Amplifying the Impact:
Examining the Intersection of Mobile
Health and Mobile Finance

A discussion guide for collaborative insight presented by the World Economic Forum,
in partnership with the mHealth Alliance

mHealth Alliance™

"Opportunities multiply as they are seized."

—Sun Tzu

Introduction:

In looking at the rapidly expanding adoption of mobile communications, **one of the most promising opportunities** for positive socio-economic change lies in the scaling of mobile health and mobile financial services (MFS). In fact, more people today have access to a mobile phone than to clean water or the electrical grid.[1] By 2012, it is estimated that there will be **1.7 billion people** who **have mobile phones** but no bank account. Of those individuals, approximately **1 billion** will also **lack access to healthcare systems.**[2]

Providing services in an **affordable and sustainable** manner for these individuals is a significant challenge. While reduced costs and advances in **network coverage** are accelerating, the underlying business models to sustain this growth are unclear.

It goes without saying that the issues of extreme poverty are highly complex and interconnected. The World Health Organization (WHO) cites inadequate healthcare financing mechanisms as one of the two biggest challenges to improving health outcomes for the poor.[3] Both mHealth and MFS are nascent industries and fragmented along multiple dimensions. While there are now well over 5 billion mobile subscribers in the world, it arguably is still at subscale in terms of the deployment of value-added services on a global basis.

As an example, mobile finance has achieved commercial scale (i.e. 1 million or more users) in less than one out of 10 deployments globally. While there has been widespread adoption in the countries of Kenya and the Philippines there are more than 100 deployments that have not reached this level of scale.[4]

Mobile Health efforts are also highly fragmented. Because of the lack of platform standardization, many providers are building discreet and independent systems from the ground up. As a result, systems are costly, inefficient, unable to achieve scale and often not interoperable.

The aim of this paper is to help reduce some of these uncertainties and reinforce dialogue on how the mobile communications platform can be leveraged to strengthen mutually positive outcomes related to both financial inclusion and health. With user-centric solutions that leverage common technologies, new efficiencies and capabilities can be created that serve to accelerate global scale.

Unlocking this potential will require the following questions to be addressed:

1. What will be the best method to drive awareness and adoption of the self-reinforcing dynamics of "wealth and health"? Who will lead these efforts?
2. How will the integration and interoperability of disparate technologies across multiple industry and public sector domains occur?
3. Who will build and manage the common

infrastructure and distribution networks?
4. How will the various points of policy coordination work across sector domains?

Synergies Between mHealth and Mobile Financial Services

At its core, the mobile communications platform reduces the time, distance and cost for delivering information. As such, providers in the healthcare and finance industries have a globally efficient, innovative and cost-effective channel for delivering new services.[5] For banks, the mobile platform creates innovative ways to deliver convenient branchless banking solutions to geographically remote areas. Once in place, these financial services enable the creation of new cost structures and "micro-sevices". Mobile-based remittances, micro-insurance and savings accounts can all be offered to those at lower socio-economic levels.

Because payments are also a vital component throughout the healthcare delivery continuum, a means to securely, reliably and cost-effectively transact is valued by both industry sectors. Along with the need to accelerate transactions, both industries have common users, digital infrastructure elements, business processes and policy concerns. Recognizing these synergies and working cross-sector, stakeholders in both industries are positioned to achieve greater impact, ultimately establishing a more robust ecosystem for servicing the needs of the poor.

Driving Demand: Mobile Financial Services Spur mHealth Adoption

Mobile financial services represent a tool that facilitates remote payments for healthcare services for those with and without bank accounts. By leveraging MFS for healthcare services, key stakeholders in the continuum of care can benefit from improvements in quality, accessibility and cost. MFS can apply to both providers of health services as well as patients.

Mobile Financial Services for Providers

Salary Disbursement: Healthcare employers can pay a healthcare worker automatically into the healthcare worker's mobile financial service account rather than paying in cash or cheque, which is both cumbersome and costly to manage.

Healthcare providers face the challenge of how to pay unbanked and remote healthcare workers in a timely and safe manner. In rural areas, healthcare workers often spend time walking to other localities to pick up cash when they are paid. The time spent on administrative tasks could be better used serving patients.

Additionally, the potential of fraud ("cash leakage") associated with salary disbursement to remote employees is greater when there is no access
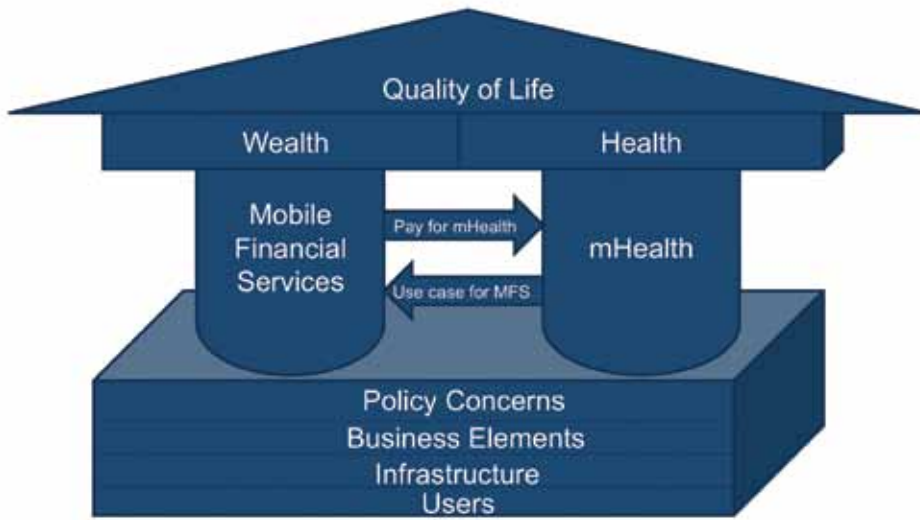
mHealth and MFS are inextricably linked by common building blocks and cross-sector dependencies
(Source: mPay Connect)

to a banking infrastructure. In Afghanistan, when mobile financial services infrastructure was implemented for salary disbursement of national police in lieu of cash, it became known that at least 10% of the payments had been going to "ghost policemen" and that middlemen were pocketing the difference. During this time, most policemen believed they received bonuses to their salaries, unaware of the fraud rampant throughout.[6]

Healthcare workers paid in cash in emerging markets experience similar issues. Even in the absence of fraud, the time and cost of cash disbursal of salaries create additional administrative costs that burden the viability and sustainability of healthcare business models.

