Mobile Applications for Agriculture and Rural Development

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Foreword

The dynamic growth of mobile communications technology is creating opportunities for economic growth, social empowerment, and grassroots innovation in developing countries. One of the areas with the greatest potential impact is in the contribution that mobile applications can make to agricultural and rural development (ARD), by providing access to information, markets, and services to millions of rural inhabitants. For both agricultural supply and demand, mobile phones can reduce waste, make delivery more efficient, and forge closer links between farmers and consumers.

This report provides policymakers and development practitioners with a guide that facilitates the development and deployment of mobile applications for ARD. It also informs their understanding of the key drivers for promoting such applications and services in their countries.

The report reviews country examples and extracts policy lessons and good practices. It also presents detailed studies of cases from Kenya, Philippines, and Sri Lanka, as well as summarizes 92 case studies from Africa, Asia, and Latin America (available at http://www.worldbank.org/ict/m-ard). The goal is to provide a comprehensive understanding of the development impact, ecosystem, and business models for mobile applications in ARD. The report is intended to complement the recent ICT in Agriculture eSourcebook (available at http://www.ictinagriculture.org).

It is our hope that this volume will help ARD policymakers and development practitioners more effectively harness mobile applications to generate economic and social opportunities with lasting impacts.

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Abbreviations

2G	Second generation (mobile communications)
3G	Third generation (mobile communications)
4G	Fourth generation (mobile communications)
API	Application Programming Interface
B2B	Business to Business
CSR	Corporate Social Responsibility
DFID	Department for International Development
EDGE	Enhanced Data rates for GSM Evolution
FMCG	Fast Moving Consumer Goods
GGS	Govi Gnana Seva
ICT	Information and Communication Technology
ICTA	Information and Communication Technology Agency
IFC	International Finance Corporation
IKSL	IFFCO Kisan Sanchar Ltd
KACE	Kenya Agriculture Commodities Exchange
KTDA	Kenya Tea Production Authority
LTE	3GPP Long Term Evolution
m-apps	Mobile applications
m-ARD apps	Mobile Applications for Agriculture and Rural Development
m-money	Mobile Money
NGO	Nongovernmental Organization
NHS	National Healthcare System
OECD	Organisation for Economic Co-operation and Development
OLT	Ovi Life Tools
PE/VC	Private Equity/Venture Capital
PPP	Private-Public Partnership
PWC	PricewaterhouseCoopers
RFP	Request for Proposal
RML	Reuters Market Light
SME	Small and medium-size Enterprise
SMS	Short Message Service
SWORB	Strengths, Weakness, Opportunities, Risks, Benefits
TOR	Terms of Reference
USF	Universal Service Fund
USSD	Unstructured Supplementary Service Data

Executive Summary

Mobile communications technology has quickly become the world's most common way of transmitting voice, data, and services in the developing world. Given this dramatic change, mobile applications (m-apps) in general and mobile applications for agricultural and rural development (m-ARD apps) in particular hold significant potential for advancing development. They could provide the most affordable ways for millions of people to access information, markets, finance, and governance systems previously unavailable to them.

M-apps are software designed to take advantage of mobile technology and can be developed for technology besides mobile phones. But mobile phones have many key advantages: affordability, wide ownership, voice communications, and instant and convenient service delivery. As a result, there has been a global explosion in the number of m-apps, facilitated by the rapid evolution of mobile networks and by the increasing functions and falling prices of mobile handsets. M-apps are markedly different in developing countries because they typically run on second-generation (2G) phones rather than smartphones, which are far more common in developed countries.

Though there have been many studies on the mobile revolution, there is a lack of systematic trend analyses, in-depth case studies, and assessments of experiences with m-ARD apps in developing countries. Thus this report examines their development impact, ecosystems, and business models to provide an analytical framework for policymakers and development practitioners. The framework is designed to help them understand how these applications can be used to improve services for rural residents in these countries and support enabling environments for innovative m-ARD apps.

The report summarizes a study of 92 m-ARD apps in Africa, Asia, and Latin America and the Caribbean (Annex F; detailed information sheets for each app are available at http://www.worldbank.org/ict/m-ard). It also presents the findings of 15 detailed case studies of such apps in Kenya, the Philippines, and Sri Lanka (Annexes G, H, and I). This type of report faces several challenges. M-apps are evolving rapidly, with innovative new ones entering the market daily and several large institutional players—such as mobile network operators—competing for market share. Moreover, m-ARD apps are relatively new, and many have not been around long enough to properly assess their success.

Development Impact

Most m-ARD apps focus on improving agriculture supply chain integration and have a wide range of functions, such as providing market information, increasing access to extension services, and facilitating market links. Users are also diverse, including farmers, produce buyers, cooperatives, input suppliers, content providers, and other stakeholders who demand useful,

affordable services. These supply chain integration applications could provide significant economic and social benefits—among them, creating jobs, adding value, reducing product losses, and making developing countries more globally competitive. But the potential development impact of m-ARD apps mainly lies in their ability to provide access to useful, relevant information and services (Figure 1).

Figure 1: Results Generated by Mobile Applications for Agricultural and Rural Development

Category	Service	Result	Outcome
Better access to information	Market information →	Higher prices, produce in greater demand	Higher incomes for small farmers
	Climate and disease information →	Better disaster and risk management	
Better access to extension services	Good agricultural practices →	Higher-yield production	
	Extension services →	More accurate assessments of pasture health	Lower transaction, logistical, and distribution costs for input suppliers
Better market links and distribution networks	Direct links between farmers, suppliers, and buyers →	Less exploitation by middlemen	
		More efficient distribution chains	
	Better recording, accounting, and traceability →	Increased efficiency and predictability	Improved traceability and quality standards for buyers
		Reduced administrative costs	
		Reduced fraud	
Better access to finance	Credit		New opportunities for financial institutions
	Insurance →	Higher yields, more diverse production, fewer losses	
	Payment methods		

Source: Authors' Analysis.

Quantitatively, the most widely used m-ARD apps provide access to valuable information—a crucial function because asymmetrical access to information is a weakness of rural markets in developing countries. Kenyan farmers who use the app DrumNet, for example, have seen their incomes rise by a third due to the service's comprehensive system of price negotiation, contracting, and other value chain support.

M-ARD apps also provide farmers and rural residents with timely access to extension services, such as advice on agricultural production, marketing, and technology, food security, and nutrition. Sri Lanka's e-Dairy helps farmers earn up to $262 more a year for each of their calves by providing veterinary and extension services delivered by mobile phones. Such applications also strengthen market links when used to improve production distribution and traceability. Tea growers in Kenya have reported average income growth of 9 percent—about $300 a year—by using Virtual City's production measuring, recording, and traceability functions.

In addition, m-ARD apps have expanded access to finance and insurance products in rural areas. Applications like M-PESA in Kenya and SMART Money and G-Cash in the Philippines have gained acceptance as safe, easy ways to receive payments and store money. Also in Kenya, users of Kilimo Salama's agricultural insurance products have seen their production increase by an average of more than 50 percent, or about $150 a year.

M-ARD apps also have significant qualitative impact, though such benefits are harder to assess objectively and largely depend on the local context. For example, Ushahidi—developed in Kenya and now used in other countries—uses a crowdsourcing approach to increase government transparency, provide information about domestic events (including social unrest), and support timely interventions in disaster-hit areas, such as in in Haiti after its disastrous 2010 earthquake.

Application Ecosystems

This report uses James Moore's (1996) revised definition of ecosystems: economic communities based on interacting organizations and individuals. The report identifies a wide range of players in the ecosystem for m-ARD apps, such as mobile network operators, m-app providers, content providers, and various types of users. Each player's assets, abilities, and incentives are described in Annex D.

M-ARD app ecosystems in developing countries are fragile and need support from policymakers and development practitioners. There are marked differences between the m-ARD app ecosystems of developed and developing countries, especially in terms of the differing influences of key players, existence and sophistication of m-ARD app platforms, and need for hyper-local services and support systems.

Roles and influence of key players
Mobile network operators dominate the m-ARD apps ecosystem in developing countries. They serve as gatekeepers, deciding which m-apps are allowed in their systems and dictating how revenues from the apps are shared. Kenya's Safaricom, for example, charges users up to 85 percent of the revenue from m-app transactions. In contrast, m-app providers in developed countries can choose whether to sell their apps through Apple's App Store or Google's Android

Market—or both—and receive much larger shares of the revenue. For example, m-app providers on Apple's App Store receive 70 percent on both app sales and transactions; final shares on the Android Market have not been established.

In developing countries, government departments are likely to be key content providers. Some governments, such as Kenya's, are following the lead of developed country governments by making data publicly available that can be used innovatively by m-ARD app providers.

In some developing countries, governments are the only viable source of data for m-ARD app providers due to a lack of commercial information providers. But such data can be unreliable or collected irregularly. Some m-ARD app providers have created market research units to provide users with valuable information. In India Reuters Market Light (RML) has established teams that monitor commodity prices in local markets.

Users of m-ARD apps include a wide variety of groups. Unlike in the developed world, users in the developing world demand hyper-local content. For example, agricultural prices must be sourced from local and regional markets so that farmers can compare prices and decide where to sell their produce.

There is also a burgeoning movement to collect information about users through innovative m-apps such as Kenya's Jana (formerly txteagle). This information can be used to provide users with better, more useful, and more relevant information. Content providers have also been innovative in their use of media and crowdsourcing to support their operations. Kenya's KACE provides information to commercial radio stations to complement its m-ARD app, and Ushahidi uses crowdsourcing to collect information of relevance to users.

Platforms
Platforms—that is, app stores—are the most important m-apps innovation in developed countries because they offer an operator-neutral platform that promotes innovation, encourage uniform application development standards, and provide a large pool of potential customers who are already connected. Platforms are even more important for m-apps in developing countries because they can offer a payment mechanism for users through mobile network operators (as with M-PESA). This mechanism removes a critical obstacle for m-app providers and users in the absence of other types of payment systems.

Platforms can also facilitate transactions between consumers and companies or institutions that see opportunities to market their products to rural consumers. Examples include banks, microinsurance companies, agricultural cooperatives, and suppliers and distributors of fast-moving consumer goods. All these platform features can generate faster and higher returns for m-app providers.

Nokia's Ovi Life Tools (OLT) is a highly promising platform for m-ARD app providers. For example, operator billing through OLT is available in 42 countries. In addition, the platform is geared toward narrowband, affordable m-apps. OLT has a large user base in many large developing countries, including China, India, and Indonesia.

An alternative platform, still in its beta phase, is BlueVia from Spain's Telefonica. Thus it was developed by a mobile network operator instead of an operator-neutral handset manufacturer or mobile operating system developer. BlueVia is similar to OLT in terms of platform functions, but m-app providers only have access to Telefonica subscribers because the platform is not integrated with competing mobile network operators.

Hyper-local services and support
Information provided by m-ARD apps must be highly localized to be of value to rural users in developing countries. For example, farmers attach much higher value to RML's services in India than those provided by IFFCO Kisan Sanchar because RML's information is much more relevant to their needs. But collecting hyper-local information is costly. Again, governments could support the development of m-ARD apps that provide such information by making government data public.

Because consumer education and literacy are usually low in rural areas, local support for m-apps is a critical driver of their adoption and an integral cost of marketing them. Uganda's Grameen Community Knowledge Worker Initiative used literate, village-based intermediaries to provide support and information to poor residents—an approach considered essential to its success.

Business Models

Business models are the systems that organizations use to create, deliver, and capture value. This report defines the concept of value for commercial m-ARD apps as their ability to earn enough profits to operate for at least the next two years. For noncommercial m-apps the concept is defined as providing nonmonetary benefits greater than the costs of providing them to targeted users.

In terms of services, commercial m-ARD apps typically deliver information or conduct transactions (or both), while noncommercial ones typically only provide information. It is difficult to assess business models for noncommercial m-apps due to the lack of a business approach by governments and donors. Specifically, the lack of a profit motive means that many noncommercial m-apps suffer from a lack of clear goals. Impact assessments and cost-benefit analyses can sharpen this lack of focus.

This report breaks down the 92 m-ARD apps studied into three stages of business development: the pilot stage, where concepts are being proven, usually with small target markets; stage 1, where m-ARD apps are being scaled up and trying to enter new markets; and stage 2, sustainability—defined as the requirement to be profitable or break even for commercial m-ARD apps, and continued donor or government funding for noncommercial ones.

Only 16 percent of the m-ARD apps studied have achieved sustainability (Figure 2). Most are facing challenges scaling up after successful pilots, with different challenges for commercial and noncommercial applications. Slightly more commercial than noncommercial applications fail between stages 1 and 2, even though sustainability is defined very differently for each type.

Figure 2: Stages of Business Development for the Applications Studied
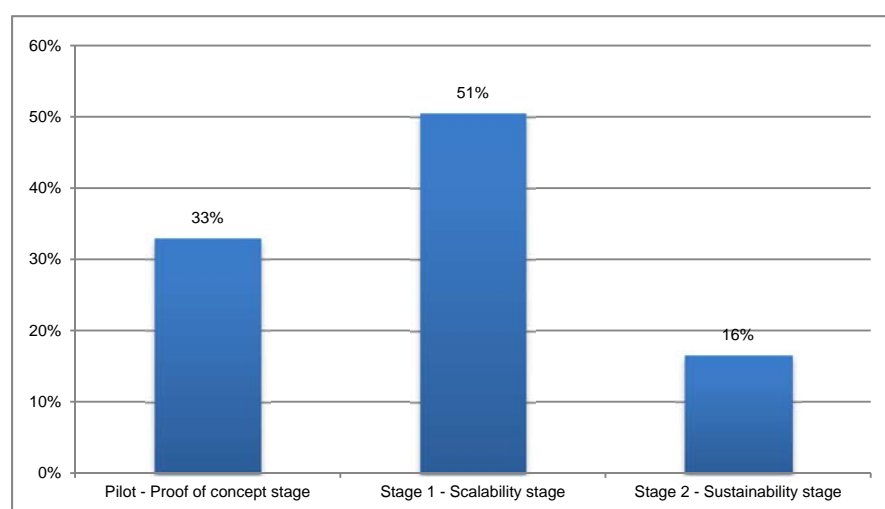
Source: Authors' analysis.

Population size does not appear to be a major determinant of sustainability. More relevant factors include the size of the target market, customers' ability and willingness to pay, and the focus and usefulness of the services offered.

Willingness to pay and revenue
Willingness to pay reflects the demand for m-ARD apps because many commercial services are still not easily affordable because they have not achieved economies of scale. In addition, from a development perspective it might be nearsighted to focus on ability to pay because it ignores the poorer population who could benefit the most from such services.

Evidence on willingness to pay is mixed. Experiences in many countries suggest that farmers are willing to pay basic or even premium SMS charges. But that willingness heavily depends on the farmers' incomes, education levels, and the services provided. Poorly educated farmers are less willing to pay even basic charges—especially if the benefits of using a service take a long time

to appear. Users are more willing to pay for a mix of tools and relevant information, such as those offered by platforms like OLT.

Securing sufficient revenue is still a challenge for most providers of m-ARD apps. Only 29 percent of the applications studied receive enough revenue to cover operating expenses; the rest are partly or entirely dependent on government, donor or corporate social responsibility (CSR) funding. The most common revenue stream is a share of SMS revenue, though on average providers receive less than 18 percent of their revenue from this source. One strategy to overcome this obstacle is to use a freemium pricing model (see below). Charging for each transaction can also be successful, as with Kenya's Kazi560, which provides job information.

Providers must develop a creative mix of revenue streams while taking into account the affordability of services. The report describes various types of fees and the rationales for them. These include fees for user sign-up, information access, transactions, advertising, and data collection. Because disposable income is limited in rural areas of developing countries, an innovative alternative advertising model is being developed. This model takes advantage of information asymmetry and scale, as with Jana's use of crowdsourcing to collect data for companies interested in rural consumers, providing information about these customers not available from other sources.

Pricing models

The report identifies four main pricing models for m-ARD apps:

- The nonchargeable model generally does not charge users. These are typically noncommercial services that provide basic information, such as Sri Lanka's 1919 Government Information Center and Kenya's Ushahidi.
- The transaction-based model charges users based on the number of transactions they make. These m-ARD apps typically provide hyper-local, value added information, as with Virtual City (Kenya) and RML (India).
- The embedded services model provides a service for no charge, but it does so to generate demand or strengthen customer loyalty to the provider's main, chargeable product or service. This model often requires creating a new market and so has significant potential, as shown by Kilimo Salama.
- The freemium model offers basic services at no charge as a marketing or promotional tool but charges a premium for advanced and value added services. This model can help introduce applications, build trust, and facilitate upselling. Only a few of the applications studied use this model, including KACE (Kenya) and Manobi (Ghana and Senegal).

Some of these models might overlap, and some providers use them in combination.

Costs

The report analyzes a range of m-ARD apps for which cost data are available. For commercial applications, capital and operation costs are compared with user and transaction targets to assess affordability. Analysis of KACE, b2bpricenow.com (Philippines), and RML shows that providing useful information is costly. For example, RML's operating cost per user is $4. High costs result in a tradeoff between providing local information and achieving scalability because more local research units are required to collect data as an application's market expands. This means that costs rise at the same rate as new subscribers sign up. Accordingly, some providers use the freemium model to increase user volume so that they can build to scale.

The analysis also shows that operating costs are much higher for some m-ARD apps, such as DrumNet and e-Dairy. For example, the DrumNet pilot's operating cost per user is $45. Costs are high because these applications cannot benefit from economies of scale in their pilot stages and because they lack a modular approach to system development. DrumNet, for example, provided full supply chain integration services from the outset instead of building a modular system like KACE and Virtual City.

Noncommercial providers have much lower operating costs per transaction. For example, the Philippines's TXT CSC has an operating cost of just $0.02 a user. This is largely due to the simple, information-only services provided by such applications.

Financing

Government, donor, or corporate social responsibility (CSR) funding covers the startup and operating costs of 85 percent of the m-ARD apps studied (figure 3), and there is a major financing gap between the pilot stage and stage 1 (scalability). This gap cuts across the case studies from Kenya, the Philippines, and Sri Lanka and is true for both successful and less successful applications. This gap occurs during the transition from public (donor or government) to private funding and poses a challenge for m-ARD apps because a lack of private funding implies that providers do not have access to the professional advice and skills needed for their next stage of growth.

Figure 3: Sources of Financing for the Applications Studied
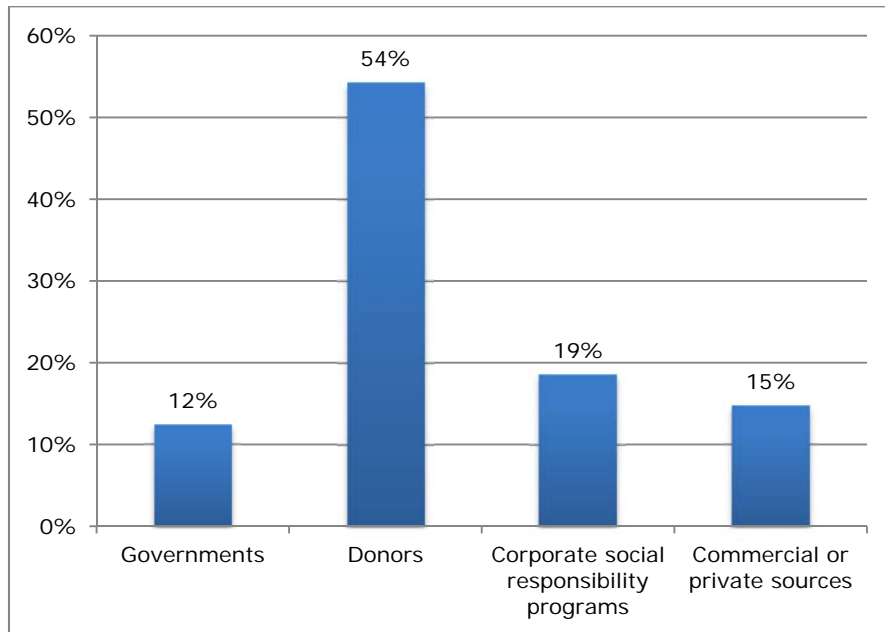
Source: Authors' Analysis.

