finance for example, one idea for consideration is for ministries paying out salaries and social benefit payments via m-payments. Considering that they are likely to be among the largest payors in any given country, this practice could be a significant market catalyst.

Governments can also stimulate adoption of mobile-based ICT solutions for healthcare delivery and other social services. If governments

create policies to support their own stated goals for delivering mobile-based services, there may be a second order impact where other services can flourish and reach scale.

### Summary

To serve the underserved, “business as usual” simply won’t work. New groups of stakeholders need to align on common priorities; new types of partnerships need to be built; new bundles

ICT has the potential to change the way developing economies deliver essential social and economic services and attain sustainable growth. To create an environment for transformation, reinvigorated levels of public-private coordination will be required across businesses, governments and civil society organizations. With robust competition, sustained investment and collaborative innovation, there is unlimited potential for positive social and economic growth.

Actions for Stakeholders:		
Stakeholder Group	Primary Role	Action Needed
ICT (and Related) Businesses	Develop sustainable business models	Focus on distribution strategies which enable “paraskilling” of local agents  Embed a deeper understanding of the needs and economics of serving those living in extreme poverty
Government/Regulators	Provide public infrastructure  Define and implement policy  Create an enabling environment for scaling of new services	Act as a catalyst for demand-side generation of e-government services (i.e. using mobiles for government disbursements and payment of taxes)  Remove obstacles to scale. Provide incentives for initial services to evolve into more fully developed offerings  Accelerate the allocation of additional wireless spectrum for civilian use  Explore opportunities for using end-users as a tool against fraud protection
Civil Society Organizations	Support communities in improving lives  Advocate for community needs  Define priorities for stakeholders	Work to more effectively share results and learnings from local mobile deployments  Advance the need for policies which cultivate and expand the scope, scale and expertise of local retail agents
Donors, International Organizations	Monitor and assess results  Share knowledge	Provide capital to “de-risk” infrastructure investment in rural and remote areas  Accelerate the exchange of benchmarks for assessing the health of ICT ecosystems

- <sup>1</sup> ITU, 2009
- <sup>2</sup> GSM Association Wireless Intelligence, 2009
- <sup>3</sup> The Landscape of Telecoms, Economist, September 24, 2009
- <sup>4</sup> GSM Association Wireless Intelligence, 2009
- <sup>5</sup> World Bank; ITU 2009
- <sup>6</sup> Qiang, Christine Zhen-Wei, World Bank, 2009
- <sup>7</sup> ITU Information Society Statistical Profiles 2009, Africa
- <sup>8</sup> World Economic Forum, Next Billions: Unleashing Business Potential in Untapped Markets, 2009
- <sup>9</sup> Bharti Airtel, 2009. This is unique given that many of Bharti Airtel's customers average less than US\$2 of revenue per month
- <sup>10</sup> The Landscape of Telecoms, Economist, September 24, 2009
- <sup>11</sup> GSM Association, 2009
- <sup>12</sup> Pentland, Alexander. 2009. "DakNet: Rethinking Connectivity in Developing Nations"
- <sup>13</sup> Pentland, Alexander 2009
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- <sup>15</sup> GSM Association, 2009. "Digital Dividend Report"
- <sup>16</sup> World Economic Forum, Global Agenda Council 2009
- <sup>17</sup> GSM Association. 2009. "Green Power for Mobile: Top Ten Findings"
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- <sup>19</sup> GSM Association. 2009. "Mobile's Green Manifesto"
- <sup>20</sup> Chipchase, Jan. 2009. "Mobile Phone Practice and the Design of Mobile Money Services for Emerging Markets"
- <sup>21</sup> Chipchase, Jan. 2009
- <sup>22</sup> Chipchase, 2009
- <sup>23</sup> The Landscape of Telecoms, Economist, September 24, 2009
- <sup>24</sup> CGAP/GSMA. 2009. "CGAP/GSMA Mobile Money Market Sizing"
- <sup>25</sup> CGAP/GSMA. 2009. "CGAP/GSMA Mobile Money Market Sizing"
- <sup>26</sup> G20. Leaders' Statement: The Pittsburgh Summit. September 25, 2009
- <sup>27</sup> World Bank, International Finance Corporation, 2009: Accelerating the Development of Mobile Money Ecosystems.
- <sup>28</sup> Chipchase, 2009
- <sup>29</sup> Chipchase, 2009
- <sup>30</sup> United Nations Foundation, 2009 mHealth for Development. This report also notes that at the other end of the communications continuum there is growing evidence that SMS alerts also have a measurable impact on health-related behaviours.
- <sup>31</sup> Grameenphone's HealthLine operates in Bangladesh where there is only one doctor per 4,000 people. Getting access to a doctor can be difficult often involving lengthy and expensive travel with long waits.
- <sup>32</sup> GrameenPhone, 2009. Recognizing that IT skill sets and training are just as important as technology, GrameenPhone (and its community of partners) have launched an education program on basic computer skills. All of the training material is in Bengali and targeted towards rural students, unemployed youth and women
- <sup>33</sup> Bharti Airtel, 2009. A joint project with IFFCO
- <sup>34</sup> Dolan, Jonathan. 2009. "Accelerating the Development of Mobile Money Ecosystems." IFC and the Harvard Kennedy School
- <sup>35</sup> GSMA and Deloitte. 2007
- <sup>36</sup> ITU estimates 2009  
Collins, Morduch, Rutherford and Ruthven, Portfolios of the Poor, 2009
- <sup>37</sup> World Economic Forum, 2009 The Next Billions: Business Strategies to Enhance Food Value Chains and Empower the Poor
- <sup>38</sup> World Economic Forum, 2009 The Next Billions: Business Strategies to Enhance Food Value Chains and Empower the Poor
- <sup>39</sup> United Nations Foundation, 2009 mHealth for Development

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Turkcell

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