Performance-based Funding (PBF):
Providers of performance-based funding can pay healthcare workers electronically into their mobile financial services account based on services that were performed on patients.

As performance-based funding becomes more prevalent, those organizations paying caregivers are burdened with complicated management of variable payouts to caregivers. The system quickly becomes too cumbersome to manage costs effectively, particularly if done manually

through cheque and cash. Automating the calculation and payout processes by combining mHealth data with the mobile platform creates a way to reduce the complexity and scale new capabilities.

An example of this is a public-private initiative in Tanzania, where an "SMS for Life" program was established targeting data collection to reduce pharmaceutical stock-outs for anti-malaria drugs. The programme used SMS as the method for data collection and motivated pharmaceutical supply-chain workers to submit inventory information via mobile phones.

In the absence of mobile financial services to provide payments, they motivated key personnel to participate by pushing airtime minutes as a bonus to workers for accurate data input. By combining ICT for reporting of inventory and motivating data submitters through a proto-currency of airtime, the six-month trial reduced stock-out rates from 95% to 6%.

Due to this effort, 300,000 more people were able to receive anti-malaria treatment in 150 health facilities servicing 226 villages.[7] In this example, e- and mHealth addressed the question of how to make systems more efficient, while mobile financial services addressed

the question of how to motivate people to participate.

Vouchers or Conditional Aid: Mobile financial services can be the settlement mechanism between payers and providers of healthcare services or products given to patients who use vouchers.

In the area of food dissemination, for example, mobile-enabled systems for food voucher registration, claim and settlement are used by the World Food Programme. In this system, World Food Programme workers identify and register eligible recipients for food.

Upon registration, the recipient receives a scratch card with a code, which they use to claim food at nearby retailers. To verify the transaction, the retailer submits the code into a mobile phone and receives verification from the system. When the retailer provides the food and performs the transaction, the system automatically settles the payment between the World Food Programme and the retailer by moving the money between mobile financial services accounts.

This automated system has significantly reduced the paperwork burden for all entities in the supply chain while also motivating suppliers to participate, as payment settlement occurs in minutes rather than months. Such a system can be applied to healthcare services as well.

Supply Chain Settlement and Credit:
Supply chain participants can settle payment electronically between their mobile financial service accounts. For example, this type of payment settlement can be used in the pharmaceutical supply chain to increase the speed of payment settlement. In addition, providing access to credit to buyers within the supply chain will reduce inventory stock-outs often caused by lack of funds.[8] While it remains to be seen whether implementing mobile financial services in drug supply chains can assist in reducing counterfeit drugs, what is certain is

that when drugs are identified as counterfeit, digital money trails will assist in more effectively locating criminals.

for the poor in Bangladesh, India and South Africa.[9]

In Kenya, 56% of women give birth at home, mostly due to lack of access and economic means to pay for delivery the in healthcare facilities.[12] Home birth increases maternal and natal mortality rates. Those who seek better healthcare and deliver their child in hospitals risk the fate of imprisonment if they cannot afford payment. As was noted by the Los Angeles times in 2009, an increase in cases of cash-starved public hospitals detaining patients over unpaid bills spurred outrage in Kenya.[13]

Digital Efficiencies

Digitization leads to increases in productivity and transparency and decreases in crime and human error

Productivity Gains: The use of ICT and digitization of data and processes saves time on administrative tasks in healthcare and financial services. Whether it is the cost savings associated with retrieving patient data in a timely fashion or the time saved not having to walk to a bank, the economic benefits are significant due to reduced shoe leather and opportunity costs. In addition, digitizing manual processes and data reduces errors that ultimately adversely affect productivity.

Improved Transparency: Digitization of patient medical treatments and money movement creates a level of transparency that can reduce fraud and theft by creating an auditable digital trail and reducing the number of participants in the value chain. For example, digital money facilitates direct payments from the payer to the remote recipient of payment, cutting out the middle man handling cash. This, in turn, ensures that less money is pocketed, or "leaked" during the transaction. In addition, accessing patient data directly from the source further reduces the chances of incorrect or missing healthcare information used for making diagnoses.

One provider is addressing this issue through various methods. On the logistics and access side, they are developing a maternal health clinic system of vans that can be standardized, replicated and brought to expectant, low-income urban mothers.

On the financial side, this provider is assisting families with financial planning for upcoming delivery by providing a prepaid savings account. The patients can move money into this savings account any time and anywhere using their mobile phones to trigger a money transfer using Kenya's mobile money transfer system, m-Pesa. The same account can be used to pay delivery costs to the clinic.

In another example, a hospital began to issue prepaid cards to expectant mothers, leveraging m-Pesa so patients could move funds to their prepaid savings cards.[14] At the time of hospital delivery, patients use prepaid cards to pay for their healthcare services at the hospital.

Mobile Financial Services for Patients

Mobile Pre-paid Savings: The majority of the world's population has no access to healthcare insurance. Access to mobile-based savings may assist with this issue. Patients can accrue assets in a prepaid mobile savings account to prepare for upcoming healthcare costs.

Unlike cash stored under the mattress, these accounts provide a safe, reliable place to store and accrue their assets out of harm's way. They also can establish a financial history, which can be used by financial service providers for future credit offerings.

New financial services, such as mobile-enabled savings accounts, assist patients in financial planning and saving for future healthcare needs. Serious injury and funerals are cited as the top frequent event causing financial emergency

It has also been suggested that mobile money systems like m-Pesa in Kenya may play a significant role in reducing risk: as noted by research from Georgetown University "…households who have access to m-Pesa and are near an agent point are better able to maintain the level of consumption expenditures, and in particular food consumption, in the face of negative income shocks. On the other hand, households without access to m-Pesa appear to be less able to protect themselves from such adverse events."[10]

There are also examples of mobile financial services programs with prepaid savings being tested within the context of maternal health. For example, in Kenya only 5% of the population has medical insurance. Kenyans employed in the formal sector pay for mandatory health coverage, but 11 million adults work in the informal sector with no such insurance.[11]

Mobile Micro-Insurance: In addition to savings accounts, patients can pay for micro-insurance premiums through a mobile phone and receive claims into the mobile financial services account. By taking the friction out of saving and making regular payments, opportunities are created for individuals to manage small amounts of money more effectively.