Commercial applications in developing countries generally lack access to private equity and venture capital (PE/VC) funding because of a lack of firm clustering, limited PE/VC financing in these countries, and weak m-app ecosystems that do not support scalability. Noncommercial m-apps do not suffer as much from lack of finance because they are likely to continue operating as long as there is government, donor, or CSR funding. But here too growth can be limited by lack of sufficient financial support.

There are various ways to narrow the financing gap. Donors could create development funds for m-apps, providing financing based on their potential for advancing development. This could be supported by m-app labs, providing a single location for a suite of services including financing, expert advice, and skills development.

Another approach is to create apex funds, which pool investment capital from a range of sources, including donors and development-oriented investors. Such funds are operated by PE/VC groups willing to accept modest returns on the investments. While there are many large funds of this type, few offer relatively small loans ($100,000 to $500,000). Apex funds would also deliver business advisory services to help m-apps providers scale up or expand to other markets.

A third approach is to use universal service funds (USFs) to fund m-apps. USFs exist in many countries and typically have extensive resources due to low disbursements. But funding can be mobilized fairly quickly. Public-private partnerships (PPPs) can also help address the financing gap. PPPs provide a framework for governments to exploit the synergies between the private and

privat sectors, provide access to funding and skills, and bring focus to the costs and benefits of m-ARD apps. This is an opportune time for PPPs because innovative models for service delivery are superseding their traditional use in infrastructure development. Text2Teach is an example of an m-ARD app using the PPP approach, with financing from the Philippine government, Nokia, and the Ayala Foundation.

Conclusion

M-ARD apps offer dynamic, interdisciplinary, and innovative services to rural residents in developing countries. This report offers only a snapshot of the field's evolution but provides policymakers and development practitioners with insight into its significant potential.

One of the main findings is that an enabling platform (or platforms) is probably the most important factor for the development of m-ARD apps. Platforms can facilitate interactions among ecosystem players, increase access to users, provide technical standards, and incorporate payment mechanisms.

The hyper-local nature of m-ARD apps makes scaling up challenging for providers. It is crucial for providers to leverage existing information resources, and providers who can aggregate and customize content from different sources will have an advantage. Governments and donors can be immensely helpful by making data publicly available and ensuring that the data are as accurate and granular as possible.

Despite various challenges, some m-ARD apps are achieving scalability, replicability, and sustainability. Governments and donors play a critical role in helping m-ARD apps achieve sustainability by covering initial capital costs. M-ARD apps that can achieve low operating costs are also more likely to be sustainable.

1. Introduction

Mobile communications technology has become the world's most common way of transmitting voice, data, and services, and no technology has ever spread faster. At the end of 2011 there were almost 6 billion cellular telephone subscriptions worldwide, and the number is expected to reach 8 million by 2016 (Figure 1.1).

Figure 1.1: Global Mobile Subscriber Base (In Million, 2009-16)
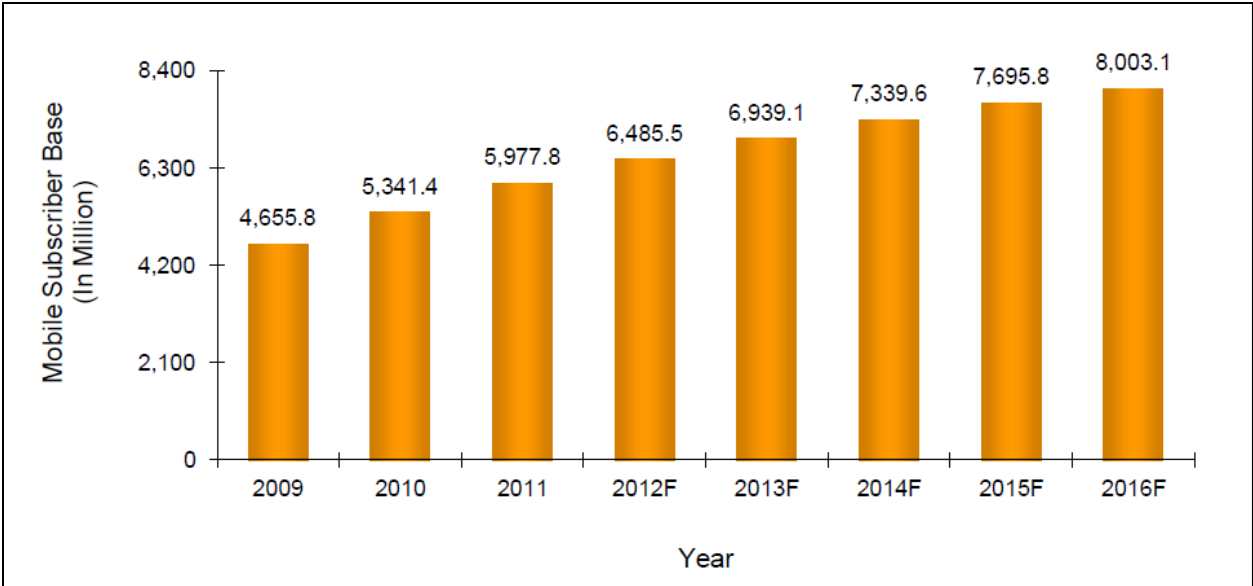
Source: Portio Research 2012.
Note: Data for 2012-16 are projected.

The mobile phenomenon is especially important for developing countries because that is where it is growing fastest, and in the next few years nearly all new mobile customers will come from developing countries because penetration has reached saturation levels in developed countries. Mobile phone technology has also been key to leapfrogging fixed-line Internet in developing countries and providing mobile broadband to a growing share of people.

What Are Mobile Applications?

With mobile handsets being used in nearly every country and community, the development of applications for them offers uses that extend well beyond voice and text communications. Mobile applications for agricultural and rural development (m-ARD apps) could provide the most economic, practical, and accessible routes to information, markets, governance, and finance for millions of people who have been excluded from their use.

This section discusses m-apps generally; the report then switches to its focus on m-ARD apps. M-apps are software designed to take advantage of mobile technology, enabling the collection and transmission of data for economic and social activities—whether for commercial, administrative, or entertainment purposes (McNamara 2009). Moreover, m-apps are not necessarily associated with specific access devices but focus on providing information and facilitating activities.

M-apps can be developed for technology besides mobile phones. For example, in one of the case studies conducted for this report, e-Dairy—an agricultural extension service offering timely data on cow insemination in Sri Lanka—was designed for touchscreens, which are larger and less mobile than cell phones. The touchscreens are at fixed locations, and though their monitors can provide more information than the smaller screens on mobile phones, mobile phones have several advantages over less mobile (or fixed location) devices such as touchscreens. Mobile phones:

- Are owned by more people.
- Provide delivery in an instant, more convenient way.
- Can deliver personalized information to individual owners.
- Are cheaper to deploy.
- Provide other functions such as voice communication.

In addition, most m-apps can be replicated across different mobile interfaces and devices, such as SMS phones, mobile browsers, smartphones, and tablets. This is because the most challenging part of developing m-apps involves their common backend and infrastructure—especially if integration between databases is required.

In developed countries m-apps are considered software that operates on smartphones (such as iPhones, BlackBerries, and Android devices) rather than standard second generation (2G) mobile phones. But mobile phone operators—particularly in developing countries—have been developing m-apps, including for information on agriculture prices, for almost 10 years.

In recent years there has been a global explosion in the number of m-apps. Getting accurate information on the size of the m-apps market is challenging. Table 1.1 summarizes recent surveys and projections on the size of this market.

Table 1.1: Global Market for Mobile Apps, 2008-12

(billions of U.S. dollars)

Source	2008	2009	2010	2011[a]	2012 [a]
Gartner		4	5.2	15	
Ellison			4.9		
GetJar / Chetan Sharma Consulting		4.1			17.5
MarketsandMarkets		4.5	6.8		

Source: Gartner 2011; Ellison 2010; GetJar 2010; MarketsandMarkets 2010; BBC Market Trust 2010.

a. Projected.

This explosion in the development of and market for m-apps has been driven by rapid growth in the use of smartphones and falling Internet access costs on mobile 3G networks. In 2002 Research in Motion transformed the smartphone market with its introduction of the BlackBerry. But Apple's iPhone, introduced in 2007, showed the real potential of smartphones, allowing multiple m-apps to be stored on one device and fully integrated with its operating system. Until then, smartphone users were limited to text messages, Internet and email use, and phone calls. Now m-apps can be tailored to a wide range of needs and purposes.

The advent of smartphones also brought with it operating systems (such as Apple's iOS and Google's Android) and application stores (such as Apple's App Store) that enabled third party providers to create m-apps for customers. These developments restructured the m-app market in developed countries from one where mobile network operators were gatekeepers to one that enables and encourages independent providers to build innovative m-apps and mobile network operators are primarily data conduits.

M-apps are expected to become increasingly pervasive. The convergence of mobile and computing devices and the growing use of mobile phones will increasingly make applications that started as computer-based functions—such as online banking—accessible by handheld devices.

The rapid speed at which mobile networks are evolving (from 2G to EDGE to 3G to 4G/LTE) is facilitating the changes in m-apps. For example, Kenya's M-PESA (which means "mobile" followed by the Swahili word for money) was originally designed to be a money transfer service, but additional services have quickly been added—including insurance, savings accounts, bill payments, bulk payments, and loan repayments. If m-apps mimic the evolution of mobile money services, change will occur quickly. Thus change and even obsolescence can occur quickly as one m-app is replaced by another with more features or technological flexibility.

In addition, handsets are changing quickly: standard mobile phones are offering more features and smartphones are becoming cheaper. For example, Research in Motion considers developing countries a key area for potential growth and is lowering its prices in them. BlackBerry Messenger is already popular in developing countries where text messaging is widely used, and many carriers offer handsets with prepaid plans. Accordingly, BlackBerries and other smartphones will continue to penetrate these markets.

Still, from a development perspective there are constraints to the potential of m-apps. Smartphone penetration is low in the developing world. Even by 2015 standard mobile phones will outnumber smartphones in developing countries by nearly four to one (Figure 1.1). Few standard mobile phones have 3G functionality. For example, the most widely used phone in Indonesia, Nigeria, the Philippines, and South Africa is the Nokia 5130 XpressMusic, which is not 3G-enabled. The phone can download applications from Nokia's Ovi store, but the number of downloads is quite small—though growing quickly.

Standard mobile phones will continue to dominate in the developing world for at least the next five years, and probably longer in rural areas. Thus, over the short to medium term, the primary way of accessing m-ARD apps is going to be through these phones, limiting the types of services that these apps can offer.

The penetration of smartphones is premised on the availability of mobile broadband. But many developing countries have low or no 3G penetration. And costs—including of purchase and data downloads—are a major obstacle. Accordingly, m-apps in the developing world still primarily offer only SMS and other 2G services, especially in rural areas.

Moreover, most m-apps are for entertainment and lifestyle purposes, especially in the developed world. These consumer-oriented m-apps are typically offered on a mass-volume, low-cost basis. (Indeed, many m-apps lacking full functionality are free.) In contrast, it is far more complex and time-consuming to develop m-apps targeted at a specific challenge in a particular sector. M-apps for development purposes rarely generate sufficient revenues to be financially sustainable at a small scale or without significant revenue from bundling, advertising, cross-subsidies, and other sources.

Figure 1.2: Forecast of Global Mobile Phone Use by Type, 2015

Millions of units
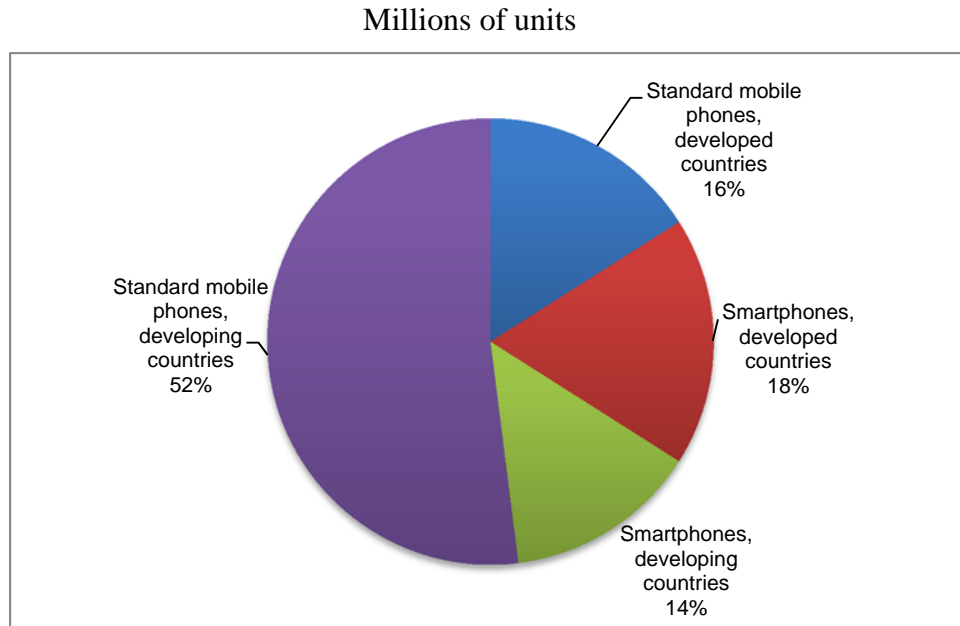
Source: Strategy Analytics 2010.

This Report's Scope, Audience, and Focus

There are already many studies on the mobile revolution. But systematic trend analysis and in-depth case studies of mobile applications and services remain insufficient except for a few widely cited ones. More important, there is little analysis of experiences with business and operating models for developing innovative m-apps and m-services in key sectors. Yet m-ARD apps offer significant development potential due to some notable successes, the varied areas of possible applications, and their direct and pro-poor impacts.

Hence this report summarizes trends in and uses of m-apps (and m-services) for agricultural and rural development and provides examples and analyses of how they can be used to improve outcomes in the sector. It also analyzes the mobile ecosystem in developing countries and suggests how it could be optimized to develop viable m-apps for this sector. Innovative m-ARD apps, including candidates for scaling up and replication, are identified. The report applies analytical tools—including typology, results chain, ecosystem, and business model analyses—to case studies of m-ARD apps used worldwide.

The report provides an analytical framework that supports m-ARD app innovation for two main audiences:

- *Policymakers*. What policies could support m-ARD apps that offer the greatest potential benefits for development? What components of the ecosystem require support to provide an enabling environment for m-ARD apps?

- *Development practitioners*. Where could m-ARD apps have the largest development impacts? What kinds of business models have the best chances of success?

The report also provides a methodology for comparing business models for m-ARD app providers.

The report's analytical framework for development practitioners is designed to help them understand how m-ARD apps can improve services for rural residents. This framework pays particular attention to mechanisms that create an enabling environment for m-ARD app innovation, such as policies and education conditions, as well as appropriate areas of the agricultural economy.

The report focuses on access, which touches on every aspect of economic and social life—particularly in rural areas. Every need or activity that affects or governs living and well-being can be thought of as requiring access, whether to information, resources, markets, crop technology, finance, insurance, education, or many other areas. Access is also the first step in helping poor people receive the information and services needed to improve their lives. The importance of communications as an access enabler is widely accepted by development practitioners. Thus the emergence and use of affordable mobile communications and m-ARD apps could enable far more people to access things that they value and need to improve their lives.

Lessons drawn from the 92 m-ARD apps reviewed by this report are summarized in Annex E. These lessons should be highly relevant and practical to policymakers, development practitioners, and m-ARD app providers because they are based on actual experiences and provide much-needed insights on the m-ARD app phenomenon. The lessons distilled and the issues highlighted cut across various aspects of m-ARD app development and are discussed in more detail in the following chapters.

2. Methodology and Case Selection

This report developed a typology of agricultural and rural development and conducted desk research on 92 mobile applications for agricultural and rural development applications (m-ARD apps; information sheets for these case studies are available at http://www.worldbank.org/ict/m-ard) as well as detailed case studies of 15 m-ARD apps based on field visits to Kenya, the Philippines, and Sri Lanka. It applies various analytical perspectives to the case studies based on the development impacts of m-ARD apps (Chapter 3), mobile ecosystems (Chapter 4), and business models (Chapter 5). The findings are then used to offer recommendations for policymakers and development practitioners working on agricultural and rural development in developing countries (Chapter 6).

Typology

A structural typology of agricultural and rural development was developed to analyze how m-ARD apps can be used to address sector-specific issues. This typology identified the main economic subsectors in agricultural and rural development, various markets and activities in each subsector, and development challenges facing rural stakeholders. It was also used to classify the case studies of m-ARD apps, choose representative m-ARD apps for those studies, and map and analyze benefits for users.

The typology of agricultural and rural development was split into five subsectors, with the most common m-ARD apps in the following order:
- Agriculture (including animal husbandry, fisheries, and forestry).
- Resource management.
- Labor, migration, and human development (including education).
- Governance and political issues.
- Rural finance, infrastructure, and information and communication technology (ICT).
  (The complete typology is in Annex A.)

Figure 2.1 shows the subsector distribution of the 92 m-ARD apps studied worldwide, covering at least 20 countries. (Some apps cover more than one country.) Though governance and political m-apps only accounted for a small share of the total, e-government is becoming more important. The trend toward making government data publicly available (see, for example, www.data.gov.uk) means that there is likely to be high growth in this subsector.

Figure 2.1: Subsector Distribution of the Applications Studied
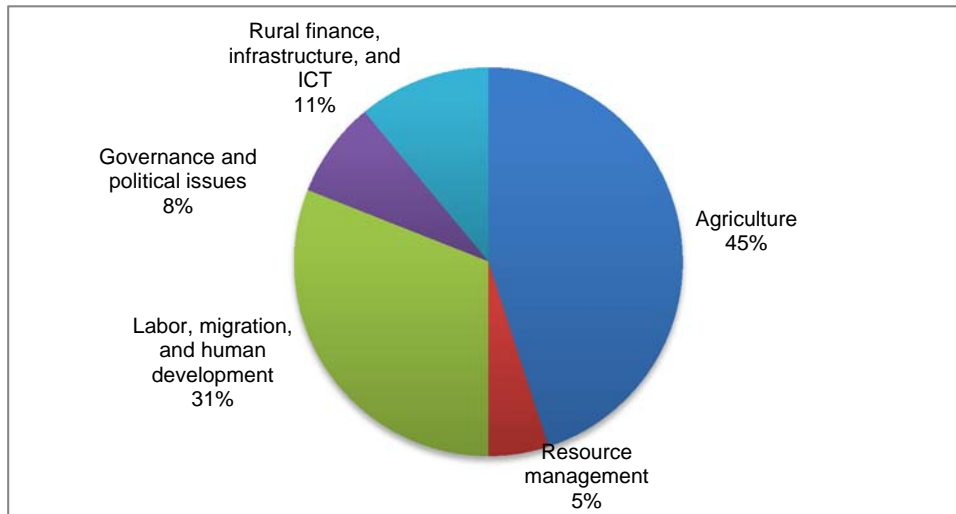
Source: Authors' Compilation.

Case Studies

During the desk research an information sheet was used to record all pertinent information and initial analysis about relevant m-ARD apps identified (Annex B). It includes the subsector and segment, ecosystem players, business model, benefits, potential for growth, scaling up, and replication, hurdles to be overcome, and a SWORB (strengths, weakness, opportunities, risks, and benefits) analysis. This information was useful for identifying the best cases among the various m-ARD apps for the country case studies. Annex C summarizes the information gathered on all the cases researched, including descriptions, countries, and target users.

Based on the number of relevant m-ARD apps in the subsectors and market segments defined by the agricultural and rural development typology, a shortlist of countries was selected for detailed case studies. Figure 2.2 lists the number of m-ARD apps that could be studied in each of these countries.

Figure 2.2: Number of M-ARD Apps Identified by Country
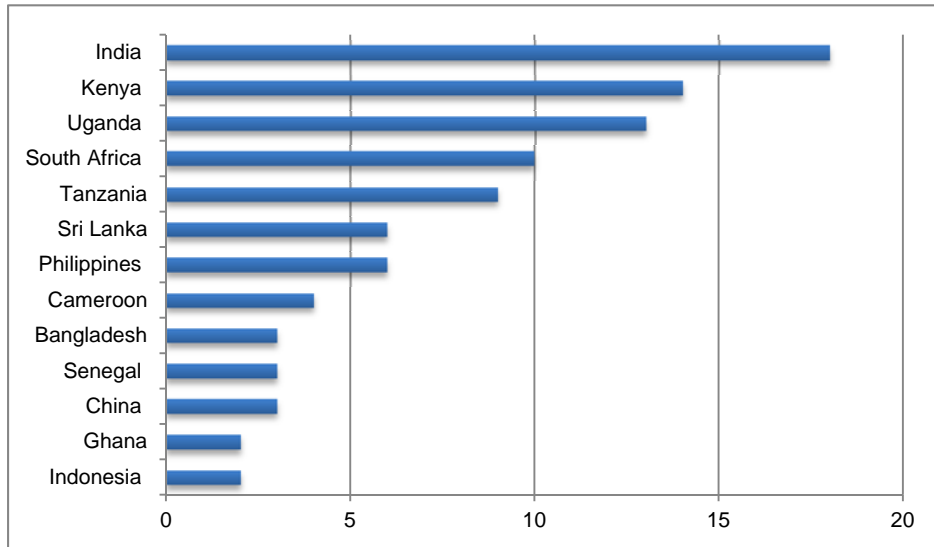
Source: Authors' Compilation.

Based on the typology, India and Kenya have the most m-ARD apps and the broadest spread of subsector and segment activities. Because Indian m-ARD apps have been extensively documented in other literature, they were excluded from this report. For Kenya the typology allowed for the study of at least five segments of agricultural and rural development. The country's global leadership in mobile payments through M-PESA appeared to offer the possibility of several innovative new applications and trends. Moreover, Kenya still seemed typical of the developing country experience, where m-ARD apps are largely at the pilot and commercialization phases.[1]

Though other countries in East Africa (Uganda and Tanzania) offered interesting areas for detailed study, the report team chose the Philippines and Sri Lanka because:

- The Philippines is home to m-ARD apps that provide text-based information on agriculture and extension services, the agriculture market, education, and government services.
- Sri Lanka has m-ARD apps on extension services, the agriculture market, and government services. In addition, a Sri Lankan researcher was able to add value by drawing comparisons with m-ARD apps developed in India for the same subsectors.
- Relative to Africa and Asia, Latin America and the Caribbean offered few opportunities to conduct a broad cross-sectional survey of m-ARD apps.

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[1] In addition, several Kenyan m-apps were discovered during the in-country research that had not been identified by the desk research.

The final selection of Kenya, the Philippines, and Sri Lanka provided the broadest, most varied study opportunities. Case studies of 15 m-ARD apps in these countries included surveys and interviews of key app sponsors and related ecosystem players. Much of the analysis in this report is based on these case studies, with trends and lessons also drawn from other m-ARD apps covered by the desk research.

Kenya, in particular, provided a window into perhaps the world's most dynamic environment for m-ARD app development, with constantly emerging possibilities for new apps and for scaling up and expanding existing ones. The strength of the country's software development system, its dynamic m-apps scene, and the general economic environment has led Nokia—a leading supplier of handsets in developing countries—to invest considerable resources in developing and diversifying this potential.

Table 2.1 summarizes how the 15 case studies, considered to best represent m-ARD apps in the three case study countries, are placed in the typology for agricultural and rural development. The table also provides a brief description of each app.

Table 2.1: Subsectors and Segments of the Mobile Applications Studied

Country	Application	Agriculture				Resource manage-ment	Labor migration & human dev.	Gover-nance/ political issues	Rural finance, infra., & ICT	Description
		Price info	Market links	Extension and support	Distri-bution, logistics, & traceability					
Kenya [*Cases studied in detail]	*KACE	●	●							Provides daily market information on 20 commodity prices, facilitates offers and bids to match farm outputs with demand from wholesalers, and facilitates links between farmers and buyers (such as with contract negotiations and commodity transport).
	*DrumNet	●	●							Covers the horticultural and oilseed industry and provides information on market trends, weather, prospective partners, and the like. Includes finance, production, delivery, and payment functions to smooth supply chain processes among various actors, including producers, buyers and processing plants, transport providers, banks, and input retailers.
	*Virtual City		●		●					Provides automated systems to major buyers of tea, coffee, cotton, and dairy for collecting, recording, accounting, and traceability/distribution of agricultural products. Farmers receive faster and more accurate price, quality, and quantity information. Small and medium-size retailers can use phones to facilitate sales, deliveries, orders, and payments.
	*Kilimo Salama		●						●	Offers agricultural insurance to farmers who plant as little as one acre to shield them from financial losses when drought or excess rain is expected to affect their harvests. The insurance is weather-indexed and covers inputs such as seeds, fertilizers, and chemicals.
	KenCall Farmers' Information Service			●						Provides extension information and advice from experts. Information and answers to questions are available online or by returned phone calls within one day.
	Green Dreams—Mkulima FIS and iCow			●						Provides extension information and advice from a database using various technologies such as USSD, IVR, SMS, and the Web, including livestock management information and advice about cattle.

Country	Name									Description
	*Grundfos Lifelink					●				Provides reliable, safe, convenient, and automatically pumped groundwater to villages. Users access water pumps using an electronic key paid for using M-PESA.
	Kazi560 /Mobile4Good						●			Links employers and job seekers using mobile phones. Employers can advertise and job seekers can subscribe to alerts for numerous types of jobs.
	Jana						●			Offers services to companies in developing countries such as collecting the opinions of mobile subscribers about consumer products. Rural inhabitants do such work and are paid in mobile phone minutes or other ways.
	*Ushahidi							●		Collects and reports information on crises, disturbances, and other events by mobile phone and updates the information on Google Maps. Has been used beneficially in Kenya and Haiti, and has been licensed to many other locations.
Philippines	b2bpricenow	●	●							Provides current market price information to farmers and cooperatives. Its online marketplace links these sellers to buyers and can process financial transactions using bank accounts (Web) or debit cards (mobile phones).
	Project Mind						●			Provides distance and informal education services by mobile phone. Students' performance is monitored through their answers—sent by SMS—to multiple-choice math and science questions. Exams are also administered this way.
	Farmers Texting Center		●	●						Innovative SMS-based service for answering agricultural queries—mainly about rice production—from farmers, extension workers, and others. Also provides technological updates on rice production and a virtual network where farmers and clients can interact.
	TXT CSC							●		Provides information to citizens on government services and enables citizens to provide feedback and complaints. Complaints are sent by SMS, voice, and other means, then routed to the appropriate agencies.
	text2teach						●			Provides fast and timely educational content using mobile and satellite technologies. Content includes more than 900 multimedia materials in video, picture, text, and audio formats. Also uses SMS to receive feedback and comments.

Country	Service									Description
Sri Lanka	1920 Agri Extension (also known as Govi Sahana Sarana)			●						Toll-free hotline service that provides crop advisory and technology advice to farmers in Sinhala and Tamil languages. The aim is to help farmers solve problems related to technology, inputs, and marketing matters. Users can call from anywhere in the country for immediate answers by call center operators. Agriculture experts are also available as a second line of support for more complicated questions.
	Dialog Tradenet	●	●							Forwards agricultural commodity price information by SMS and USSD, reducing information arbitrage. Subscribers receive up to five price alerts for five fruits and vegetables from each of the three markets covered. Also provides a trading platform for farmers to identify potential buyers.
	e-Dairy			●						Provides farmers with information and access to just-in-time veterinary services using SMS and touch-screen computers. Information covers animal health, milk prices, feed suppliers, drug suppliers, bank loans, techniques for stall construction, and other topics.
	1919 Gov't Info Center	●						●		Hotline that provides information on public services from 99 percent of government organizations, such as how to obtain passports, copies of birth certificates, marriage and death certificates, and national identity cards. Also provides information on train schedules and crop prices by SMS.

Source: Authors' Compilation.

3. Development Impact

The largest number of mobile applications for agricultural and rural development (m-ARD apps) involve improving supply chain integration and likely have the greatest impact on agricultural and rural development. Agriculture is typically crucial to the economies of developing countries and employs many people (World Bank 2011). Thus improvements in agriculture are likely to have the greatest development impacts.[2]

Improvements in agriculture supply chains have impacts beyond the private sector, such as in the informal and public sectors. Such improvements can be assumed to generate spinoffs that provide economic and social benefits factors such as employment creation, added value, and reduced product losses (van Roekel, Willems, and Boselie 2002). For example, participation in modern supply chains can increase farmer incomes by 10-100 percent. Efficient supply chains also help make economies globally competitive (World Bank 2007).

Access to market information and extension services, facilitation of market links, and access to finance are all related to supply chain operations. The value of using m-ARD apps in the agriculture supply chain cannot be understated and—though they are not a panacea—there is evidence of their usefulness in these areas.

Key actors in the agriculture supply chain include:

- *Producers (farmers).* Farmers integrated with a supply chain can gain access to timely, cost-effective, personalized information on markets, prices, inputs, weather, good practices, and impending natural disasters. They can also secure reliable, profitable links beyond local markets and expand under structured agreements (contract farming) with buyers.
- *Suppliers.* Providers of agricultural inputs through, for example, an SMS alert about a farmer's input requirements, can plan their stockholding requirements throughout the season and try to achieve economies of scale. This approach increases sales without adding credit burdens or risking default or the loss of working capital.
- *Buyers.* Buyers face numerous challenges in a supply chain that is poorly structured and requires cumbersome searches for produce and complex financial administration. Such a supply chain requires heavy reliance on brokers or trader networks that are not always able to deliver produce of predictable quantity, quality, or source. Unreliable quantities lead to supply shortfalls that increase production costs and can raise the costs of finished

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[2] World Bank (2008). In particular, table 9.2 (p. 205) lists rural employment by sector of activity. For example, in Sub-Saharan Africa 61 percent of men in rural areas work in agriculture. Moreover, 60 percent of the region's population lives in rural areas; see UN Habitat and UNEP (2010).

goods. With more efficient supply chains, buyers can benefit from cheaper, higher-quality produce.

- *Financial institutions and insurance companies.* Agriculture is considered a risky sector for financing. Financing small farmers involves high transaction costs, making the market undesirable for and underserved by financial institutions and products. With supply chain integration, financial institutions and insurance companies can lower transaction costs and avoid the complexity of managing large numbers of farming loans. In addition, producers can better manage risks and plant higher-yield produce thanks to better insurance coverage.
- *Rural development and agricultural extension organizations.* Extension workers play an important role in explaining the benefits of m-ARD apps and obtaining detailed information about the services required by communities . Extension workers are at the frontline in terms of collecting and disseminating information.

Virtual City's AgriManagr illustrates the benefits of automating the supply chain in Kenya's export market for tea (Box 3.1). In addition, this report found a number of cases where m-ARD apps improved access to information, finance, and rural extension and advisory services, and increased the efficiency of market links and distribution. Figure 3.1 shows a results chain of m-ARD apps addressing key challenges for agricultural and rural development and achieving development impacts.

Box 3.1: Virtual City's AgriManagr—Automating Tea Purchases in Kenya

Virtual City has introduced several applications, one sector at a time, in the form of turnkey automation paid for by a leading player in each sector or market segment (for example, a main industry buyer such as a tea factory or cotton or dairy cooperative). An m-app, AgriManagr, automates purchases and strengthens relationships between the leading chain of tea factories—the Kenya Tea Production Authority (KTDA)—and tea growers and transport companies. Based on positive initial results, AgriManagr will be more widely deployed in KTDA's territory.

Increased efficiency and reduced fraud at buying centers
AgriManagr cut the average transaction time at tea buying centers from 3 minutes under the manual system to 22 seconds. Weight data for tea is collected electronically at the buying centers and no adding, editing, or deleting of records is allowed without proper authority. Growers or clerks swipe growers' smartcards, automatically updating the day's transactions. Growers' receipts show the weight of produce delivered that day and the cumulative weight for the month. Fraud has been reduced as a result.

Higher incomes for farmers
AgriManagr has proven beneficial for small tea growers. The average weight per transaction has increased by about 9 percent. According to independent research, a typical tea farmer with a 3-acre farm earned about $3,300 in 2010, so the 9 percent additional income due to AgriManagr translated to about $300.

Lower administrative costs
Before AgriManagr, the average annual factory cost for paper, data entry reconciliation, communication, and fraud was approximately Kshs 60 million, or $600,000. This has been reduced by replacing paper documents with electronic data entry and reconciliation. In addition, the cost of collection has been cut by three-quarters.

Figure 3.1: The Results Generated by Mobile Applications for Agricultural and Rural Development

Better access to information	Market information →	Higher prices, produce in greater demand
	Climate and disease information →	Better disaster and risk management
Better access to extension services	Good agricultural practices →	Higher-yield production
	Extension services →	More accurate assessments of pasture health
Better market links and distribution networks	Direct links between farmers, suppliers, and buyers →	Less exploitation by middlemen
		More efficient distribution chains
	Better recording, accounting, and traceability →	Increased efficiency and predictability
		Reduced administrative costs
		Reduced fraud
Better access to finance	Credit	
	Insurance →	Higher yields, more diverse production, fewer losses
	Payment methods	

Higher incomes for small farmers

Lower transaction, logistical, and distribution costs for input suppliers

Improved traceability and quality standards for buyers

New opportunities for financial institutions

Source: Authors' Analysis.

Quantitative Impact

Most m-ARD apps are in the pilot phase. But several have provided clear, quantifiable benefits (Table 3.2). These apps have increased income and access to finance for farmers and provided benefits to other players through supply chain efficiencies.

Increasing agricultural productivity, profitability, and sustainability in the developing world depends on the ability of rural populations to adopt changes and innovations in their use of technologies, management systems, organizational arrangements, institutions, and environmental resources. Expanding people's capacity depends on their access to knowledge and information. M-ARD apps such as KenCall Farmers' Info Service and GreenDreams in Kenya, Farmers

Texting Center in the Philippines, and 1920 Agri Extension and e-Dairy in Sri Lanka were developed to provide relevant information services to rural populations.

Table 3.1: Benefits of Various Mobile Applications

Application	Country	Increased income through better access to information and services	Higher-yield production	Improved efficiency in supply chain	Better access to finance
Virtual City AgriManagr	Kenya	• Typically, small farmers see their incomes increase 9% due to better measuring and recording of produce weights		• Transaction time reduced from 3 minutes to 22 seconds • Cost of delivery reduced by 75% • Fraud minimized through use of electronic data entry	
KACE	Kenya	• 75% of farmers and 60% of commodity traders report higher incomes		• Market integration (linkage efficiency) improved for two commodities—maize and beans	
Kilimo Salama	Kenya	• $150 average increase in income per small farmer	• 50% increase in production due to insurance on higher-yield inputs	• More efficient value chain leads to lower retail costs	• Farmers in first year insured 10-20% of their inputs and increased insurance to 50% of inputs the next year
DrumNet	Kenya	• Farmer incomes rose by an average of 32%		• Improved access to agricultural inputs • Input suppliers achieve economies of scale	• Bank creditworthiness increased due to secure produce supply contracts • Reduced transaction costs for financial institutions
b2bpricenow.com	Philippines	• Volume of trade since inception in 2000 is nearly $30 million		• Direct access to buyers improves sales	• More efficient and secure payments to members
Farmers Texting Center	Philippines	• Farmers are planting crops with higher yields	• Production increases of 20% reported		
Dialog Tradenet	Sri Lanka	• 23% premium on produce due to timely market price information		• Lower information asymmetry between farmers and brokers	
e-Dairy	Sri Lanka	• Additional income of $262 per additional calf due to more timely access to veterinary services	• Milk production can increase by 30%	• Accurate prices provided at delivery point instead of days after delivery, as in the past	

Source: Authors' Compilation.

Providing access to information

The most widely used m-ARD apps provide users with access to useful, relevant information. An example is where a farmer can get commodity prices in various urban markets through a simple request made on a mobile phone. Asymmetrical access to pricing information is a weakness of rural markets. Middlemen can buy farmers' produce cheaply and sell it at high prices unless farmers have the same information about the prices for their produce in specific markets. Increasingly, because of mobile phone penetration and market information apps that require a low level of literacy to understand, m-ARD apps can provide farmers with direct, immediate benefits—such as higher incomes.

The case study on Kenya found many such examples. The DrumNet pilot reported that farmer incomes rose by a third due to a comprehensive system of price negotiation, contracting, and other value chain support. KACE reported that incomes increased for three-quarters of farmers and three-fifths of commodity traders—again, apparently due to a fairly complex support system for links in the value chain. Tea growers using Virtual City's AgriManagr reported an average 9 percent increase in their incomes (about $300 a year) because of more accurate recording of their production volumes (see Box 3.1).

Elsewhere, m-ARD apps focused on increasing access to information and providing support for transactions have improved bargaining power and lowered transaction risks and costs for small farmers. Examples include B2BPricenow.com in the Philippines and Manobi in Ghana and Senegal.

Tradenet is a service launched in 2009 by Dialog, Sri Lanka's leading provider of mobile services, to provide information on agricultural prices by mobile phone. This content is supported by Govi Gnana Seva (GGS), a nonprofit that specializes in agricultural marketing and collects and disseminates information on wholesale trade in produce. Tradenet enables farmers to access up-to-the-minute prices on agricultural commodities, reducing information arbitrage. As a result, farmers obtain better prices for their produce and, hence, higher incomes.

Farmers can receive up to five price alerts for up to five fruits and vegetables from each of the three markets covered by GGS, including the Dambulla Dedicated Economic Centre—Sri Lanka's largest wholesale market for fruits and vegetables, which handles nearly 80 percent of wholesale agricultural trade in the country. Tradenet is available free of charge to Dialog subscribers. Information on the Tradenet platform is disseminated using multiple technologies, including SMS, Unstructured Supplementary Service Data (USSD), and the Internet. The SMS service is offered in English, Sinhala, and Tamil.

Tradenet provides users with timely information on price movements in wholesale agricultural produce. In 2010 farmers 10-15 kilometers from the nearest market obtained an average premium of 23 percent on the price per kilogram of their produce by using Tradenet (Lokanathan 2010). Farmers also use the service to plan harvest and market entry times. They can do so

because most fruits and vegetables in Sri Lanka exhibit high intraday and interday price volatility due to mismatches between supply and demand. Accurate, real-time price information is allowing farmers to minimize the sunk costs associated with entering the market at nonoptimal times (since, due to transport costs, they cannot take their produce back to their farms even if prices are low in the market).

Information services such as Reuters Market Light in India, Manobi in Ghana and Senegal, and Ovi Life Tools in China, India, Indonesia, and Nigeria are designed to provide relevant information to rural residents. These m-ARD apps start by providing general market information about a specific region or village (such as weather information), but information can then be highly targeted.

Providing access to extension and advisory services
M-apps also play an important role in expanding timely access to rural extension and advisory services to meet the immediate needs of farmers and other rural residents as they change their production and livelihood systems. M-apps provide advice to farmers on problems and opportunities in agricultural production, marketing, conservation, and family livelihoods; transfer new technologies and good practices or lessons; facilitate the development of local skills, organizations, and links with other programs and institutions; and address public interest issues such as resource conservation, food security monitoring, agricultural production monitoring, food safety, nutrition, family education, and youth development.