In the Philippines, the national insurer introduced SMS payments of insurance premiums on a fractionalized basis. This enabled individuals to

Maternal Health

The Case of Maternal Health

Maternal health could greatly benefit from the use of mobile financial services. Along the continuum of the 14-month cycle of healthcare, there are key points where mobile financial access could address key issues in the patient, provider or service, and HR or administrative levels of support.

Pre-Pregnancy: During the pre-pregnancy phase of care, patients can receive education on family planning, sexually transmitted diseases and other healthcare matters through their mobile phone, paying for such services through airtime top-up minutes to the mobile network operator or through MFS to the third-party provider of these services.

Pregnancy: During the pregnancy phase of care, MFS can be used for remote payment and settlement of testing, lab work and remote diagnostics. MFS can be used as the method of supply chain payments for prenatal vitamins. In the future, healthcare providers may use MFS to pay for remote access to a pregnant mother's electronic healthcare records. Patients can receive conditional cash transfers for participating in healthcare services offered to pregnant mothers and healthcare workers can receive performance-based funding for successfully completing various healthcare services for the patient. For those pregnant mothers without insurance, prepaid savings accounts can be offered in preparation for upcoming delivery expenses.

Birth: MFS can be used for direct payment, co-payment or for third-party settlement of all healthcare services associated with birth, from ambulatory transport to hospital care.

Post-Natal: Voucher-based or direct mobile payments can be triggered via mobile for services associated with post-natal care, such as infant immunizations. In the case of voucher payments, a mother could sign up for post-natal services and receive a scratch card or identification code which she could then present to the immunization clinic. That clinic would send that code using their mHealth application to the provider for verification. If the code is verified, the clinic would provide the services and receive immediate payment by the third-party payer for the performed service through the mobile financial services system.

pay smaller amounts of money on a weekly/monthly basis, rather than larger payments on a quarterly or half-yearly basis. With lower costs and greater convenience, participation rates increased.

In Bangladesh, health micro-insurance is provided to poor patients who pay yearly premiums. Co-payments are made by the patients upon visits to health centres. MFS can be used in the future in lieu of cash for these payments. Using a mobile phone for insurance payments

and payouts significantly reduces the administrative costs associated with providing insurance to these customers.

Conditional Cash Transfers: Patients can receive conditional cash transfers instantly and electronically into their mobile financial services account. Fast, safe and efficient payment motivates patients to participate in the healthcare system.

Future Uses of Mobile Financial Services for mHealth

As mHealth continues to gain momentum and more advanced remote services are offered, electronic payments will be needed to support these services. Today, there are one- and two-way communications and information-based mHealth services in emerging markets, such as health hotlines.

These services are often free of charge or rely on de facto airtime top-up systems as the method of payment whereby a payer purchases additional airtime minutes to pay for the mHealth service or receives payment through airtime minutes.

This system works well for low-value purchases (equivalent of one rupee per day). However, as the mHealth industry matures in these markets and the services offered become more sophisticated, the value of the services will increase such that one rupee payments through airtime will not suffice. At the point, mobile financial services and more robust third-party settlement systems will be required to enable payment.[15]

For example, in the future, as patients begin to receive diagnostic care through decision support systems enabled through a mobile phone, how will payment be made between the user and provider? Similarly, if a field healthcare worker requests expert clinical diagnostics through the mobile phone, how will payment of that service be made? Neither cash nor banking systems can support remote money movement of unbanked people. Mobile financial services will be the method to enable and settle these types of mHealth transactional payments.

Driving Demand: mHealth spurs Mobile Financial Services

Still in the early stages of development, there are a number of uncertainties on the business models of mobile finance services. With more than 164 MFS initiatives deployed worldwide,

Drive Up the mHealth Value Stack
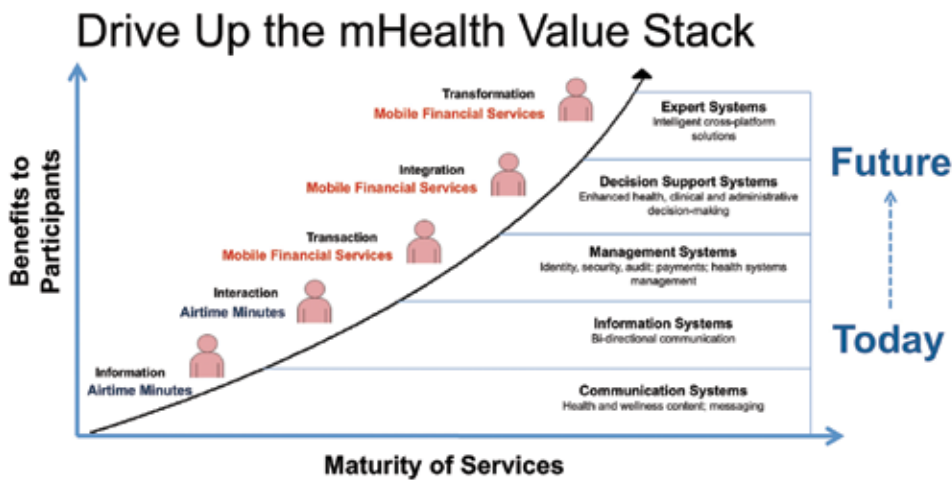
Uses of MFS for future mHealth applications (Source: mHealth Alliance and mPay Connect)

only 10 have achieved a subscriber-base of more than 1 million users.[16] As such, there is a widely recognized need for a strong use case to spur adoption and unlock greater capital flows.

As one of the most important industries globally, health services may spur mobile money adoption in markets with lagging mobile financial services uptake.

To motivate new users, enterprises and governments to adopt a payment system, there must be significant value and a compelling reason to change. Receiving money is a motivator to sign up for a system. Payers sending the money become the "influencers" in the system, virally signing up receivers of payments. Key stakeholders in the healthcare industry can act as the influencers that spur sign-up and usage of the mobile financial services system by using it for salary disbursements, performance-based funding, conditional cash transfers and conditional aid.