The government-owned Information and Communication Technology Agency (ICTA) of Sri Lanka, for instance, discovered that between 2003 and 2008 more than half of the country's milking cows (over 560,000) were not pregnant at any given time (e-Dairy 2009). Low pregnancy rates were due to lack of timely access to artificial insemination and breeding services, resulting in a loss of 30-35 days' worth of milk (about 300 liters, worth $100). The e-Dairy service was introduced in 2009 to address this issue.[3]

E-Dairy enables farmers to request veterinary and extension services related to issues such as animal health, artificial insemination, milk prices, and construction of dairy stalls through a simple SMS interface or on touchscreen computers. Farmers type in personal identification codes and the code of the service they need. The request is then sent to all registered suppliers so that they can contact the farmers directly. Farmers usually obtain feedback within a few hours. So far, 300 farmers have registered for the service. E-Dairy also provides training on computer and Internet use.

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[3] The pilot was launched by the Dambadeniya Development Foundation, a community-based organization, with financial backing from the ICTA. The foundation developed the technology used and supplies the information, while the ICTA funded half of the initial investment cost. Dialog, the country's leading mobile service provider, has provided a special SMS gateway for the service. The service received the Manthan Award South Asia, which recognizes best practices in electronic content and creativity in Afghanistan, Bangladesh, Bhutan, India, the Maldives, Nepal, Pakistan, and Sri Lanka. See http://www.manthanaward.org/other_full_story.asp?id=21.

According to Sri Lanka's Department of Dairy Foods, milk production could be increased by 30 percent if artificial insemination services were requested and supplied in a timely manner. Moreover, the ICTA estimates that farmers could earn an additional $262 a calf each year. Farmers could also benefit from access to optimal market prices. Dairy farmers are usually paid every 15 days. They used to deliver their milk to collection centers without knowing what price they would eventually be paid. By using e-Dairy, they can obtain prices before delivering their milk, ensuring that they receive the highest prices.

Extension services can also collect feedback for providers about the usefulness and needed features of their m-ARD apps. For example, the Grameen Community Knowledge Worker Initiative in Uganda collects data on the needs of rural farmers using mobile phones and feeds it into a database to better target extension services.

Establishing market links
M-apps are effective at strengthening market links. They are also being used to improve product distribution and traceability using more sophisticated and less expensive tools. Sensors that track spoilage, density, and light and that monitor storage facilities improve product traceability and food safety in rural areas (RFID News 2009).

Expanding access to finance and insurance
Rural farmers typically lack access to financial services that could increase their ability to upgrade or diversify their practices. This is mainly because financial institutions and insurance companies do not seek out rural customers because of the high costs of small transactions and of loan and claim management. Increasing attention is being paid to the potential to integrate financial institutions and mobile money (m-money) services in agricultural value chain applications.

M-apps such as M-PESA in Kenya and SMART Money and G-Cash in the Philippines have attained widespread trust and acceptance among rural populations as safe, easy ways of making and receiving payments and storing money. Banks and businesses also recognize these m-ARD apps as efficient means of administrating payments and money transfers. And, in these countries at least, m-money is increasingly accepted by banks as a legitimate platform to pay for agricultural inputs and outputs.

The implementation of an automated village well water supply system in Kenya (Grundfos Lifelink), for instance, depends entirely on M-PESA as a risk-free and cashless payment system. Villagers buy an electronic pump key to access safe pumped groundwater instead of having to walk long distances to collect water from a hand-pumped well or impure surface water source such as a lake or river. M-PESA is used to recharge the pump keys as needed. The minimum recharge is $1.25, which pays for at least 20 jerry cans of water. Payments flow directly to the system account, which then pays for maintenance and repays the community loan for the well.

Kenya's Kilimo Salama system is a more complex m-ARD app that provides weather-based microinsurance to small farmers using automated premium collections and payouts through M-PESA (Box 3.2). Farmers, agricultural input suppliers, and the insurance industry all benefit from this innovative product. In addition, it could protect rural residents against other unexpected life events if its use were extended to other insurance products such as funeral and accident coverage.

Box 3.2: Kenya's Kilimo Salama Microinsurance Product

Kilimo Salama is a weather-based insurance m-app distributed by farm input suppliers to insure farmers' investments in inputs—such as seeds, fertilizers, and chemicals—against weather risks such as drought or excess rainfall. It uses solar-powered weather stations to provide farmers with full climate data (rainfall, temperature, wind speed, sunlight) and mobile payment technology to collect premiums and distribute payouts. The m-app also provides an advice line for farmers and sends text messages to help farmers improve their techniques.

Benefits to small farmers
By insuring their farm inputs, farmers are more confident that they can plant the following season even after loss, due to the payout. The system's climate data also enable prediction of the incidence of disease and other potential risks. The information, combined with knowledge about farmers' locations and mobile numbers, enables farmers to receive timely text messages that help them improve their practices, productivity, and food security.

The initial pilot, where the indexed insurance made major payouts (80 percent of purchase value), gave farmers—who on average insured only 10-20 percent of their input purchases in the first season of the program—the confidence to increase their insurance to 50 percent of inputs the next year. In addition, more farmers bought seeds, fertilizers, and chemicals that have higher yields in normal years. Still, the complex interactions between weather, information flows, proper use of the information, and insurance arrangements underscore the critical importance of education and extension services alongside the sale of insurance and the adoption of new, more productive techniques.

Input suppliers
Distributing insurance also makes sense for suppliers: their revenue and turnover are closely related to climatic circumstances because their clients only buy inputs when it rains. When suppliers are the only ones providing credit to farmers, their businesses are quickly in danger of bankruptcy when droughts occur. Kilimo Salama provides more secure revenue for suppliers because farmers are willing to buy inputs even in seasons following adverse weather conditions. Moreover, Kilimo Salama is only offered by certified, trusted suppliers, potentially increasing the loyalty of their customers and boosting sales.

Insurance industry
The Kilimo Salama m-app made it feasible for the insurance company to provide a product in an otherwise untapped and practically unreachable market. Both the insurer and international reinsurers can be confident in the accuracy and timeliness of data provided.

Qualitative Impact

In addition to their quantifiable benefits, m-ARD apps have significant qualitative benefits. By nature, qualitative benefits are harder to assess objectively and largely depend on the local context. Determining success is made even more complex by the lack of clear project targets in many e-government m-apps. For example, how does a project assess the benefits of m-apps relative to the costs of providing them? This remains a key challenge for e-government m-apps.

For example, TXT CSC in the Philippines and the 1919 Government Information Center in Sri Lanka are e-government applications that provide government information to citizens though a mix of SMS, voice, and Internet channels. TXT CSC receives some of the heaviest traffic of the government's text-based services. Providing information about government services provides clear benefits at relatively low cost and in response to significant demand. But because both services mainly only provide information, quantifying their impact is challenging.

Ushahidi, developed in Kenya, is another example of an m-ARD app delivering qualitative benefits. It uses crowdsourcing to acquire information about events in an area and superimposes the results onto maps. It was initially used to monitor post-election violence, and its main benefit has been providing accurate information about what is happening on the ground and increasing government transparency. Ushahidi is also used to support timely interventions by and aid government agencies in disaster-hit areas, such as in Haiti after its disastrous 2010 earthquake. Ushahidi provides a platform for organizations to receive information, analyze it, and form a response. It is provided on an open source basis to a wide range of public and private agencies, including new ones—how the information is used and acted on is not Ushahidi's responsibility.

4. Mobile Ecosystems

The general definition of a mobile ecosystem is the same one used by James Moore when he applied biological concepts to the business world: an economic community supported by a foundation of interacting organizations and individuals—the organisms of the business world. This economic community produces goods and services of value to customers, who are also members of the ecosystem (Moore 1996). The ecosystem for mobile applications for agricultural and rural development (m-ARD apps) is the community of service providers, rural agencies, m-app providers, customers, and related participants such as government departments, financiers, and regulators.

All possible players in the ecosystem for m-ARD apps are listed in Annex D. The annex also describes the players' assets, abilities, and incentives, which are important parts of this report's analysis and were initially developed as an analytical information sheet.

This chapter analyzes elements of the m-ARD app ecosystem that differ in developing and developed countries. It is important to examine these differences because rural markets in developing countries are fundamentally different than in developed countries, and will remain so for quite some time. Lessons from the developed world are only valuable in drawing lessons relevant for developing country contexts and ecosystems. The main differences between the m-ARD app ecosystems of developing and developed countries are summarized in Table 4.1.

Table 4.1: M-app Ecosystems in Developing and Developed Countries

Participants/ features	Developing countries	Developed countries
Key players	• Mobile network operators are gatekeepers	• Platform providers dominant (such as Apple's App store) • Independent providers are key players
Platform	• Platform being developed (such as Ovi Store) • Often no mobile payment system • Mobile money available in some countries (such as Kenya's M-PESA) • Operator billing negotiated at the platform level	• Easy to put m-apps on the platform • Platform provides developer support, customer service, payment system (credit card, PayPal), and guarantees the functionality of apps
Content and services	• Hyper-local information • Highly local training • Content often not available in digitized form, so greater need for collaboration with local content providers	• Multiple ways of getting information and services in both rural and urban areas • Substantial information available in digitized form

Source: Authors' Compilation.

As noted, in the developed world there are many ways of accessing information, including computers, newspapers, magazines, and blogs. By comparison, in rural parts of the developing world mobile phones are one of the main and often only ways of accessing information. For example, in the United States 94 percent of rural areas have at least one mobile broadband provider, television penetration is 98 percent, and radio penetration is 99 percent (U.S. Census Bureau 2011).

In the developed world a considerable amount of Internet use involves social media. While social media is also widely used in the developing world, more attention is paid to the role of m-apps in solving problems where few alternatives exist. In the developed world the most popular types of m-apps are for games, weather, and social networking. M-apps that focus on agriculture are often extensions of services available from the Internet or desktop software. For example, Apple's App Store has 40 apps that can be found using agriculture as a keyword. Most involve utilities, productivity, or business issues. The reference category contains just 4 apps—and they all consist of basic agricultural glossaries that are of limited use, leaving just 36 agriculture-focused m-apps out of 425,000 (as of June 2011), or 0.008 percent of the total. In the Android market there are just 7 agriculture m-apps out of 200,000 (as of May 2011), or 0.004 percent of the total.

From an agricultural and rural development perspective, this means that outcomes in the developed world are the result of a particular context or development path. The introduction of the iPhone in 2007 and Apple's App Store in 2008 transformed the developed world's m-app ecosystem. The developing world—particularly because it has such information scarcity in areas such as B2B operations—will follow a different path of m-app evolution. Hence using the developed world's m-app ecosystem as a reference point for the potential evolution of m-apps in developing countries is not particularly useful.

The key challenge in developing countries is creating dynamic m-app ecosystems, including platforms, that mirror developed countries in some ways—most notably by making m-apps more accessible and viable. Several interventions can support progress toward a dynamic model in which a range of stakeholders feed a virtuous loop of m-app development. Numerous policy measures will be required to address deficiencies in the m-app ecosystem in developing countries. The needs and issues are discussed below, and recommendations are provided in Chapter 6.

Key Players

Mobile network operators
The mobile ecosystem in developing countries tends to be a loose association of companies not all pulling in the same direction. Mobile network operators generally dominate the ecosystem—providers are not seen as a core constituency. Instead of providing the tools needed to host and sell m-apps and letting the market determine which ones are desired, mobile network operators in developing countries decide which m-apps they want on their systems.

M-PESA, for example, has not released its application programming interface (API), so third party providers cannot develop innovative uses for it (Kemibaro 2011, Kimunyu 2009). Also in Kenya, Safaricom is the gatekeeper for any m-apps that want to link to its system and charges up to 85 percent of the revenue from m-app transactions. In India and Indonesia revenue shares are more favorable toward m-app providers, with even splits of revenue possible.

M-app providers
In developed countries mobile operators have become data carriers only and are of secondary importance to m-app hosting platforms. The best example is the end of AT&T and Apple's exclusivity agreement for iPhone coverage. As a result, iPhone sales have soared (Apple 2011). The Apple iOS and Google Android operating systems rely on third party providers for m-apps and charge about 30 percent of transaction revenue. Independent software developers are free to innovate and drive the development of m-apps.

Users
Depending on their goals, m-ARD apps target different types of users:

- *Farmers*. KACE in Kenya, Manobi in Ghana and Senegal, and several other m-ARD apps target farmers with pricing information as well as more sophisticated supply chain services.

- *Rural produce buyers and food processing plants (including warehouses)*. Supply chain integration solutions provide a lower cost of supply and can increase the quality of supply. M-apps providing these kinds of solutions include KACE, Manobi, and Virtual City.

- *Cooperatives*. B2bpricenow.com in the Philippines initially targeted cooperatives that held accounts with the main agricultural bank. It has since expanded services to small farmers.

- *Input suppliers*. Kenya's Kilimo Salama, an agricultural insurance program, has formed a partnership with Syngenta, an agricultural input supplier with a network of additional suppliers.

- *Consumers.* Ovi Life Tools (OLT) in India, Indonesia, and Nigeria provides farmers with agricultural price information and consumers with health, entertainment, and education services. This approach could facilitate economies of scale, cross-subsidies, advertising, and other financial benefits.

- *Rural development organizations.* These include government health agencies, government ministry field workers, and donors active in the field. For example, the Grameen Community Knowledge Worker Initiative in Uganda collects data on the needs of rural farmers and uses it to improve the design of education programs.

Unlike in the developed world, m-ARD app users in the developing world demand relevant, hyper-local content. For example, agricultural prices must be sourced from local and regional markets so that farmers can compare prices and decide where to take their produce. (Several m-ARD apps provide this information, including Manobi, OLT, and Reuters Market Light). In addition, there is a burgeoning movement to collect information about users through innovative m-ARD apps such as Jana. This information can be used to provide users with better, more useful, and more relevant information.

Content providers
Several m-ARD apps provide hyper-local information as a key part of their services. Such content is useful because it can be acted on and relevant because it is user-specific. Several players in the mobile ecosystem can provide useful and relevant information:

- *Government departments.* Government departments provide data to local m-ARD apps, following the lead of innovative developments in the United Kingdom and United States (www.data.gov.uk and www.data.gov respectively). Kenya's government has launched www.opendata.go.ke, which provides data on the national census, government spending, parliamentary proceedings, and public service locations as part of an experiment to see what innovative m-apps that providers can design using the data.

- *Extension workers.* Several initiatives provide extension services to farmers, such as the Grameen Community Knowledge Worker Initiative, developed and operated by the Grameen Foundation with funding from the Bill and Melinda Gates Foundation.

- *Civil society.* In Sri Lanka Govi Gnana Seva (GGS), a nonprofit, works with Dialog Tradenet to provide real-time market pricing information to farmers.

- *Specialized commercial units.* In Kenya, KACE has organized market research centers that collect and monitor local market data daily, report information to radio stations on bid/ask prices, and provide farmers with market links, pick-up and delivery transportation, and training in information and communication technology (ICT). The centers are a mix of wholly owned and franchised businesses, a model that appears attractive.[4]

- *Media.* KACE broadcasts local agricultural prices and trades using community radio.

- *Crowdsourcing.* Ushahidi in Kenya provides a platform for people to collect and plot information (ranging from disaster management to civil unrest) from officials or citizens sent by email, SMS, or Twitter.

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[4] See Annex G, Kenya Case Study, section 4.3.

Platform

The most important m-apps innovation in the developed world has been the creation of a platform that allows independent software providers to create m-apps. For the purposes of this report, a platform is defined as software architecture that serves as a foundation or base for other programs or applications. A platform usually includes security features—procedural and software rules that m-apps must comply with to use the platform. Examples of platforms include Android, Apple's iOS, Ushahidi, and Telefonica's BlueVia.

Apple's App Store distinguishes itself from previous systems, such as those developed by mobile network operators, by providing an operator-neutral platform. Providers are free to be innovative, and getting an m-app into the Apple App Store is relatively easy. In July 2010 the platform had more than 43,000 app providers associated with iOS (AppStoreHQ 2010). Moreover, the App Store provides developer support, customer service, and a payment system, and guarantees m-app functionality. This creates consumer trust in the system and contributes to the massive number of m-app downloads.

Creating a similar platform for developing countries would face obstacles including low mobile broadband penetration, lack of an m-payment system, low smartphone penetration, and low advertising revenue. These factors, coupled with the importance of mobile network operators in driving mobile phone adoption, have created an alternative platform for developing countries.[5]

Nokia, drawing on its historical dominance in developing countries with standard phones and having lost significant market share to smartphones in developed countries, sees an opportunity in developing countries. Nokia launched the Ovi Store in 2009, incorporating a group of m-apps called Ovi Life Tools (OLT) targeted at users in developing countries. These tools are geared toward narrowband, affordable m-apps providing health, education, agriculture, and entertainment services. OLT has about 6.3 million users in China, India, and Indonesia (Nokia Conversations 2010b), and has been operational in Nigeria since November 2010. Several of Nokia's m-apps, such as Ovi Maps, use compression to reduce data usage, making them better suited to narrowband environments (ReadWriteWeb 2010).

Unlike the Apple and Android models, which use mobile network operators purely as data carriers, developing country platforms such as OLT must integrate with mobile network operators to use their operator billing systems. Credit cards are still uncommon in developing countries and so are not good mechanisms for consumers to pay for m-apps. Few institutions in developing countries are as trusted as mobile network operators and their associated mobile money (m-money) operations such as M-PESA, GCash, and Smart Money (the latter two both in the Philippines).

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[5] Developing countries and emerging economies are defined according to the list in IMF (2010).

M-PESA has a long history of providing person-to-person transfers and other money services in areas with no prior access to financial services. Operator billing enables consumers to buy m-apps and have the cost deducted from their prepaid or postpaid balances. When the Ovi Store is introduced in an area, operator billing accounts for an average of 13 times more sales than credit cards (Nokia Conversations 2010a). As of November 2011, operator billing through the Ovi Store was available in 46 countries (Nokia Developer 2011).

Providers like using the Ovi Store because it negotiates on their behalf with mobile network operators—hence the rapid increase in the number of m-apps available through the store. But the Ovi Store has to negotiate with every mobile network operator in each country, slowing the process of providing m-app services relative to Apple and Android. Still, using operator billing as an alternative (though imperfect) replacement for m-money provides a foundation for m-apps to develop their own revenue streams. Without a payment mechanism, m-apps face significant challenges to becoming commercially sustainable. Hence, supporting m-money and other mobile payment systems is an important step toward promoting sustainable m-apps.

Mobile network operators have different models for m-app development platforms, of which BlueVia, created by Spain's Telefonica, is particularly interesting. Telefonica launched BlueVia in late 2010. BlueVia copies several features of the Apple and Android development platforms:

- Providers earn 70 percent of m-app sales and subscription payments.
- The application programming interface (API) is free.
- Providers earn a share of advertising revenue.
- Providers have access to all Telefonica subscribers (Telco 2.0 2010).

BlueVia differs from competing models such as T-Mobile's because it bring providers into the platform for free and does not charge for the API. Providers can also sell their products to third party m-app stores. Like Nokia's Ovi Life Tools model, BlueVia also allows providers to charge for their apps by mobile phone—in the Czech Republic, Germany, the Slovak Republic, and the United Kingdom using the O2 brand and in Latin America and Spain using the Movistar brand.

Still, the BlueVia model faces challenges. Though Telefonica has presented a plan for integration with other mobile network operators, it does not yet have any integration with competitors. As a result, the number of users is limited to Telefonica's 200 million subscribers, while the Android model's limit is potentially far higher. The Android model also has the advantage of not being associated with any mobile operator, while BlueVia is explicitly associated with Telefonica. BlueVia's stated intention is to be operator independent, but Vodafone, T-Mobile, and several other operators have launched their own app stores. It remains to be seen how the app store landscape will play out among mobile operators.

The challenges facing m-apps where there is no platform—and the potential benefits of getting one—are described in Box 4.1. In developing countries the ability to scale up depends on an m-

app ecosystem platform. A platform gives m-app providers access to a large number of consumers and well-known, trusted payment mechanisms (m-money companies such as M-PESA). A platform can also facilitate transactions between consumers and companies that see opportunities to market their products to rural consumers. These types of companies include suppliers and distributors of fast-moving consumer goods (FMCGs), banks, microinsurance companies, and agricultural cooperatives (see Figure 4.2 and Chapter 5).

Box 4.1: Virtual City: The Challenges of Working Without a Platform

Virtual City is an m-apps developer in Kenya that has provided automation solutions in the tea, coffee, dairy, and cotton agricultural segments. Virtual City interacts only with the lead buyer in each sector to develop customized solutions (Box Figure 4.1). Virtual City might have some interaction with farmers and distributors, but this is intermediated by buyers. Virtual City does not have any influence on critical m-apps ecosystem players such as handset manufacturers, financial institutions, and mobile network operators. Virtual City's approach is self-sustaining because clients realize that its benefits justify its costs. But Virtual City is limited by the number of m-apps that it can develop.

Figure B4.1.1: Virtual City Ecosystem
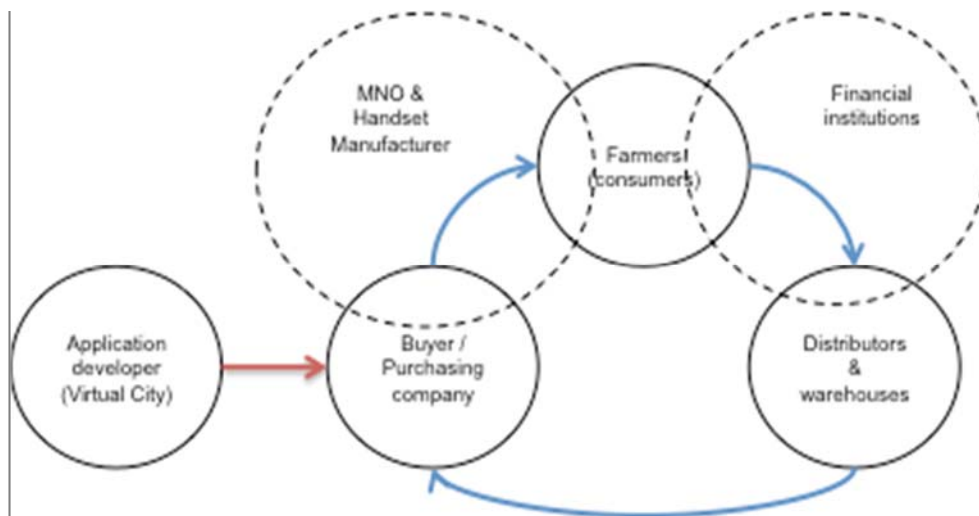
In September 2010 Virtual City received $1 million from Nokia's Growth Economy Venture Challenge. This cash infusion provided financing as well as an opportunity for Virtual City to work with Nokia on integrating Virtual City's Mobile Distributor Solution with Nokia's Ovi Life Tools (OLT), creating potential for more clients and increased scalability. This is a promising route because the OLT platform serves 2G and 3G handsets that are far more commonly used than iPhone, Android, and Blackberry handsets in the developing world.

Figure 4.2: Ecosystem Platform
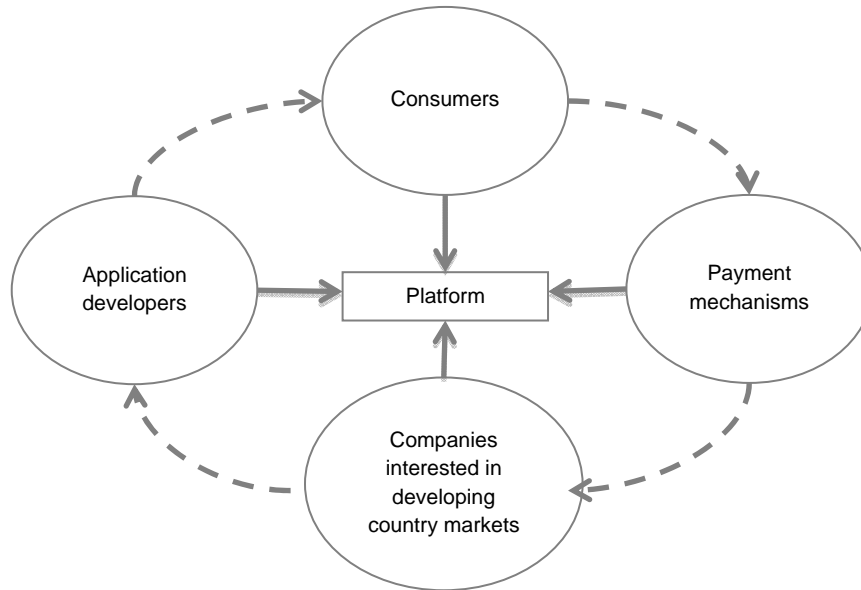
Source: Authors' Compilation.

The Nokia Ovi Store and Ovi Life Tools (OLT) models suggest that a successful m-apps platform is possible for developing countries. Such a platform provides relatively uniform m-app approval procedures and processing times. The principle of streamlining the approval process through an intermediary such as the Ovi Store or OLT is important.

Highly Local Content and Services

Another fundamental difference between developed and developing country markets is that m-apps in developing countries must be hyper-local and tailored to user requirements—even down to the village level—in terms of the information and services that m-apps offer, necessary training, and the operating platform. Scaling up is difficult.

In developed markets there are many ways to access local information. Most local stores, for example, have a presence on the Internet. Finding the price for a good or service simply requires going online. In developing country markets information asymmetry is the norm. Disposable income is extremely low and people cannot afford to use several different methods to access information. To offer value to customers in developing countries, information provided by m-apps must be hyper-local.

A study of Indian services showed the relative value provided by specialized content providers (Mittal and Tripathi 2010). Farmers placed higher value on the information provided by Reuters Market Light (RML) than that provided by IFFCO Kisan Sanchar Ltd (IKSL). The information

provided by RML was more specific, and RML had more experience with providing relevant information. IKSL was a partnership between a fertilizer cooperative and a mobile network operator. The information business was secondary to its primary business—gaining more mobile subscribers and increasing fertilizer sales (Lokanathan and De Silve 2010). Its learning curve, in terms of disseminating relevant content, was steep. Unlike RML, providing relevant content was IKSL's only way of generating revenue, so it spent more time trying to understand the needs of its target audience.

Moreover, levels of consumer education and literacy are usually low in rural areas of developing countries and so require onsite demonstrations or training in the use of m-ARD apps. Several m-ARD apps highlight the need for trainers to visit villages to explain the benefits and use of each app. Examples include:

- Govi Gnana Seva agriculture price collectors in Sri Lanka, who work in association with Dialog Tradenet.
- KACE's market resource centers, whose staff visit markets in Kenya to get data and work with farmers to help create links after they get information on market prices.
- Kilimo Salama, an insurance marketing application in Kenya that provides farmers with integrated financial training and educational extension services about insurance and high-yield seeds.
- Reuters Market Light in India, which provides local-level market information to farmers, using local teams to collect market data for submission to a central server.

Such support is costly. Some m-ARD apps are developed for literate village-based intermediaries such as phone operators, health workers, and entrepreneurs who then provide information to their village's poorest residents, who are illiterate or do not own phones. The Grameen Community Knowledge Worker Initiative in Uganda is an example.

For m-ARD app platforms, Nokia's requirement that OLT be hyper-local ensures that it can offer unique content in each country. In India, for example, OLT's agricultural information desk handles more than 10,000 data points a day, more than 275 different crops in more than 4,000 markets, and in 11 languages (Nokia World 2010). This is why services such as OLT are available in only 14 languages and 4 countries.

5. Business Models

Business models are the systems that organizations use to create, deliver, and capture value (Osterwalder and Pigneur 2009). Still, the definition of a business model is murky. It usually refers to a loose concept of how a company does business and generates revenue. Yet simply having a business model is a low bar to set for building a company. Generating revenue is a far cry from creating economic value, and no business model can be evaluated independently of industry structure (Porter 2001). Moreover, multiple business models may exist within an industry structure, and the concept of value has two meanings in the context of m-ARD apps in developing countries:

- For commercial mobile applications for agricultural and rural development (m-ARD apps), the concept of value is the ability to earn enough profit to continue operating in the medium term (more than the next two years).
- For noncommercial m-ARD apps (such as some e-government apps), value is defined as providing a nonmonetary benefit to a target group such as rural residents, patients, or any other defined group. For a noncommercial m-app to be sustainable, the social and economic value it delivers should be greater than the cost of providing it.

Commercial m-apps are either transactional or informational. Transactional m-apps have a built-in payment system—for example, integration with a mobile money (m-money) service provider (such as M-PESA) or operator billing service (such as Ovi Life Tools). Informational m-apps aim to be profitable or sustainable by generating an alternative revenue stream—say, by providing services (as with Jana). Noncommercial m-apps do not have any integration with payment systems or alternative revenue streams because they are funded by donors and governments.

The business model analysis in this report study was undertaken in accordance with the case study information sheet in Annex B. In addition, the business models for the 92 m-ARD apps studied were aggregated and the apps were placed into three stages of business development:

- *Pilot.* The proof of concept stage: m-ARD apps are testing their concepts, usually with small target markets, and often do not charge for their services. Donors and governments usually provide the funding for this stage.
- *Stage 1.* The scalability stage: based on a successful pilot stage, m-ARD apps begin scaling up and trying to enter markets. Commercial m-ARD apps move from being free to charging fees, such as for transactions or membership. In the noncommercial category, even if an app does not charge fees—as with a government information service such as TXT CSC in the Philippines—sponsors can make the transition from a limited to a larger scale and become more popular or feature-rich based on whether goals are being met and the costs of scaling up justify the outcomes.
- *Stage 2.* The sustainability stage: the point at which m-ARD apps are profitable or at least break even. Even if not profitable in stage 1—for example, an m-app may still be reliant

on donor support—an m-app's sponsors must demonstrate how sustainability can be achieved. Growth is still a major focal point, but medium-term sustainability has been achieved. This usually requires having a business plan that might call for more investment in marketing and enhancing software to reach the scale required for profitability.6 For noncommercial m-apps, the funding cycle is not dependent on monthly cash flows, but rather the willingness of the donor or government to continue funding the application. Decision cycles for noncommercial m-apps might be much longer than for commercial ones.

Sustainability

Figure 5.1 shows where the 92 m-ARD apps reviewed by this report fall in terms of the three stages of business development. Figure 5.2 shows whether the apps are commercial or noncommercial and where they fall in the business development stages. Only 16 percent of the m-ARD apps have reached stage 2, the sustainability stage. This may be because many are still in early stages of development. With time, more of these apps will likely move from the pilot stage and stage 1 to stage 2. But the significant difference in the number of m-ARD apps at stage 1 and stage 2 indicates the major challenges involved in becoming commercially sustainable.

Figure 5.1: Mobile Applications by Business Development Stage
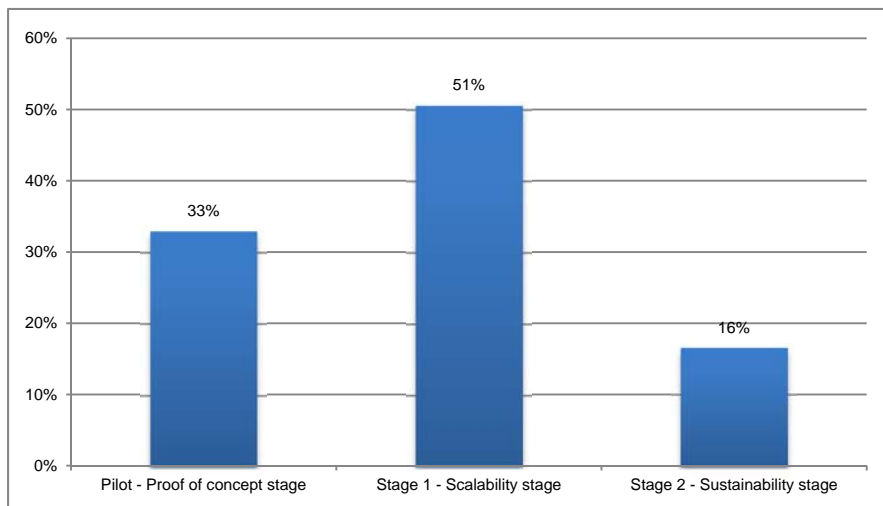
Source: Authors' Compilation.

Most of the m-ARD apps studied—commercial and noncommercial—are facing challenges in scaling up after successful pilot stages. For commercial m-ARD apps this evolution requires

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[6] In Kenya, KACE required 40 percent donor funding in stage 1 but has a clear business plan that will require spending much more on marketing and investing in the development of an enhanced platform, neither of which was possible under donor funding. With the promise of profitability within two years, the business plan is targeted at securing private debt and equity. DrumNet prepared such a plan for commercialization after its successful pilot, but its future is uncertain because it has tried to move from the pilot stage to stage 2 with a sophisticated, ambitious business plan that has yet to attract an investor.

balancing the demands of maintaining profitability and covering expansion costs. For noncommercial m-ARD apps the scalability stage involves a constant evaluation of the benefits that these apps provide to subscribers and whether they justify the costs of expansion.

A similar pattern emerges when comparing commercial and noncommercial m-ARD apps through the stages of business development. There are more m-ARD apps in stage 1 for both commercial and noncommercial apps. But there is a larger drop-off from stage 1 to stage 2 for commercial than noncommercial apps. There is little substantive evidence to explain this difference, though one possible reason is the different types of financing available to the two types of applications.

Figure 5.2: Mobile Applications by Type and Stage
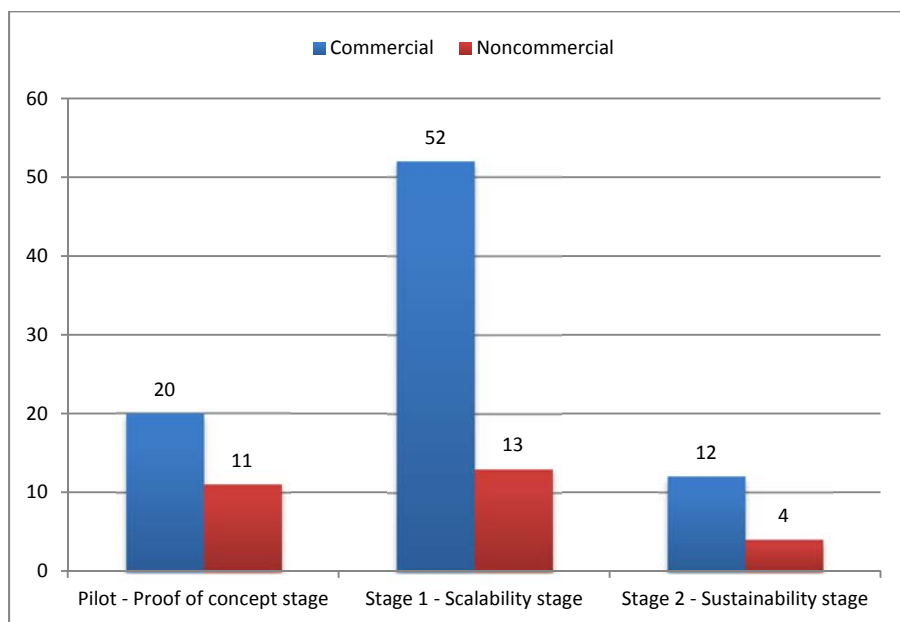
Source: Authors' Compilation.

Note: The number of enterprises sums to more than 92 because many applications have different versions in different countries or fall into a mix of categories.

The relationship between potential market size and the success of an m-ARD app adds complexity to the issue of sustainability. For example, Reuters Market Light (RML) is based in India, a country with a population of more than 1.1 billion (World Bank 2009), and has a subscriber base of 250,000—but is not yet profitable. B2bpricenow.com, based in the Philippines, where the population is 92 million (World Bank 2009), has a very different product offering focused on a niche market with far fewer subscriber than RML. Yet b2bpricenow.com is profitable. Though population size may be linked to sustainability, factors such as target market size, customers' ability and willingness to pay, and services offered may be more relevant.

Noncommercial e-government applications also face unique challenges to achieving sustainability, as they need continued support from various government agencies and ministries to deliver government information. This support ranges from simple responsiveness to information requests to database integration. But the main challenge for most e-government m-apps is moving beyond providing information to providing responsive systems with tracking and feedback capabilities. Doing so adds significant value for users and helps ensure the sustainability of these services.

Willingness to Pay

Demand is one of the key sustainability issues for commercial m-ARD apps in developing countries, especially in terms of users' willingness to pay for goods and services. Willingness to pay is distinct from ability to pay, but they are related concepts from a demand perspective. For example, consumers who derive considerable benefits from the consumption of a good may be willing to pay for it, but their budgets are limited by their ability to pay.

Willingness to pay is more reflective of the demand for m-ARD app services because many commercial apps are not yet at their most affordable prices, as they are still unable to fully benefit from economies of scale. In addition, focusing on ability to pay is myopic from a development perspective because it ignores poorer population segments that are likely to benefit more from such services. Hence ability to pay does not provide as useful a perspective to development practitioners and policymakers, this report's main audience.

Evidence on willingness to pay from many countries—India, Kenya, the Philippines, Senegal, Sri Lanka, and elsewhere—indicates that farmers seem willing to pay for basic or premium SMS calls to secure information. But their willingness to pay for these calls, and possibly to pay an additional fee for the service, may depend significantly on their income and education levels and the scope of the information services provided. The experience of Manobi, a market pricing system in Senegal, suggests that small farmers earning just $1-2 a day might not be willing to pay for even a simple information service, such as market prices, even though they could double their income by receiving such information (Annerose 2010).

Experiences also indicate that poorly educated farmers are less willing to pay even basic phone charges for simple information services, and even less so if the benefits of the information emerge in the long term (such as learning about new farming techniques where the payoff is not immediate). But it is important to remember that almost all users have to pay for the voice call or SMS to access such services, and it is typical for m-app providers to receive a portion of this revenue from mobile network operators.

Hence the evidence is mixed on farmers' willingness to pay more than the basic telecommunications costs of SMS or premium calls for useful information or services. Some m-

ARD app providers interviewed for this report are convinced that farmers are willing to pay for more value added apps that facilitate deals, have useful granular or local market information, and provide trading and linkage management services. In Kenya two case studies show that linkage management can be priced at up to 5 percent of the value of the deal it facilitates. The combined benefits of higher commodity prices, more secure deals, elimination of middlemen, and other factors generate this demand (see below).

Willingness to pay can also be increased by offering a mix of tools and relevant information for users in developing countries. For example, Nokia combines several categories of services in its Ovi Life Tools (OLT) package:

- *Agriculture*: providing information on prices, weather, and availability of pesticides and seeds, for example. Information is customized by location.

- *Education*: tools to boost knowledge of the English language as well as general knowledge at the local, national, and international levels.

- *Health*: information, advice, and tips on health issues, particularly pregnancy and maternal health and childcare.

- *Entertainment*: games, email, and other entertainment.

Revenue

Typical revenue streams
Several revenue streams are available to m-apps. The costs of app development and support are often affordable, even on a consumption basis, and even more so because B2B prices are based on leveraging subscribers' willingness to pay. Thus m-app providers have reasonable options. The most common revenue stream for information services is a share of SMS revenue. But m-ARD app providers typically receive less than 18 percent of SMS revenues from mobile operators (just $0.016 a message in Kenya). This is part of the motivation for m-app providers to offer freemium pricing models that derive revenues from higher-value services based on transaction or membership fees.