Sharing Common Building Blocks

Both the finance and health sectors share common customers, infrastructure, business processes and policy concerns. These shared elements, if addressed in an integrated and holistic manner, can serve to reduce inefficiencies and costs.

The Same End-users

In terms of serving their end-users at the base of the pyramid, the mHealth and mobile finance sectors have overlapping constituencies. As such, there are potential cross-sector efficiency gains in better understanding customer needs.

There is surprisingly little known about the complex needs of the poor, although they represent approximately 40% of the world population. According to The Portfolios of the Poor, "Large surveys give snapshots of living conditions. They help analysts count the number of poor people worldwide and measure what they typically consume during a year. But they offer limited insight into how the poor actually live their lives week by week – how they create strategies, weigh trade-offs and seize opportunities."[17]

The nuances surrounding culture, socio-economic status, access and literacy are complex and can only be appreciated at the personal and community level. Those who interact with end-users in the field have a wealth of understanding that is required for service providers to adequately tailor services to meet the needs of their end-users.

Better information sharing creates a richer understanding of the individual (Source: mPay Connect)

Common Building Blocks: Technology Infrastructure

As ICT-based solutions, mHealth and mobile financial services share a number of common infrastructure elements that can be leveraged. By sharing a common underlying technology platform, not only do both sectors save on operational expenses, but the ability of their systems to scale and handle additional complexity is extended.

Front-end Efficiencies: Given that both financial and health systems leverage the mobile handset, the usability, accessibility and

Some of the key questions on end-users include:

- What are the differences between rural and urban dwellers in the region?
- What are the degrees of health clinic and bank access?
- Who are the influencers in the community who can spur adoption?
- What are the financial and health literacy levels of the end-users?
- What role does gender play in mobile access and use of such services?

Collectively, the financial services, communications and health sectors have a common opportunity to develop a richer understanding of their end-users. From a digital perspective, analytics on the data (and metadata) generated in the use of these services can help stakeholders within the mHealth and MFS ecosystem to better understand individuals, their needs, and behaviours.

Of course, the principles and trust frameworks for the sharing and usage of personal data must be addressed by all stakeholders. It will be critical to understand and agree upon what aspects of data can be shared for optimizing health and financial services while also maintaining customer rights and the security/stability of financial and health delivery systems.

The Efficiencies of User Centricity

As patterns of behaviour and needs of the poor become better known within communities, both MFS and mHealth benefit from cross-sector knowledge to build better services that tailor to their needs. For example, a microfinance institution that provides micro-credit for Raina Kapur understands that she is an influencer in her community, works many hours on her business, and has a strong track record of micro-credit repayment. Her mobile operator knows that she is a heavy user of SMS and uses her phone frequently, but may not know that her phone is used to conduct her entrepreneurial endeavours that are financed through her MFI.

At the same time, her healthcare worker knows she is pregnant and is prescribed with prenatal vitamins. A holistic snapshot of Raina could reveal that she is an ideal candidate for mobile financial services for healthcare since she is mobile-savvy, needs to plan for upcoming delivery costs through a prepaid savings account, has a strong financial history of micro-credit repayment, is a time-constrained entrepreneur and needs an easy and safe method to purchase her vitamins. Because she is an influencer in her community, she may also help others to adopt MFS and mHealth services.

Access to additional cross-sector data can assist with profiling customers for credit and reducing insurance risk. Some firms are now investigating new modelling techniques of mobile usage to help determine credit worthiness for segments of the population with no credit histories. If mobile usage could be an indicator, could healthcare patterns be as well? Could a consistent pattern of healthcare usage combined with steady usage of money transfers suggest a lifestyle that should have access to premium insurance and credit?

In addition, combining mHealth data collected in the field through the mobile phone can provide more robust actuarial data for determining insurance risk. The benefits of better actuarial data provide for more efficient forecasting for design of benefits, reimbursements and government-proposed standards on healthcare costs. Of course, defining customer rights and establishing frameworks around data privacy will be vital to these efforts.

reliability of applications is vital to ensure adoption. Both sectors are impacted by the user's preferred mobile user interface, their understanding of the device, the affordability of the mobile phone service (device, data and voice network, and tariff structure) and the accessibility to a reliable electricity grid for recharging phones.

Back-end Platforms: There are commonalities in the back-end requirements for mHealth and MFS systems. Both e- and mHealth and mobile financial service rely on ID management, authentication, fraud detection and security for their platforms. By understanding common requirements between mHealth and MFS, back-end systems can be built to leverage these common building blocks. Standardizing these common areas at the platform level will enable cross-industry cost savings and the possibility for easier integration among service providers within and between both industries in the future.

The historical lack of electronic healthcare management systems and financial services infrastructure in many emerging markets may provide a possible advantage when creating cross-sector platforms rather than integrating legacy systems. This will enable superior cost benefits, decreased time to commercialize and better ability to integrate MFS with healthcare payments throughout the continuum of care.[18] Donors and governments have the potential to play an important role in bringing together the key stakeholders to define a common technology framework that can benefit all relevant stakeholders.

ID management is one example of an element in the technology platform that can be leveraged by multiple entities.

As various entities deliver services to the same individual, each organization faces the challenging questions regarding identity, including:

1. How does one ensure that this person exists?

Example: ID Management (Source: mPay Connect)

2. How does one authenticate and ensure that the person is who they say they are?
3. How does one verify that it was really the person stated who received treatment at clinic X?
4. How does one ensure that the insurance firm, the payment settlement system and medical clinic all recognize the same person as the same individual and that co-payment is made accordingly?
5. How does one ensure there are not redundant, fraudulent or misspelled data entries of the person's name in the mHealth and MFS systems?

For the delivery of personalized services, the secure, reliable and confidential validation, authentication and management of identity systems is critical. Absent these core enablers, the opportunity for error, corruption and fraud is rampant. For example, a recent survey done by the Food and Supplies department of Delhi government on ration cards revealed that, in the absence of a robust ID system, over 1.7 million ration cards were being issued to bogus individuals. In fact, they found 901 different records for the same name and address.[19]

An open issue for discussion, however, is if one common ID system is needed. The role of shared trust frameworks that provide different actors the ability to provide different levels of authentication and control for different classes

of activities is a growing area of focus.