A charge per transaction can also be quite successful. For example, Kazi560 in Kenya is a job information service that links job seekers to employers. There is a small fee for job seekers to receive an SMS message. This application has only been used in Nairobi but is expanding to other cities, though it is not yet targeting rural job seekers.

Still, securing such revenue is difficult. Only 29 percent of the m-ARD apps surveyed receive some form of operating revenues from normal business activities through shares of SMS, transaction fees, or membership fees (Figure 5.3). The other 71 percent are partly or entirely dependent on external financing (such as from donors or governments) because they do not earn enough revenues to sustain operations. But pricing for viability is possible if investment funding is secured.

Figure 5.3: Mobile Applications by Revenue Source
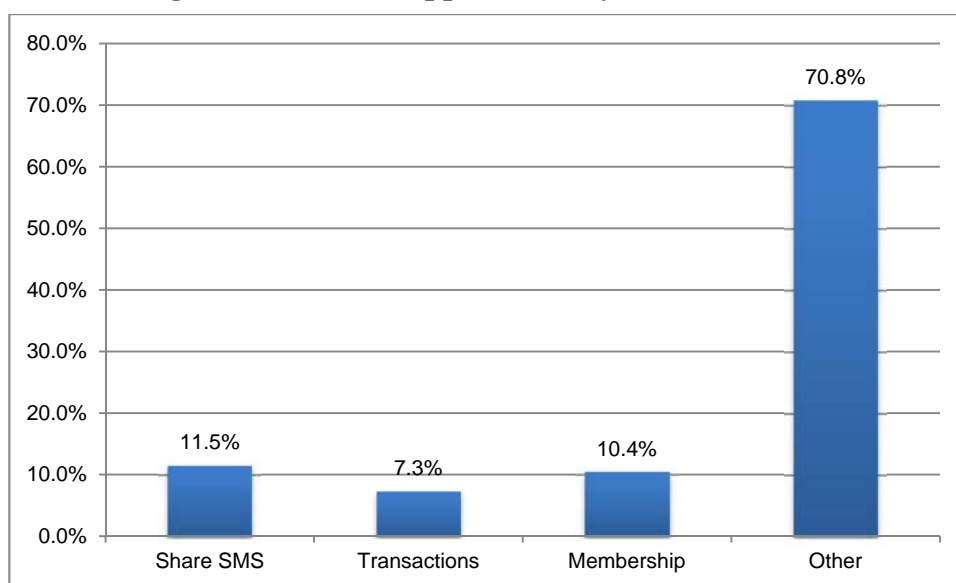
Commercial m-ARD apps must develop a creative combination of revenue streams that can yield a return on investment and cover operating costs while taking into account the app's affordability—a possible barrier for some consumers. But m-apps can be marketed with a range of strategies and pricing options, changing consumer perceptions of affordability. Table 5.1 summarizes a range of potentially feasible revenue streams for information and support services that benefit various players in the rural ecosystem and so could generate sufficient demand to ensure sustainability.

Table 5.1: Rationale for Fees and Revenue Streams for Mobile Applications

Revenue source	Fee	Customer	Rationale
User sign-up fees	One-time membership fee that gives farmers access to a network of partners and basic services	Farmers	Access to a network provides farmers with markets, credit, and information they would otherwise not receive
	One-time or recurring subscription fee for basic or premium services delivered through a Web-based portal, including reports, maps, and alerts	Buyers, banks, insurance companies, other commercial entities	A subscription to the portal featuring several basic services available to major customers payable on a scale for premium services such as individualized alerts and premium information
Information access fees	Nominal fee for an SMS message or package of messages	Farmers	Farmers benefit from pricing information if local or granular in nature, especially if m-apps use market information to offer linkage services that assist with tasks such as contracting and transport

Transaction fees	Nominal fee for SMS or USSD communications	Farmers	Offers to buyers or inquiries about credit could be made through the platform's SMS facility and involve a fee to buyers for each SMS, which is more cost-effective than other communications
	Fee on agricultural input or insurance transaction facilitated by the platform	Input retailers	Input retailers and agricultural input dealers can increase their sales by acting as certified network partners for input suppliers or distributers of microinsurance products on the system
	Fee on produce sales facilitated and expedited through the platform	Farmers and buyers	Farmers and buyers pay for services to expedite produce contracting collection and delivery, facilitate payment for produce, and track and report produce collection and payment (farmers have shown willingness to pay a fee of 5% in various cases)
Advertising and research	Fee for advertising products and services on platform to network partners either by SMS on a Web portal	Commercial companies	Companies (both users and nonusers of the m-app) will pay to advertise their products and services to farmers and others inside and outside the agricultural sector., and could target certain locations or demographics
	Fee for facilitating research in the form of simple questions (such as from farmers) about demand preferences	Commercial companies and others	Companies and agencies with economic or development interests in rural areas, such as suppliers and distributors of fast-moving consumer goods, banks, NGOs, and cooperatives, would pay for access to all farmers on the network. The research could be more successful if part of the fee were shared with targeted users such as farmers in the form of service credits or airtime.
	Fee for accessing valuable information available in growing database	Commercial companies and others	Many organizations, including research and community development organizations, would find valuable the data on farmers, buyers, and banks and the interactions contained in the service database.
Other service fees	Fee for alerting a bank to the loan needs of specific farmers and facilitating their interactions with banks	Banks	Some commercial banks want to lend to the agricultural sector and to small farmers but doing so is risky and expensive, so banks will pay to be introduced to farmers looking for loans—especially those with access to contracts or with known credit history
	Fee for process or platform customization	Buyers and banks	Major users such as buyers and banks may require customization of processes such as forms or of Web-based portals

Source: Authors' Compilation.

Alternative revenue streams

The ability to find alternative or supplementary sources of income beyond government or donor support could significantly increase the sustainability of m-ARD apps. Revenue from advertisers gives m-apps in the developed world a major advantage in reaching long-term sustainability. For example, providers in the Apple App Store and Android Market can earn $10 and $7 per subscriber, respectively, through advertising. (This is for apps with more than 500,000 downloads and/or more than 75,000 daily users.) Such amounts are unrealistic in developing countries because disposable incomes and the number of m-app users are much lower, and these countries have less of an advertising culture.

Instead of adopting the developed world's advertising revenue model, m-app providers in developing countries can take advantage of revenue opportunities available because of information asymmetry and scale. In such cases the lack of consumer information can be an advantage in encouraging companies interested in developing country markets to pay for information from m-apps.

Some innovative m-apps already operate along these lines. Instead of looking at consumers as their only source of income, these m-apps see the potential for facilitating and profiting from transactions between consumers and companies in developing countries. These companies typically have commercial interests in rural markets and may see an opportunity to market their products through m-ARD apps. They may also have an interest in nonagricultural m-apps where valuable market information could be extracted. Suppliers and distributors of fast-moving consumer goods (FMCGs), banks, microinsurance companies, and agricultural cooperatives are potential candidates for such market research and survey services.

For example, Jana, which started in Kenya and has since spread elsewhere, is a crowdsourcing m-ARD app that gathers small pieces of information from mobile customers in developing countries in exchange for airtime credits, and has automated algorithms to evaluate the quality of the data and compensate respondents. If a company selling FMCGs wants to understand consumer reactions to a brand of shampoo, a brief questionnaire can be texted to a Jana database of users. For answering the questionnaire, each respondent receives free airtime. Thus Jana is exploiting an alternative revenue stream that has been missing from developing country m-apps: FMCG companies are paying for access to a large number of consumers, getting information about consumers' wants, and promoting their products. Business models such as Jana's are highly scalable, low-cost, and focused on generating revenue.

The crowdsourcing or market intelligence approach can be combined with other m-ARD apps in rural areas to develop supplementary revenue streams, particularly as information about consumer habits is compiled over time. As indicated by Table 5.1, these databases can be mined to add value and benefit for nonrural organizations including governments that want to understand their citizens' behavior, motivations, and interests. This is relevant to the challenges

facing m-app providers in developing countries, and should be an agenda item for m-app collaboration and networking initiatives.

Similar ideas, as well as related creative advertising, could be married with m-ARD apps to form partnerships with companies interested in rural markets. These companies could create supplementary revenue streams for m-ARD apps. Governments and donors could bring such companies into the evolution of m-ARD apps by including them in consultations, workshops, networking events, and other initiatives.

Pricing Models

This report identified four main pricing models for m-ARD apps: nonchargeable, transactional, embedded services, and freemium. These models are derived from the qualitative analyses of the 15 case studies in Kenya, Sri Lanka, and the Philippines, as well as a comparison with other well-developed cases elsewhere.

Table 5.2 categorizes 19 m-ARD apps based on these models. There are 11 nonchargeable, 3 transactional, 3 embedded, and 2 freemium models. But some of these models can overlap, and each has successful examples discussed in detail below.

Table 5.2: Mobile Applications by Pricing Model

Application	Nonchargeable	Transactional	Embedded services	Freemium
KACE				*
Lifelink			*	
DrumNet		*		
Kilimo Salama			*	
B2bpricenow.com		*		
Virtual City		*		
Dialog Tradenet		*		
e-Dairy	*			
1919	*			
1920	*			
Text2Teach	*			
Project Mind	*			
Farmers Texting Service	*			
Reuters Market Light		*		
Esoko		*		
Manobi				*
iCow		*		
Kazi560		*		
M-PESA			*	

Source: Authors' Compilation.

Nonchargeable model

Under the nonchargeable model, subscribers generally do not pay to use m-ARD apps. These are typically noncommercial services such as Ushahidi, 1919, and 1920. These services typically aim to provide only basic market information and are likely to be developed and offered independently—not embedded in other product marketing or promotion strategies.

Transactional model

This model charges subscriber for using m-ARD apps based on the number of transactions conducted and shares some features with the freemium model. Examples of m-ARD apps using this model include Virtual City, KACE, and Reuters Market Light (RML). Under this model, m-ARD apps typically have to provide sufficient value to justify their use. Hence such services are typically highly effective and efficient.

For example, Virtual City's supply chain automation service enabled the Kenya Tea Development Authority (KTDA) to shorten transaction times from 3 minutes to 22 seconds, reduce fraud at collection points, and increase farmers' income by 9 percent. To justify their use and charges, these m-ARD apps may also provide hyper-local, niche, or value added information

not available elsewhere. RML and Tradenet, for example, provide independently generated or collected niche information and value added services such as market trades and logistics support.

Embedded services model

Pricing for this model is indirect because m-ARD app services are provided free of charge. But the services are provided to generate demand and strengthen customer loyalty to the provider's primary, chargeable product or service. This model has potentially significant development impact because the m-ARD apps offered are typically new or used innovatively to help companies sell their primary product or service. In addition, the m-ARD apps are normally developed and provided by large companies, which bring have significantly more resources than other m-ARD app providers, and their benefits are relatively easy to assess because the service is new.

However, use of this model is limited by the scope of providers' primary products or services because the m-ARD apps must complement them to increase sales. In addition, this model could be used to entrench a company's market position to the exclusion of competitors. For example, M-PESA raised the market value of Safaricom, increased entry barriers for other operators, and has been an integral part of Safaricom's success in maintaining its market share over the past five years (Wireless Intelligene 2010). The potential for market failure as this model matures implies that regulatory intervention may be required to ensure that the development of m-ARD apps expands beyond the original players.

Freemium model

This model cross-subsidizes basic information or SMS services by charging for advanced, value added features, functionality, or related products and services. Value added services may include access to market links for which providers charge membership fees or costs per transaction that can be fixed, graduated, or based on percentages of purchase or sale value. The freemium model can be seen as a variation of the nonchargeable model because it provides low-cost services at no charge mainly as a marketing and promotional tool to charge for more sophisticated services with higher costs.

The freemium model could offer significant advantages in developing m-ARD app markets because it introduces subscribers to providers' services, builds trust, and creates upselling opportunities. But only a few of the m-ARD apps analyzed by the research conducted for this report use the model. KACE offers market pricing information by radio or text messages to attract farmers to its market resource centers, which then provide assistance with market links such as transactions, delivery coordination, competitive pricing on inputs, and other supply chain services. Users pay for this assistance as a percentage of the transactions, and most of KACE's revenues come from these fees. Manobi follows a similar strategy, offering free market price information that is subsidized by higher-value services.

Costs

Commercial applications

Where cost data could be obtained, a range of m-ARD apps was selected that are illustrative of the pricing models. To have as complete a dataset as possible, capital and operating expenditures were measured against available user and transaction target levels to compare development and support costs with affordability (measured as a percentage of rural household income in countries where the apps are active). Though, as noted, willingness to pay is a more relevant measure for measuring demand for most m-ARD apps. The analysis first compares KACE, b2bpricenow.com, and Reuters Market Light (RML). These three m-ARD apps have adopted different models to address their costs. Table 5.3 summarizes the estimated capital and operating expenditures per transaction for each of these apps.[7]

Table 5.3: Sample Commercial Mobile Applications with Low Costs

Application	Current or target market (number)	Incremental cost per user or transaction (U.S. dollars)		Cost per user as % of household income	
		Capital expenditure	Operating expenditure	Capital expenditure	Operating expenditure
KACE—SMS and radio broadcast trade platform, as well as market resource centers	1,000,000	0.40	0.50	0.07	0.8
b2bpricenow	26,000	31	2	2.51	0.15 per transaction
Reuters Market Light	250,000	8	4	0.94	0.47

Source: Authors' Compilation.

- *KACE*. In its forward-looking expansion plan seeking to move from stage 1 to stage 2 of business development, KACE is targeting about 1 million farmers and, in addition to its one-time incremental capital expense of approximately $400,000 ($0.40 per targeted user), would have an annual operating cost of $0.50 per user. It provides a range of services, starting with simple market price information (which could contribute significantly to the business revenues if the user target is reached), progressing toward fees or commissions based on matching buyers and sellers, and finally commissions based on successful delivery of agricultural goods (supply chain integration). The progression from simple market information to supply chain integration is needed to achieve its target market. If the target market of 1 million is missed by 50 percent, the operating cost per user doubles to $1, which could require higher pricing for simple market information. But the total package of services, with reasonable assumptions for the number of accesses a year by each farmer, can be operated for less than 1 percent of the typical rural farmer's household income (well below what consumers normally spend

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[7] These estimates are based on publicly available information and are not necessarily accurate.

even on private ICT services). This promises good potential for marketing the services profitably. KACE's higher-value services contribute the most to its commercial viability, though missed targets could delay commercial payback and profitability.

- *B2bpricenow.com.* This site targets a much smaller group—mainly agricultural cooperatives. Its m-ARD app is based on providing a payment platform to facilitate transactions between cooperatives and buyers, thus its cost related to household affordability is less relevant compared with the other two examples in this set. Because its target audience is so much smaller, its operating costs per user are higher than KACE's. But it shares one feature with KACE: using one income stream to cross-subsidize another. B2bpricenow.com is expanding beyond cooperatives to individual farmers and hopes to develop a mobile trade platform. This progression would not be possible without its primary income from matching cooperatives and buyers.

- *Reuters Market Light.* RML has the highest operating cost of these three m-ARD apps: $4 per customer based on current customer levels. This includes some startup sunk costs, but is also believed to reflect the capital cost of starting up, expanding to another country, or building and staffing new granular, hyper-local information collection and support services. Its operating cost is still less than 1 percent of rural household income, even if only half of its declared users are active at any given time. It has adopted a different approach from KACE and b2bpricenow.com because it is not cross-subsidizing different products. Instead, it is focused on providing agriculture-related price, weather, and other information targeted at users based on their locations. To do this, RML builds teams that monitor agricultural prices and other data in each location. Because of this expense, RML's market remains relatively small, especially relative to India's population.

Providing useful, relevant information is costly. There is a tradeoff between the provision of local information and scalability: local teams are needed to collect data, which means that expansion into new areas involves the same content provision costs. Costs climb at the same rate as new subscribers sign up. RML, for example, is not yet profitable even though it has 250,000 subscribers in 12 Indian states.

Some m-ARD app providers have found ways to overcome this problem. Local data also need to be collated at the national level to take advantage of the best price offers. KACE's model collects information locally but provides farmers with national information and linkage support. Manobi also provides different levels of local information, starting with free local pricing information and moving toward more sophisticated information that costs subscribers more. This freemium model allows m-ARD apps to provide hyper-local information while benefiting from economies of scale.

In contrast to the relatively low operating costs of KACE, b2bpricenow.com, and RML, operating costs are much higher for the three m-ARD apps—DrumNet, Dialog Tradenet, and e-Dairy—in Table 5.4.

Table 5.4: Sample Commercial Mobile Applications with High Costs

Application	Current or target market (number)	Incremental cost per user or transaction (U.S. dollars)		Cost per user as % of household income	
		Capital expenditure	Operating expenditure	Capital expenditure	Operating expenditure
DrumNet	5,000	57	45	8.7	6.8
Dialog Tradenet	1,500	107	11	7.7	0.9
e-Dairy	300	333	20	23.9	1.4

Source: Authors' Compilation.

There are two explanations for the higher cost base:

- *Different stages of the business cycle*. DrumNet, for example, did not progress beyond the pilot phase and was unable to take advantage of a larger market to defray costs. In attempting to become fully operational, its high incremental costs were likely partly responsible for its failure to secure financing. But it was expected that nonfarmers—such as buyers, input suppliers, and banks—would provide at least half of its revenues, so relating costs to affordability for farmers was not particularly relevant. E-Dairy is still in the pilot phase, with a small market of about 300 farmers.
- *No modular system development*. DrumNet tried to provide a full supply chain integration service from the outset and did not build a modular system like KACE or Virtual City (an agricultural supply chain m-ARD app). But it still could have had potential if it had been successful in refinancing and attracting high-value players such as major buyers and banks. Tradenet initially provided only agricultural market price information. Since its purchase by Dialog, a mobile network operator in Sri Lanka, it has become a marketplace for various goods to broaden its target market. But this approach is not segmented by target market; it is trying to appeal to a large single market. So opportunities for cross-subsidies are limited. The higher operating costs for DrumNet, Tradenet, and e-Dairy highlight the tension between low-margin SMS market information services such as Tradenet and higher-margin linkage assistance services (such as delivery confirmation and other supply chain integration functions) such as DrumNet. The model used by KACE and Manobi has more potential in this regard because it can shift from low-margin fees to high-margin fees based on more sophisticated services.

Noncommercial applications

Relative to commercial m-ARD apps, noncommercial ones are generally information-based and use relatively simple service models. Unlike KACE, which has a sophisticated supply chain integration model, m-ARD apps such as TXT CSC (the Philippines) and 1919 (Sri Lanka) provide information to users at no charge. Because users are not being asked to pay for these services, affordability is less relevant, though costs are still very low.

The three examples in Table 5.5—Farmers Texting Center (the Philippines), TXT CSC, and 1919—target markets of different sizes and each has a relatively low operating cost per

transaction. For example, TXT CSC is an e-government program that provides government information to citizens. It has a simple service model: text messages are received by staff, then either forwarded to the relevant government department or, if the information is readily available, responded to directly. The backend consists of a mobile phone, computer, and several staff members. The cost per user is about $0.02. The challenge of the TXT CSC model is that the information it provides to citizens is limited and expanding beyond basic information provision is difficult. Still, basic information provision can be implemented at a low cost. The challenge of this model is its limited lifespan and restricted future expansion.

Table 5.5: Sample Costs for Noncommercial Mobile Applications

Application	Current or target market (number)	Incremental cost per user or transaction (U.S. dollars)	
		Capital expenditure	Operating expenditure
Farmers Texting Center	36,000	0.06	0.93
TXT CSC	12,000	0.17	0.02
1919	1,277,500	0.05	0.12

Source: Authors' Compilation.