Common Building Blocks: Similar Business Operations and Business Model Elements

Both sectors gain advantages by leveraging common business operations. In addition to the cost savings associated with sharing operations and infrastructure, both industries may benefit from pricing that takes into account the needs of both.

Business Operations – "Last Mile" Human Agent Network: In providing services to the poor, both industries still require "last mile", in-person relationships to reach their customers. Often referred to as agent networks for telecommunications operators or community health workers for mHealth, they have a high degree of local knowledge and the trust of the community. Along with providing feedback and insights for tailoring the design of appropriate and affordable services, these individuals can act as the liaisons to educate, train and register users for services.

In some cases, these trusted agents perform the mobile functions on behalf of the customer, who may not have the level of literacy to be able to complete the task themselves. In addition, they perform certain in-person services. For instance, in the absence of extremely expensive

ATMs, mobile network operator (MNO) agents act as "human ATMs", taking cash-in and disbursing cash-out of the MFS system.

Microfinance institutions use their agent networks to disburse and collect microfinance loans. In mHealth, community healthcare workers and traditional healers provide healthcare screening to patients.

Business Model: Both mHealth and MFS share common concerns regarding business issues on revenue models, cost structures, sustainability and scale. In serving the lower socio-economic sectors, service providers are still challenged to achieve sustainable business models. What is the pricing structure and who pays for services for people earning less than US$ 2/day? Individually a new venture in mHealth or MFS can be custom built and achieve some level of profitability. But scaling these individual pilots on a global basis remains a long-term challenge.

For service providers that are not facility-based mobile network operators, how do the various fees and tariffs associated with voice, text and data affect end-user adoption rates? Developing a balanced pricing structure so the fees imposed by the incumbent industry do not constrain others is an open issue and a constraint on achieving scale.

Both in mHealth and in MFS, the question of who leads is non-trivial. In healthcare, who should maintain and host the electronic healthcare record is difficult to answer and may be determined in part by evolving policy on who "owns" the health record (and can move its location/hosting) and who determines who has access to the record.

Similarly, who leads in MFS varies from one market to the next. In the case of MFS, regulatory policies are being developed to clarify the role that financial institutions and mobile operators can play in rolling out such services. In different markets, varying business models

Efficiency gains in cross-sector agent operations: Given that both mHealth and MFS require field personnel to interact with the same user base, there are opportunities to identify common or redundant tasks that can be done by a shared resource. For example, the functions of signing up users, checking their ID and registering the mobile numbers[19] may be points of redundancy that can be done by one rather than two or three separate agent networks. In addition, there may be opportunities to do cross-sector training with these agents to educate them on the various mHealth and MFS services.

Healthcare workers could augment their income by providing cash-in and cash-out services where appropriate. Organizations are now beginning to test this concept. In India, there are examples where healthcare workers act both as a healthcare liaison and as the registrant for micro-insurance services using a handheld device.

Efficiency gains in business models: Both MFS and mHealth are inherently dependent on affordable pricing. Naturally, this can either have a positive or negative effect on adoption. Pricing may be effective for person-to-person money transfers but ineffective for delivering mHealth. For example, if the end-user fees for transferring money exceed the price for receiving a particular mHealth service, the value breaks down.
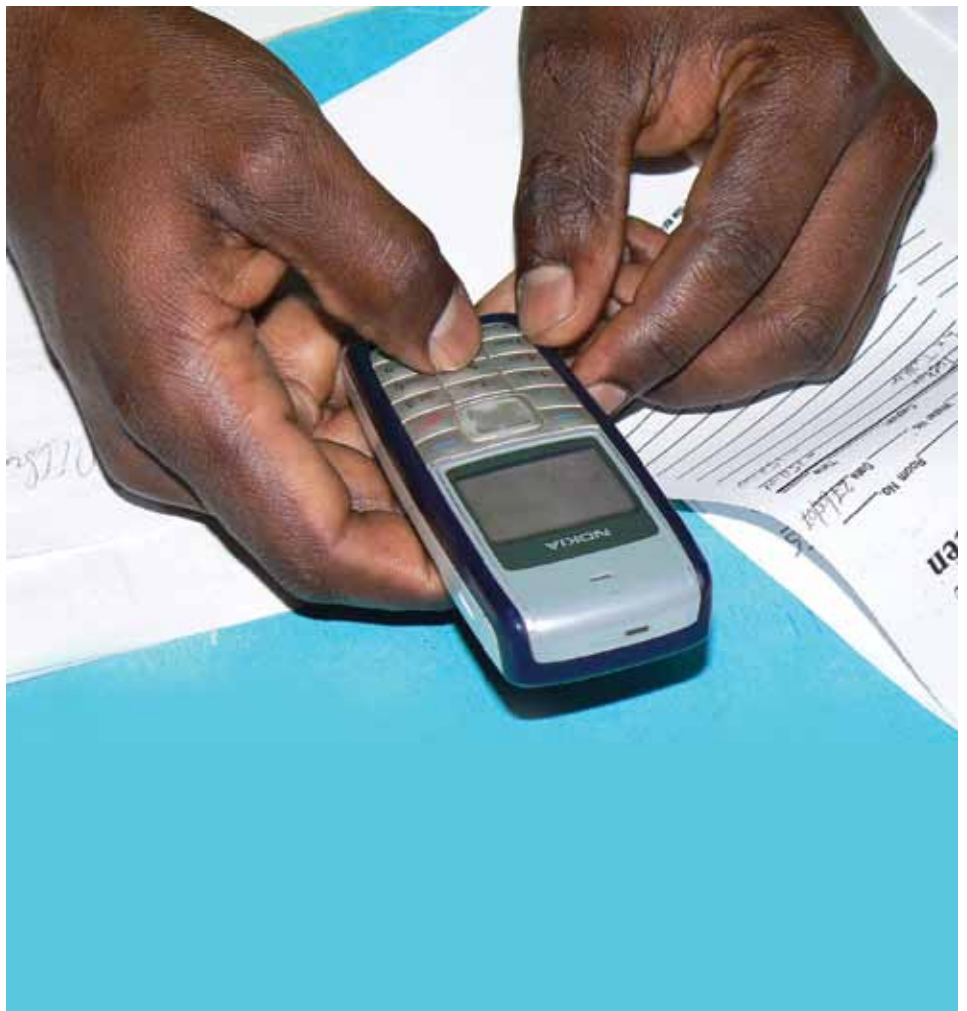
will ultimately prevail based on regulatory policy guidance, motivations and concerns.

Common Building Blocks: Similar Policy Concerns

As innovative technology-based services, both mHealth and MFS benefit from policy and regulatory frameworks that promote incentives for competition, investment and innovation on a cross-sector basis. Overregulation typically constrains large-scale investment and innovation. While there are no one-size-fits-all solutions, it is important to recognize the value of shared learnings for helping policy-makers arrive at solutions which meet their unique needs.

The traditional, siloed approach to policy-making by different ministries may not only hinder, but actually reverse intended goals. For example, in South Africa in 2004, the Ministry of Finance, in an effort to increase financial access within the country, instituted a proportional regulatory policy to account registration. The circular relaxed the documentation needed to open low-transaction volume (mobile money) accounts.

As a result, the large numbers of the population without a formal address were able to register for financial accounts for the first time. However, the ministry involved with telecommunications, in response to increased mobile-triggered bomb threats, passed a 2009 amendment targeting electronic data interception with increased document requirements for any mobile network operator or mobile phone distributor providing SIM or mobile phones. The lack of inter-agency coordination, in this instance, led to a reversal of momentum intended to increase financial access through mobile financial services for the poor and led one mobile network operator to cease efforts in registering new customers. What arm of government ultimately makes decisions in cross-sector matters? Furthermore, the level of interdisciplinary knowledge required to enact meaningful policies is greater than in the past, and challenges regulators who have deep

knowledge in their own realm, but not in other domains. Legacy policy frameworks, lack of knowledge cross-sector and limited flexibility can be immense systemic constraints in policy-making.

Who is liable in cross-sector industries? Both MFS and mHealth are faced with challenges regarding the liability of actors within the value chain. Mobile network operators (MNOs), healthcare service providers, e-money

Key Stakeholders
Key Stakeholders in mHealth and MFS

mHealth and MFS have a number of ecosystem constituents, which include policy-makers, large corporations, donor communities and agent networks.

Policy-Makers: Core concerns to policy-makers for mHealth and MFS involve the degree of regulatory policy to enact to ensure adequate safeguards for health and finance without stifling innovation and free market competition.

Constituent parties involved include ministries associated with:
- **Communications:** Focused on broadband data, data encryption, security (networks, devices, adoption and utilization), privacy and reliability of networks
- **Central Bank:** Focused on money supplies, banking regulations, consumer privacy, money laundering and terrorism financing concerns, and electronic money transfer regulations
- **Health:** Focused on enabling ubiquitous, affordable access to healthcare based on population needs assessment and consumer healthcare information privacy

Private Sector Large Corporations:
- **Mobile Network Operators (MNOs)** seek to launch value-added services to bolster revenues and reduce churn in their customer bases. From one market to the next, MNOs will have very different perspectives on their role in offering value-added services as simply a distributor of such services to full ownership of the value chain associated with that service. What constitutes competitive advantage is quite different from one operator to the next and one region to the next.
- **Companies in Health Services** seek to leverage mHealth and MFS as enablers to their existing health services businesses. Pharmaceutical companies, for example, want to enable traceability of drugs in the supply chain to minimize fraud and counterfeiting while also seeking efficient and low-cost payments settlement to bolster return on investment. Insurance companies view mHealth as a method for superior data collection and dissemination to increase healthcare success and reduce risk of illness while MFS is used for efficient and low-cost payment settlement with providers of healthcare in the field. Healthcare providers seek to provide the highest quality healthcare ubiquitously. In doing so, they seek the ability to leverage ICT remotely for information sharing for services and to motivate healthcare workers and patients to participate in the system through programmes such as conditional cash transfers. They further try to reduce administrative resource burdens by leveraging ICT.
- **Mobile Money Providers** are third-parties, mobile operators, or financial institutions that provide mobile financial services to mobile subscribers. Typically, the success of such systems relies on network effect and achieving significant scale. Large corpora-

Key Stakeholders (continued)

tions are well capitalized to drive such efforts, although innovation is often stymied by the size of the organization. Start-ups often move at the fastest pace to drive innovation, but lack the resources to achieve scale quickly. Banks look to participate in the growing market of "banking the unbanked" by acting as the wholesale holder of aggregate funds or a retail partner to mobile network operators or other third party providers in reaching unbanked segments. Various models are being tested around acquisition, partnership and joint ventures among these various constituents to bring MFS to market.

Donor Communities: *Donors provide grants for mHealth and MFS programmes that enable access to critical health and financial services for the poor. By supporting efforts to pilot and commercialize mHealth and MFS initiatives, donors strive to achieve their missions, whether the missions involve increasing the health or financial quality of life for the poor.*

Health Service Agents (Community Healthcare Workers and Traditional Healers): *mHealth provides access to expert advice for community healthcare workers and enables them to efficiently transmit critical aggregate data back to centralized facilities for analysis. MFS enables healthcare workers to received prompt payment for salary and services performed while reducing "leakage" associated with fraud due to lack of traceability of cash.*

Mobile Financial Services Agents (MNO Agents, MFI Agents and Others): *Independent airtime top-up agents are often the points for cash-in and cash-out of mobile financial services systems driven by mobile operators. MFI community workers, retailers, remittance operators and post office workers are other forms of agents that can reach rural communities and act as cash-in and cash-out points. These agents are motivated by the commissions they receive for exchanging cash into digital mobile money and vice versa.*

issuers and banks all have distinct areas of competence.

However, the boundaries distinguishing where one service begins and the other ends has become murky. A few key uncertainties in this area include:

- If financial or medical SMS messages are not received, is the mobile network operator liable for the adverse consequences?
- Does an application on a mobile phone also require device certification?
- Can a mobile network operator be held liable for malpractice in the event of a security breach?

The digitization of healthcare and financial services also leads to questions of data access

and consumer protections. A richer understanding of who has rights to access and share such information, the types of data that can be analyzed and the policies governing customer rights are in their nascent stages.

Proportionality: A Conceptual Framework for Managing the Risks and Complexities of Innovation. As MFS and mHealth sectors begin to tackle questions of proportional customer documentation, liability within complex ecosystems and customer protections, these policies should support one another. As such, it will become increasingly important for regulatory bodies to be knowledgeable of how their counterparts have tackled similar issues.