Financing

Lack of financing for m-ARD apps was one of the main findings from the case studies in Kenya, the Philippines, and Sri Lanka. This includes some of the relatively successful cases such as KACE, Grundfos Lifelink, Kilimo Salama, Farmers Texting Center, 1920, and DrumNet (which was a successful pilot, although it did not advance to stage 1). The finding also reflects a common financing gap issue that affects technology entrepreneurs in both developed and developing countries, and is often called the "Valley of Death."[8]

This report splits financing into private and public. In the private sector the main measure of success is whether an m-app is profitable. A private investor such as a venture capitalist wants to earn a strong rate of return on risky ventures. Public measures of success are more complex, involving social as well as financial benefits.

Several m-ARD apps have been partly financed through commercial corporate social responsibility (CSR) programs, a form of private financing that shares some features with public and donor financing. Examples include Kilimo Salama in Kenya (Syngenta CSR) and Text2Teach in the Philippines (Nokia CSR). In addition, development challenge awards such as

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[8] The "Valley of Death" is estimated to be the range of financing between $50,000 and $1,000,000. This is because even in most developing countries, small and medium-size enterprises can usually borrow from family and friends for startup capital under $50,000. For needs above $1 million, innovative enterprises can gain traction with venture capitalists, private equity firms, and banks. See Infodev (2008) and Jaffe (2011).

those received by Virtual City from Nokia can be considered CSR. This form of finance is usually tied to a company's commercial interests, but the mechanism for measuring success or evaluating outcomes may be complex, and is certainly longer-term than purely private investment.

The challenges of measuring success outside the traditional metric of profit and introducing a readiness to accept lower or even no financial return for a developmentally beneficial goal is also one of the drivers of philanthrocapitalism and social entrepreneur investment. With varying levels of profit expectations, these investors aim to bring the traditional strengths of the private sector to developmental, social, and public sector challenges. Philanthrocapitalists and social entrepreneurs have pushed measures such as the double bottom line (financial and social performance combined) and the triple bottom line (financial, social, and environmental performance). These measures are not without difficulties, are prone to manipulation, and are sometimes only meaningful within the socioeconomic context of a particular project and environment.

This trend blurs the line between private and public money. In the past, private funding was motivated entirely by profit. In the world of philanthrocapitalists and social entrepreneurs profit is not the only measure of success. This is a relatively new phenomenon.[9] For m-ARD apps, most financing still comes from private or public sources. Drivers of the new approach—such as working closely with projects, providing networking skills and business knowledge, and pushing for clearly measurable outcomes—have yet to be implemented on a large scale. But there is a good reason to seek financing for m-ARD apps from philanthrocapitalists and social entrepreneurs.

For example, this report found that 85 percent of m-ARD apps rely on government, donor, or CSR funding (some of the latter could possibly be classified as philanthrocapitalism) for startup and operating costs (Figure 5.4). The financing gap is particularly wide between the pilot stage and stage 1 (scalability) and during the transition from donor funding (usually limited to the pilot stage) to commercial or government funding. And while there is sufficient funding at the pilot stage, donors who provide the most funding at this stage are not operationally suited to provide long-term funding—particularly as m-ARD app providers try to scale up. Moreover, donors are usually not able or inclined to finance a large-scale marketing effort, often one of the key elements needed to raise funding.

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[9] Concepts of philanthrocapitalism are advanced in recent books such as Morino (2010), Tierney and Fleishman (2011), and Crutchfield, Kania, and Kramer (2011). All conclude that the concepts of philanthrocapitalism are used by a minority of nonprofits, foundations, and donors.

Figure 5.4: Sources of Financing for Mobile Applications
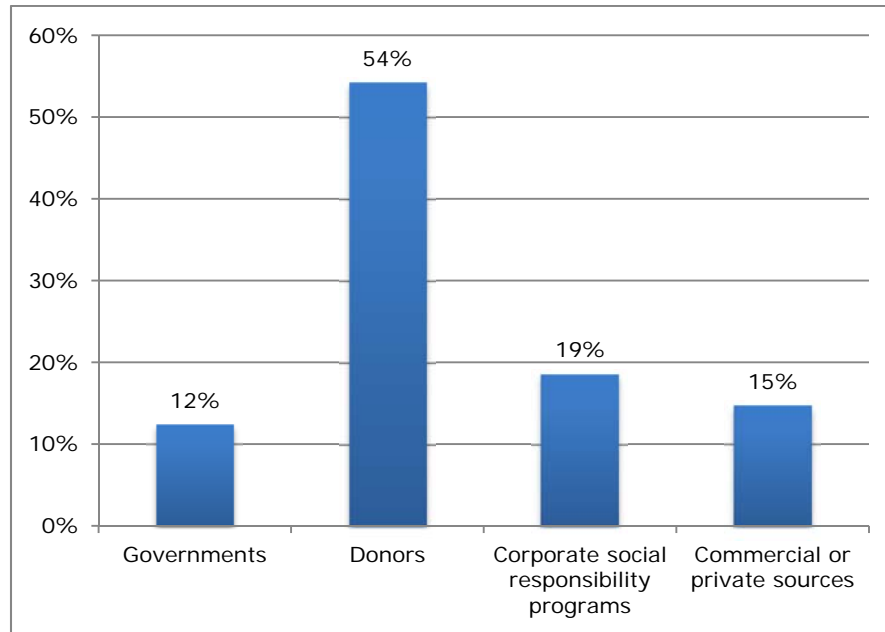
Source: Authors' Compilation.

In addition, in developed countries the support infrastructure for startups is substantial and highly liquid. In developing countries the lack of multiple sources of financing also means a lack of liquidity, so finding sufficient financing is a major challenge.

Different funding issues for commercial and noncommercial mobile applications

Providers of commercial m-apps in the developing world face very specific financing challenges. There is a need for financing primarily to close the gap between the pilot stage and stage 1 of the funding cycle. An analysis by the Kenyan Capital Markets Foundation found that only two information and communication technology (ICT) firms—both telecom companies—are listed on the Nairobi Stock Exchange, and that small and medium-size enterprises (SMEs) face an equity gap (Capital Markets Authority 2011). These findings echo those from this report's case studies. There are three main reasons for the lack of private equity and venture capital (PE/VC) funding in Kenya and other developing countries:

- *Lack of firm clustering.* M-app providers are geographically dispersed. Fostering collaboration between firms and accessing capital are challenging when firms are located far apart, especially when broadband networks are underdeveloped. Recent initiatives such as iHub in Nairobi are trying to address this problem, in addition to providing PE/VC firms with a single point of contact (iHub 2011).
- *Lack of access to financing.* There are limited funds available for a PE/VC fund. Though there are several angel investors in Kenya, these are wealthy individuals, not PE/VC firms.

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- *Lack of a healthy ecosystem.* As this report has emphasized, the most significant obstacle to addressing the challenges of scalability for m-ARD apps is the lack of a platform that links stakeholders to build a healthy m-apps ecosystem.

Funding for noncommercial m-ARD apps faces the same challenges as commercial ones but with one basic difference: government-supported m-ARD apps such as Sri Lanka's 1919 and 1920 rarely face the pressures of finding funding and of scaling up. Such m-apps will likely continue to operate for as long as governments have sufficient budgets for the initiatives.

As a result, noncommercial m-ARD apps often lack clear goals and assessments of their costs and benefits, creating a major obstacle to increasing value for citizens and accessing commercial funding. For example, 1919 provides access to government information by SMS. One measure of success is the number of SMS messages that it receives each month. On this measure, 1919 could be considered a success. But this measure does not take into account the costs of setting up the service or its value to citizens and the sponsoring government department. Another major challenge for 1919 is compelling other government departments to respond to citizen requests. The 1919 m-app is not integrated with other departments' databases, and there is no way for citizens to check the status of specific information or service requests.[10]

Financing forms, types, and cycles
To better understand the challenges of financing m-ARD apps, Table 5.6 summarizes financing forms and types and financing cycles at the pilot stage, stage 1, and stage 2 of business development. Various combinations of financing may be appropriate at different times in the financing cycles.

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[10] SMSONE, in Maharastra, India, is an example of an m-app that integrates government services. It allows residents of the state to register for SMS alerts on information relevant to their daily lives, such as water and electricity supplies, traffic congestion, and bill payment reminders.

Table 5.6: Forms, Types, and Sources of Financing for the Applications Studied

Forms of financing	Types of financing (examples)	Typical sources
Grants and sub-grants (mainly pilot stage and stage 1)	Direct grants Grant matching Public-private partnerships Corporate social responsibility funds	Governments Donors Private companies Foundations Trust funds
Equity (pilot stage and stage 1)	Seed / startup Stages 1 and 2 Syndicate Crowdsourcing / social networking	Angel financing Venture capitalists Institutional investors Friends and family
Others, including business relationship-based and asset-backed (stages 1 and 2)	Franchises Joint ventures Licensing Leasing Factoring	Business partners Commercial banks Factors
Loans and debt (mostly stage 2)	Mezzanine Commercial loans Loan guarantees	Commercial banks Governments Donors

Source: Authors' Compilation.

Different forms of financing are relevant at different stages in the m-ARD app business cycle. For example, during the pilot stage the Grameen Foundation uses donor funding to conduct ethnographic research and needs assessments, develop prototypes, establish partnerships with key m-app ecosystem players, generate and package content, pilot solutions and business models, and achieve limited or moderate scale. If the pilot proves successful and operations mature, social investment funding is pursued or the operation is spun out into locally owned social businesses with lower cost bases. In this model, donor funding is critical at the early stage to investigate market failures and innovate where the private sector sees excessive risk. Once a model can be proven effective, patient commercial capital can be obtained.

Possible financing solutions
There are various possible ways to address the financing gaps facing m-ARD apps. Each comes toward the same solution from a different direction—public, private, or a combination.

M-apps development funds. Donor funds have supported many m-ARD app startups. The challenge is moving from startup funding to longer-term sustainable financing. Donors could set up m-app development funds to provide financing for m-apps based on their potential for advancing development. The International Finance Corporation (IFC) and U.K. Department for International Development (DFID), for example, are interested in accelerating viable m-app models and possibly continuing to support them in stage 1 (scalability).

The preceding analysis on m-app ecosystems has established that funding of individual m-apps does not address the systemic challenges facing providers. Thus donors have begun focusing on some of these challenges. For example, the Mobile Application Labs—supported by Nokia, the government of Finland, and the World Bank Group-based infoDev, with locations in Kenya and South Africa—is one approach to supporting clusters of m-app developers (infoDev 2008). As a result of such interventions, Kenya has become the fastest-growing m-app economy in the developing world, with the number of Kenyan m-apps jumping from 2 in April 2010 to more than 40 in January 2011 (Nokia 2011).

Apex funds. Limited financing for m-ARD apps could be addressed by creating apex funds. Such funds would also provide critical business skills to m-app providers for their next stages of growth. The funds would be operated by private equity or venture capital (PE/VC) groups and would provide investment capital from donors or development-oriented investment agencies such as IFC. The PE/VC groups would reallocate the financing to commercial m-ARD app providers as seed or matching funds, as these providers are typically unable to access funding provided by markets and agencies such as IFC.

The PE/VC groups might have to accept lower returns from m-ARD apps than other investments would generate. But that might be feasible as part of the groups' philanthrocapitalism initiatives and lower expectations for returns. Unlike other funding mechanisms described in this report, apex fund would allow m-ARD app providers to access skills for scaling up and replication through professional funding arrangements. Apex funds would:

- Focus on providing a high volume of small loans—usually between about $100,000 and $500,000—compared with the larger thresholds from sources such as IFC, which has a minimum funding amount of $5 million.
- Assess projects and make loans in a much faster, more responsive, and agile manner, with fewer hands-on controls, than is typically required by donors.
- Warn investors to expect lower returns than traditional venture capital investments, at least as institutions and procedures are being built up.

The apex fund approach could include more than one phase of financing. But as this chapter has noted, different vehicles are used at different stages, and it is important to have a complete financial ecosystem in place.

Universal service funds (USFs). USFs and similar bodies are administered by government departments (the least desirable approach), regulators, or public-private corporate entities created to deliver ICT-related applications to previously unreached rural areas. Though the skills to manage and allocate such resources have been developed over many years, most USFs would require sensitization and capacity development to move into the m-app field. The USF approach has several advantages for commercial m-apps and could aid the development of the m-apps ecosystem. More than 70 countries have active USFs and up to half of these would be able to provide financing with little delay. The advantages of using USFs are:

- USFs leverage private investment because they are usually commercial market-based and offer only smart-subsidy investments (which can still be a substantial portion of startup capital). In other words, the subsidies are given competitively to commercial entities committed to rolling out self-sustaining service while also recognizing that some areas and projects need a kick-start to encourage investment. Awards are made based on commercial proposals to meet specific targets developed by USFs.
- A USF could be viewed as representing a significant country commitment to m-apps development by the government and ICT industry, using resources collected from the private sector.
- USFs often have extensive financial resources that they have been building up for several years through levies on revenues of telecommunications operators. Most USFs have distributed less than the funds they have received and are looking for good projects.
- USFs have started developing the skills to form public-private partnerships (PPPs), including through other forms of financing such as tender competitions seeking the lowest subsidies to deliver ICT services in rural areas.
- USFs promote fully privatized commercial market development through the competitive smart-subsidy approach, which can create focused interest and leverage private investment.
- Some USFs have already made commitments to supporting ICT applications. This can be directed toward m-apps as universal access targets are met.
- Significant resources have already been spent providing the human capital skills needed to support both infrastructure and services rollout in rural areas. Thus these skills may only require a strategic reorientation.
- In many developing countries the amount of money required to bring change to m-app development and use could be small relative to the funds held by USFs. Thus enough funds would be available to support m-app ecosystem development—assuming that the administrative capacity of USFs can be retargeted.

USFs are not without controversy even though most have been dispersing funds for several years. Many USFs in developing countries have dispersed relatively small percentages—33 percent, on average—of the funds they hold, and utilities tend to see USFs as additional taxes with few benefits. Still, the principle of USF funding is clear because unfettered free markets are unlikely to deliver goods to all citizens. There is a collaborative role for government and the private sector to play in providing services to areas where they are not profitable. Many USFs are starting to do better at disbursing funds and providing services to areas that had not had access to them. This institutional learning can be used to deliver m-apps. Aid agency activities such as the U.S. Agency's for International Development's Global Broadband and Innovations initiative are providing support to USFs to encourage increased disbursement of funds.

As with PPPs (see below), donors could have considerable leverage in helping USFs adapt their procurement strategies into the m-apps field by demonstrating and promoting the potential of m-

apps to fulfill universal access goals in rural areas, helping tailor terms of reference (TOR) and request for proposal (RFP) documentation to m-app development, and redirecting the focus of USFs into the m-apps market.

Public-private partnerships. PPPs provide a framework for governments to exploit the synergies between the public and private spheres and to access the funds and skills needed for noncommercial m-apps in particular. A major strength of the private sector is its evaluation of costs relative to benefits. This is usually driven by the profit motive and the personal investments of project developers. Hence a synergy exists between the public sector's ability to finance m-apps that provide public goods such as access to government information and the private sector's ability to assess a strategy's costs and benefits.

PPPs were first developed for infrastructure projects that the private sector had insufficient resources to fund and the public sector had insufficient skills to manage. PPPs have since been successful in delivering public health outcomes. For example, in OECD countries and Brazil, China, India, and the Russian Federation it is projected that 5 percent of healthcare spending will go to infrastructure and 95 percent to services between 2010 and 2020 (PWC 2010).

Some of the most successful PPPs have involved telecommunications, energy, transportation, and healthcare. One of the largest PPPs has been in U.K. healthcare starting in the 1990s, when the U.K. government realized that the only way to overcome decades of underinvestment in the National Healthcare System (NHS) was through infrastructure partnerships with the private sector.

This is a particularly opportune time to use PPPs for service delivery because they have grown tremendously over the past two decades and perceptions have changed on how they deliver services. Since the 1990s PPPs have expanded across the globe and have been particularly successful in developing countries. The perception that PPPs are valid only for infrastructure is based on the number of successful infrastructure projects supported by PPPs. But this is quickly changing as governments realize that PPPs can also be used to deliver services. For example, the NHS began to experiment with PPPs in 2003 to shorten waiting times for medical services (PWC 2010). The pressure to use PPPs in areas besides infrastructure will only increase as governments face mounting deficits stemming from the global financial crisis of recent years. Governments' ability to leverage private investment is going to be a critical tool in delivering services.

But various issues must be taken into account to use PPPs for m-app development. One key issue is measuring the results of PPPs. The traditional value for money metric used for infrastructure PPPs cannot be easily modified for service delivery because the latter involves far more players. For example, an assessment must include all the major service delivery players and so would have to include all m-app ecosystem stakeholders—such as mobile network operators, financial institutions, agents, content providers, providers, and handset manufacturers and distributors. Hence the system for assessing PPPs must be modified to include metrics for each of these

players, and these metrics must be included in PPP contracts. The downside of this approach is that a uniform set of metrics is not available because the context, goals, and m-app ecosystem players will differ for each service delivery PPP.

Governments should also establish clear TOR, RFP, and associated procurement mechanisms based on clear business and development goals for m-apps. In addition, governments will need to be creative but cautious in terms of defining goals for m-apps because they tend to be more complex for service delivery PPPs. E-Dairy and Text2Teach provide examples of such service delivery goals and the structuring of PPPs:

- *E-Dairy* in Sri Lanka is illustrative of a modified PPP approach to m-app development where the focus is on outcomes instead of infrastructure. E-Dairy is an m-ARD app that aims to increase milk production through increased pregnancy rates in cows. The increase in pregnancy rates can be achieved through timely access to veterinary services. Dairy farmers access a database that provides information on timing and can request services directly through the app. The ICT Agency of Sri Lanka provided half of the startup funding for e-Dairy. A grassroots community development organization called the Dambadeniya Development Foundation provides the m-app's technology and operational management.
- *Text2Teach* is a program in the Philippines that seeks to enable teachers and students to access more than 900 multimedia educational materials using SMS. The program's goal is to narrow the digital divide by improving teaching of basic education and making learning more fun for students. It has improved science, math, and English results by 11-19 percent for 120,000 fifth and sixth graders in more than 200 schools. The innovative m-ARD app highlights the potential for collaboration between NGOs, the private sector, and government. It is financed by a grant from Nokia that covers project management, implementation, mobile phone costs, and most operational costs. The program is managed by the Ayala Foundation, which is tasked with raising matching funds from the public sector to ensure the program's sustainability and impact.

Collaboration between the public and private sectors enables the program to address education needs not just in specific areas but for the entire public elementary school system. The central government provides 23 percent of the funding, schools and local branches of the Department of Education provide 3 percent, and the Text2Teach Alliance provides 74 percent. Though not a true PPP in that goals and measurements are not defined in a PPP contract, it reflects the kind of methodology that could be used for m-app PPPs.

The use of PPPs in developing countries has often suffered from poor planning, design, and measurement as well as unclear goals. Hence donors and other development practitioners may need to provide sufficient capacity building for both public and private entities interested in PPPs.

6. Conclusion

Mobile applications for agricultural and rural development (m-ARD apps) offer innovative, dynamic, interdisciplinary services. These new services could raise incomes and create more opportunities for people in rural and underserved communities in developing countries as well as stakeholders throughout the ecosystem for m-ARD apps.

Because m-ARD apps are developing rapidly, the observations in this report provide only a snapshot of this field's evolution. Still, the lessons summarized here and in the case studies should show policymakers and development practitioners how great a potential role that m-ARD apps could play in development. The report's main findings are:

1. **Enabling platforms are likely the most important factor for m-ARD apps** to move from the pilot stage to the scalability and sustainability stages—beyond donor and government funding. Such platforms are based on the links between handsets, software applications, and payment mechanisms that facilitate interactions among stakeholders in the m-app ecosystem. Platforms can provide access to more users, offer effective technical standards, and incorporate payment mechanisms. These outcomes can facilitate both demand and supply and faster recovery of investments.