For example, in MFS, a common practice is to treat risks with proportional regulatory policies around customer documentation at registration. Accounts with lower transaction volume limits, perceived as lower risk for money laundering and terrorism financing, may require relaxed data requirements on the user for account registration. Such proportionality could apply to healthcare services and the level of requirements imposed on service providers based on the established criticality of care to be provided.

In addition, it may become important to consider the possibility of organizational alignment with policy decision-making that is horizontal in nature, cutting across multiple sectors rather than vertically-focused within one industry. Without a doubt, the level of coordination, knowledge transfer and collaboration among disparate policy-making entities will be increasingly crucial.

Conclusion and Next Steps

This paper set out to identify synergies between the financial services and health industries as a way to improve the health and wealth of the poor. By understanding the interdependences among mHealth and mobile financial services, cross-sector efficiencies, innovative delivery options and increased end-user adoption were some of the key benefits. Scaling together, the socio-economic benefits amplify one another.

Going forward, it will be critical to address the following key questions to realize the synergies between the evolving mHealth and mobile financial service ecosystems:
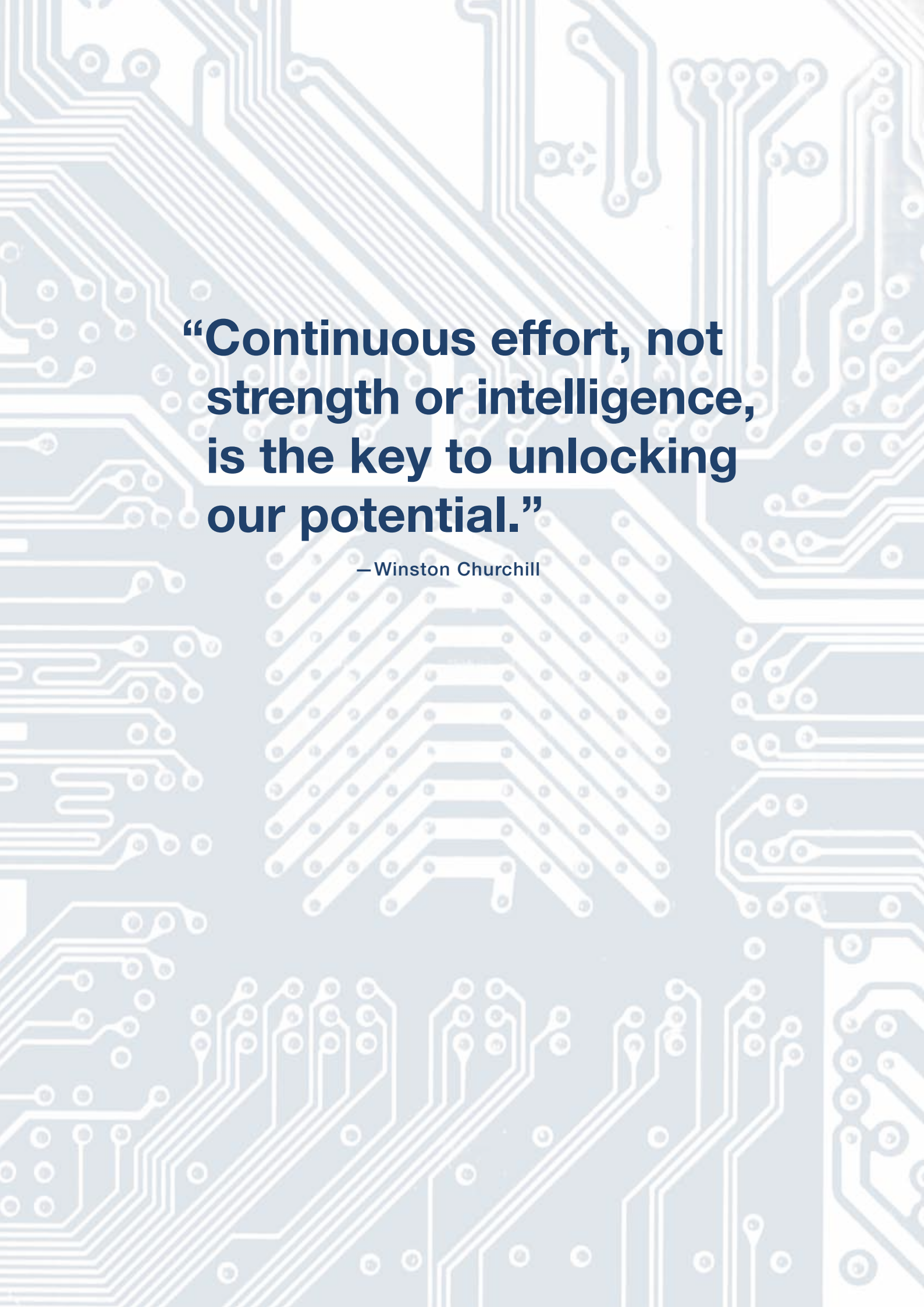
1. What is the best method to drive these efficiency gains? Who will lead these efforts?
2. Who will build and manage the common infrastructure and distribution networks?
3. How will the various cross-sector policy frameworks be coordinated and harmonized?
4. How will integration and interoperability of disparate technologies across multiple industry and public sector domains occur? How will these efforts be driven? What will

be the policies regarding customer data privacy rights?

If key stakeholders within the mHealth and MFS sectors work together to take advantage of the efficiencies and innovations that can be created with a balanced ecosystem, we will advance one step towards realizing the vision of "curing the world's poor for less than a dollar a day." [20]
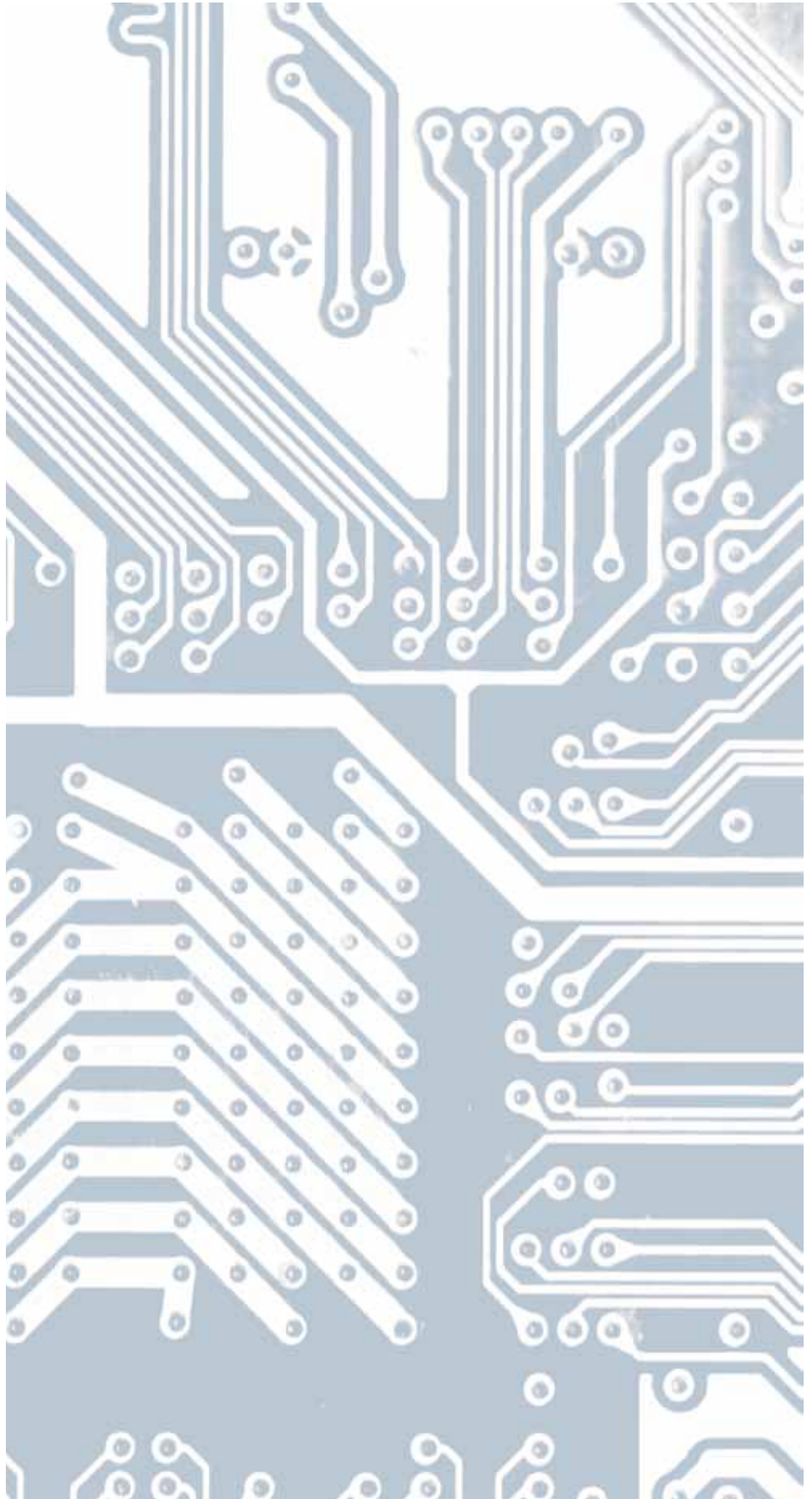
"Continuous effort, not strength or intelligence, is the key to unlocking our potential."

—Winston Churchill

1 "…1.5 billion people worldwide live without access to electricity and many more whose energy services are either sporadic or cost-prohibitive," New York Times, "World Bank Pressured on Clean Energy," 11 October 2010.

2 CGAP, "Health Issues," Anup Shah, 2 October 2010.

3 "Strategy on Health Care Financing for Countries of the Western Pacific and South-East Asia Regions (2006–2010)," World Health Organization.

4 GSM Association, Mobile Money Deployment Tracker, 2010.

5 "Mobile penetration rates are forecast to rise from 46% in 2008 to 95% by 2013 according to a new survey of 34 emerging market countries," Tariff Consultancy Ltd. By 2013 there will be well over five billion mobile phones glob ally. In contrast, there will be only 2 billion computers. "CGAP Banking on Mobiles: Why, How, and For Whom?" CGAP October, 2008.

6 "M-Paisa: Ending Afghan Corruption, One Text at a Time," Monty Munford, 17 October 2010.

7 Vodafone interview.

8 Drug counterfeiting is a particularly serious issue in the pharmaceutical industry. Mobile systems such as Sproxil are now being used to identify counterfeit drugs by enabling supply chain participants and patients to send a text message through their mobile phone that contains the code on the drug packaging for verification of authenticity. To the extent that payments are made electronically rather than in cash, combining systems like Sproxil with mobile financial service payments provides the ability to pinpoint who paid, who purchased, and where counterfeiting issues may have arisen throughout the supply chain.

9 Portfolios of the Poor, Daryl Collins, Jonathan Morduch, Stuart Rutherford, Orlanda Ruthven.

10 "m-Pesa Marches on," on Financial Access Initiative by Jake Kendall, 28 October 2010.

11 "Kenya: Medical Smart Card Extended to Maternal Care," Susan Anyangu-Amu, 15 August 2010.

12 Ibid.

13 "In Kenya, Patients held hostage to Medical Bills," Los Angeles Times, 28 June 2009.

14 "Kenya: Medical Smart Card Extended to Maternal Care" by Susan Anyangu-Amu, 15 August 2010.

15 Note: It is also important to understand that airtime minutes is not currently recognized as a true currency and, therefore, has significant regulatory limitations as the de facto method of payment beyond certain uses.

16 GSMA Development Fund Mobile Money Tracker, December 2010.

17 Portfolios of the Poor, Daryl Collins, Jonathan Morduch, Stuart Rutherford, Orlanda Ruthven.

18 Note that one area specific to e-/and mHealth in the platform function that is not directly addressed in MFS is Access Control due to the different levels of data rights and constituents associated with access to health care records.

19 "Ration card scam: Govt probe to gun for PDS mafia," Express News Service Posted: 9 July 2008.

20 "Narayana Hrudayala Heart Hospital: Cardiac Care for the Poor," Tarun Khanna, V. Kasturi Rangan, and Merlina Manocaran. Harvard Business Review, 25 April 2006.