    A developing country platform faces two main obstacles: the lack of commonly accepted payment mechanisms and of uniform approval procedures for m-apps. Whatever the payment mechanism—operator billing, mobile money (m-money), or, in the future, credit cards—it is crucial to the success of m-apps. Countries without a payment mechanism risk falling behind on the development of m-ARD apps. And a simple, uniform m-app approval procedure can link m-app providers with potentially millions of mobile subscribers, encouraging innovation and facilitating competition so that the m-ARD apps with the highest value are scaled up quickly.

2. **Several other mechanisms, such as incubators and central hubs, could support the development of ecosystems for m-ARD apps**. For example, a geographic cluster that enables m-ARD app providers to work together, such as Nairobi's iHub, can spur innovation. These locations provide an environment conducive to m-app development by offering high-speed Internet and other communications facilities. They may also attract commercial funders looking for an easy way to invest in m-apps.

    Accordingly, efforts to develop enabling environments for m-ARD apps should initially focus on supporting the creation of a common platform or platforms that provide uniform standards and payment mechanisms, and helping develop innovative m-app ecosystems by supporting providers, financiers, third party distributors, and other stakeholders.

3. **The hyper-local nature of many m-ARD apps makes scaling up challenging**:
   - Many m-ARD apps start small and focus on meeting specific customer needs, often with donor support. They tend to grow at a rate that matches capabilities, with little thought given to scaling up beyond a certain threshold.
   - Rural users of m-ARD apps value highly customized information and services. For example, farmers often need market pricing information for towns close enough for easy transport of goods. This imposes costs on content development and supply, which are then localized, and could hinder the achievement of scale economies because customers will be clustered in areas that each need their own content development.
   - Consumers in rural areas of developing countries usually have low education and literacy levels and so require onsite demonstration or training in the use and benefits of m-ARD apps. Such support is costly.

   In environments where information is scarce, leveraging existing resources will be crucial for success. Governments and donors could support the development of m-ARD apps by making publicly available accurate, granular data such as weather forecasts with integrated flood and drought information at the village or community levels. Providers of m-ARD apps are unlikely to be able to collect such data as part of their business operations, and its provision will encourage providers to innovate. In addition, m-ARD apps that can aggregate and customize content from different sources will have an advantage.

4. **Some m-ARD apps are achieving scalability, replicability, and sustainability.** Despite various challenges, a number of m-ARD apps are doing well, with a good balance of cost, marketing, and pricing strategies. Scalability is premised on several factors, including affordability, demand, and effectiveness in reaching target markets. Some m-ARD apps appear to be highly replicable. But operational issues must be taken into account, such as local languages and the ability of public service providers to compel other agencies to answer inquiries.

   Sustainability is easier to achieve when initial capital costs are covered by governments or donors and subsequent operating costs are relatively low. Commercial m-ARD apps need to improve or expand their services in response to user needs and ensure that they provide enough value to generate sustainable demand and revenues—increasing users' willingness to pay and overcoming ability to pay issues even at low economies of scale. Commercial m-ARD apps should also pursue innovative alternative revenue streams, such as advertising, and consider various pricing models to attract subscribers and build customer loyalty.

   Noncommercial m-ARD apps should have clear and measurable goals, outputs, and outcomes.

5. **About 85 percent of m-ARD apps rely on government, donor, or corporate social responsibility (CSR) funding for startup and operating costs**. Yet there is a funding gap for m-ARD apps moving from the pilot stage to the scalability and sustainability stages—indicating that m-ARD app providers need to have realistic, multistage financing plans from the start of business planning, to prepare for likely shortfalls later in the financing cycle.

   In addition, seed funders for m-ARD apps should be aware that they are unlikely to be suitable financiers at later stages. Instead, they should encourage and facilitate development-oriented professional financiers who can address gaps in the funding cycle and provide private sector business skills—such as for management, marketing, and networking—that will be critical after the pilot stage.

   Providers of m-ARD apps should consider a variety of financing methods, including apex funds, universal service funds (USFs) restructured to support m-ARD apps, public-private partnerships (especially to support noncommerical m-ARD apps), and special purpose donor funds. M-ARD apps could also attract investment from social entrepreneurs and philanthrocapitalists. Providers should carefully assess the benefits and drawbacks of all these financing vehicles.

6. **Enabling regulations and policies are crucial**. M-apps have a relatively long history in the developing world. Mobile money was the first innovation, providing clear benefits in countries such as Kenya and the Philippines, and regulatory forbearance was one of the key reasons for its success.

   Adopting regulatory forbearance during the creation of a new service means that firms experimenting with a new service are given space to be innovative and rewarded for taking risks, with the leading firm gaining first-mover advantage. The need for regulatory intervention can then be reassessed based on the maturity of the market, with a focus on ensuring a dynamic regulatory perspective to encourage development and innovation of m-ARD apps and possible intervention in cases of market failure.

   Another helpful step is introducing technical education policies that support m-app operating systems. Finally, rigorous impact assessments should be conducted to quantify the economic and social benefits of m-ARD apps. The findings of such assessments would support evidence-based policymaking and direct financing to interventions with the greatest benefits.

Annex A: Typology of Agricultural and Rural Development

Sub-Sector	Segment	Development Challenges
Agriculture, Animal husbandry, Fisheries & Forestry	• Livelihood	• Transition from subsistence to income generation (Risk raking & scale up is difficult without external support) • Small-scale farmers face relatively high transaction costs
	• Agro- support (e.g., weather, advertising, emergency)	• Detrimental / catastrophic impact of storms or draught (see rural finance/insurance) • Disaster management
	• Agro-marketing / trade (e.g., advertising, pricing, strategic link-ups)	• Lack of contact with local / regional markets • Lack of access or effective contact between the various players (producer, buyer, credit/ bank) in agric. markets • Control of information & resources by middlemen • Geographic/transportation challenges to trade
	• Distribution, Logistics & Traceability	• Inefficiencies, delays & costs in collection, transportation & record keeping • Fraud at produce collection points affecting farmer incomes • Cost of implementing solutions (e.g., cost of placing RFID tags on fruit)
	• Other rural SME & micro-businesses	• Financing for start-ups
	• Extension services	• Access to fundamental knowledge re farm & crop management, etc., timely assistance • Literacy & capacity building challenges
	• Research & Innovation (e.g. new supply chain / business models)	• Access to information & finance (see rural finance) • Access to most recent information on crops, pests, etc.
Resource Management	• Water	• Lack of wells & irrigation • Water contamination • Cost of water • Challenges in scaling up solutions
	• Land	• Land ownership • Soil erosion • Appropriate fertilizer use
	• Environment & Climate	• Impact of climate change

Labor, Migration and Human Development	• Employment	• Lack of information, especially geog. specific info – i.e. jobs available in a specific region • Lack of jobs
	• Education, learning & training	• Low literacy, especially among women • Costs of schooling
	• Rural Youth	• Opportunities, mentoring, skills, finance
	• Rural Women opportunities	• Opportunities for business & self-betterment
	• SMEs and micro-businesses / private sector development	• Training & mentoring
	• Migration	• Urbanization • Cost of Remittances, especially small scale

Governance / Political	• E-Government and administration relevant to rural development, including:
	  ○ Census & social status related data collection or enquiry
	  ○ Election & opinion management
		• Corruption
		• Opportunity to consult political leaders
		• Empowerment & participation
		• Information about issues

	• Awareness raising	• Availability of programs to rural people
	• Other m-government services	• Registrations of all personal data, companies, land ownership, etc. • Taxation & other levies
Rural Finance, Infrastructure & ICT	• Mobile Money, m-Banking and micro-finance related services	• Access to appropriate finance • Regulatory, technological, literacy challenges
	• Agricultural insurance services	• Detrimental / catastrophic impact of storms or draught • Access to insurance for small farmers, as well as understanding & trust
	• Transport	• Infrastructure (roads, vehicles, etc.) • Cost of transportation in rural areas
	• Broadcasting & program related	• Potential for local & regional participation & voice
	• Printed media	• Distribution, choice of printed media

Source: Authors' Compilation.

Annex B: Information Sheet Used for Desk Research on Mobile Applications

Segment *i.e., Which of Typology Segments*	Name of Application		Country(s) / Region
Segment / Activity *i.e., which segment in the Rural Development Typology*			
Description of Application *E.g., Sale of crop insurance to farmers with seed purchase via M-PESA. Note whether it is purely information or transaction based*			
Technology *E.g., voice, video, SMS, email, GPS, multi-media*		**Technical development path** *Note any past or expected changes and what impact technological change could have on the application and its viability*	
Leading Ecosystem Player *E.g., mobile network operator, Bank, ISP, Farmers' Union, Commercial Agent*	**Lead role(s)**		
Business Model / Rationale *E.g., Market differentiation, clear revenue/profit potential (describe)*			
Other key players 1	**Roles**		**Incentives / Business model**
2			
3, etc.			
Year of commencement	**Maturation Cycle Position** *Emerging / Expanding / Mature*		**Status** *E.g., Pilot / Rolling out / Established*
Comment on maturation / status of development			
Costs of the application & evidence of cost recovery & profit/sustainability, *E.g., Development of the technical systems & content; maintenance & skills*			
Description of benefit & impact for beneficiaries *Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.*			
Quantifiable benefits *Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.*			
SWORB *[May be summary of other sections]*	**Strengths**		**Weakness**
	Opportunities		**Risks & Barriers**
Market potential assessment *E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service*			
Replicability / hurdles / issues *Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high*			
Further study / research questions			**Select for case study** *Yes / No*
Contact	Comments on contacts made, arrangements, etc.		

Annex C: Types of Mobile Applications by Subsector

This annex contains a listing of all m-apps for rural development identified worldwide, arranged by Subsector and Segment following the classification of Annex A: Rural Development Typology. It also provides a basic description of each application, the target users, country or countries of implementation, and status (whether active, planning, pilot or no longer active).

All applications listed here have their own individual entry using the structured case study information sheets in Annex B. However the structured data is not presented in this report in the interest of length.

To assist with cross-referencing from this annex to Annex E entries, the Annex E Index is included here on the next page. The 79 applications which have a fairly substantial or comprehensive entry in Annex E are shaded in this document. The number of shaded entries may increase as more information becomes available through further research.

Subsector / Segment	Name of Service/ Product	Description/Summary	Target Users	Country	Status
Agriculture, Animal husbandry, Fisheries & Forestry • Livelihood	n/a				
Agriculture, Animal husbandry, Fisheries & Forestry • Agro-support	Nokia Life Tools	Nokia Life Tools is a software suite embedded in certain Nokia phones to provide agricultural, educational and entertainment services to developing country markets	General public, farmers	China, India, Indonesia	Active
	Reuters Market Light	It provides localized and personalized information via SMS text messages on weather, market prices, local and international agriculture and commodity news, and crop advisory tips enabling farmers to make informed decisions, reduce waste and maximize their profits.	Farmers, agricultural businesses or associations	India	Active
	DatAgro	The DatAgro project is taking advantage of the high penetration rate of cellphones in Latin America to allow rural farming cooperatives to define the types of information most critical to their lives and livelihoods and receive it via text messages.	Farming cooperatives	Chile, Latin America	Active
	SoukTel	SoukTel is a cellphone-based service that uses SMS technology to link people with jobs and connect aid agencies with people who need help.	Job seekers, employers	Palestinian Territories	Active
	LifeLines	The system's database which stores the Frequently Asked Questions (FAQs) received in the service, comprises a list of more than 350,000 questions and answers currently. Education service was introduced to provide value added and critical academic support to teachers in remote rural areas for their day to day academic transactions.	Farmers, rural teachers	India	Active
	e-Dairy	Created awareness among small dairy farmers in sending SMS utilizing their mobiles / CDMA / Touch button screen and the internet to obtain their Animal Health, veterinary and other related just in time dairy extension services. Further provided training & development activities in Computer usage for the youth of farmer's families / Livestock development officers / Veterinary surgeons. Developed database backed, SMS enabled dairy farmer / service provider tracking / messaging software and touch screen software.	Small dairy farmers	Sri Lanka	Active
	mKRISHI	The mKRISHI application enables farmers to send queries, comprising of text, voice and pictures, specific to their land and crop to agricultural experts, using their mobile phones. The mKRISHI ecosystem provides an integrated view of the farmers profile, farming history, and the required farm parameters on a console at a remote location to an expert. Farmers can also send pictures of their crops and pests captured with mobile phone cameras; sensors provide farm specific soil and crop data, weather stations provide microclimate details and voice based querying system gives freedom to the farmers to ask any	Farmers	India	Active

Subsector / Segment	Name of Service/ Product	Description/Summary	Target Users	Country	Status
		query in their local (natural) language. After analysis of the available information, the expert's advice on the farmer's query is provided on the farmer's mobile phone.			
	FADECO Telecenter & Community Radio	FRC 100.8 FM has signed a contract with a SMS management company in Dar es Salaam and has been allocated two short code numbers. The question is delivered directly to our computer via a Web managed system. We are therefore able to print it off, respond directly or email the question to our experts. The farmer receives a received note on his/ her mobile phone immediately to confirm the message is received at FADECO. After the question/ request is processed, we make a radio program with the response.	Farmers	Tanzania	Active
	Weather Application (Grameen)	The application allows anyone with a mobile phone to send and receive text messages to find out the local weather forecast by city or district.	General population	Uganda	Active
	LIRNEasia / HJS Traceability App	Gherkin farmers in Sri Lanka were given mobile phones with a Sinhala menu-based application that allows farmers to send and receive information related their crops.	Gherkin farmers	Sri Lanka	No longer active
	Behtar Zindagi	Behtar Zindagi is a mobile and IVR based information service comprised of information services for Agriculture (information on life cycle of crops), Weather Alerts and Advisories, Commodity Prices, Coastal and Inland Fisheries (fishing zones, wind speed, wave height), Livestock, Health, Rural Finance and Education.	Rural residents	India	Active
Agriculture, Animal husbandry, Fisheries & Forestry • Agro-marketing / trade	Esoko	The platform provides automatic and personalized price alerts, buy and sell offers, bulk SMS messaging, stock counts and SMS polling. Markets, commodities, languages and currencies are easily configured. Esoko also offers strategy, support and trainings to projects rolling out MIS.	Agri-business, NGOs, government, farmers, traders	N. Sudan, Burkina Faso, Cote d'Ivoire, Ghana, Nigeria, Mali, Rwanda, Tanzania, Zambia, Kenya, Mozambique, Uganda, Malawi, Mozambique, Madagascar	Active
	Google Trader (Grameen)	Google Trader helps buyers and sellers to find each other. Users can broadcast a message by sending an SMS, allowing them, for example, to list the products that they are selling or to find space on a truck to take their goods to market.	Rural producers, consumers	Uganda	Active
	DrumNet	At the core of DrumNet's service provision is an IT platform that is compatible with the Internet, mobile phone networks, and other wireless devices. The platform allows DrumNet to offer unique products like SMS scouting, data mapping and tailored reporting – be it on market trends, weather, prospective partners, or related requests.	Agricultural suppliers	Kenya	Active
	Manobi	With Xam Marsé, the latest market information system on SMS and the Internet developed by Manobi, Senegalese farmers, traders, hoteliers, and housewives can now receive free daily text messages containing information on the product of their choice on any selected market.	Farmers, traders, hoteliers	Senegal, South Africa	Active

Subsector / Segment	Name of Service/ Product	Description/Summary	Target Users	Country	Status
	WAMIS-NET	WAMIS-NET is a Network of Market Information Systems from Benin, Burkina Faso, Côte d'Ivoire, Guinea, Niger, Mali, Senegal, Togo, and Nigeria. Together they provide to all stakeholders up to date and accurate information on 400 rural and urban agricultural commodity markets via different media. The network monitors the development of the agricultural sector through the collection and publication of related statistics and analytical reports.	Farmers	West Africa	Active
	Soko Hewani	Offers and bids are announced on the Soko Hewani program. Listeners, mostly smallholder farmers and agro SMEs, are given an opportunity to phone, send SMS, IVR or e-mail messages into the radio program and bid on the offers, or offer on the bids. The radio program staff on standby during the Soko Hewani broadcast then match the offers and bids, using mobile phone calls and SMS, or reference back to the specific MRC which submitted the offer or bid for further negotiation and conclusion of deals.	Farmers, agro-SMEs	Kenya	Active
	CELAC	The project has a database of phone numbers to whom local agro-related information is sent every Monday.	Farmers, Community Development Workers, Agricultural Extension Workers	Uganda	Active
	First Mile Project	The project encourages people in isolated rural communities to use mobile phones, e-mail and the Internet to share their local experiences and good practices, learning from one another. While communication technology is important, real success depends on building trust and collaboration along the market chain. Ultimately farmers and others involved develop relevant local knowledge and experience and share it – even with people in distant communities – to come up with new ideas.	Small farmers, traders, processors	Tanzania	Active
	China Mobile Rural Information Network	The Information Network is a service platform built to provide information regarding the needs of rural residents, rural businesses and rural authorities. In 2009, to better serve rural residents, agricultural enterprises and rural governments, we completed the third full-scale upgrade of our Rural Information Network, enhancing operational capabilities and allowing for needs and services for new product development, production, and distribution as well as a centrally-shared information database to be accessed and utilized across the country.	Rural residents, rural businesses and rural authorities	China	Active
	b2bpricenow	b2bpricenow.com is an integrated e-commerce m-commerce program that has an agriculture e-marketplace that provides up-to-the-minute price updates and other market information as well as money movements through the integrated solution.	Farmers, agri-business	Philippines	Active
	Farmers Information Communication Management (FICOM)	Important tips on growing crops are relayed from the Uganda National Farmers Federation headquarters to district level	Farmers	Uganda	No longer active

Subsector / Segment	Name of Service/ Product	Description/Summary	Target Users	Country	Status
		offices, and then to 24 'village phone centers', in which each farmer's group owns a mobile phone. The farmers also send and receive SMS messages with updates on market prices, saving at times a whole day's travel to market.			
	Agricultural Market Information Systems (AMIS)	Market investigators collect up-to-date agricultural commodities prices information from a grower's – level market on market days and send price information using text messaging over cell phones into a database managed on a SMS Server, which in turn would be accessible to clients requesting price information for agricultural products through a text message request.	Farmers	Bangladesh	No longer active
	GL-CRSP Livestock Information Network and Knowledge System (LINKS)	LINKS is a Livestock Information Network and Knowledge System which provides regular livestock prices and volume information on most of the major livestock markets in Ethiopia, Kenya and Tanzania along with information on forage conditions, disease outbreak, conflict and water supply to support decision making at multiple scales.	Farmers, traders	Ethiopia, Kenya, Tanzania	Active
	Infotrade	Infotrade provides critically analyzed information collected from 20 district markets in Uganda covering a total of 46 commodities. Data is collected thrice weekly, verified and posted on a Website. Information can be accessed by email, or directly on a mobile phone.	Farmers, traders	Uganda	Active
	Ratin SMS	To assist the stakeholders in the grain industry that cannot access commodity prices through internet, EAGC initiated an SMS facility which has been tested and it's now operational. SMS codes for Kenya, Tanzania and Uganda were set up and tested by CELLNET-Kenya Ltd. RATIN SMS is a low-cost, highly implementable cell phone based platform that seeks to redress lack of market information.	Farmers	Kenya, Tanzania, Uganda	Active
	Foodnet and Farmgain	Data on prices, traded volumes, market flow, growing conditions and other relevant information is collected from villages and market centers and, together with relevant national and regional information is disseminated in local languages by local FM radio stations. The project receives and disseminates instant reports through SMS on changing market prices. Both the national and localized market information projects are fully integrated, utilizing one central information processing facility, thus reducing cost and augmenting local information with national and regional market information of relevance to the local target area.	Farmers, traders	Uganda	Active
	Dialog Tradenet	Dialog Telekom, together with Govi Gnana Seva (GGS) launched a service to deliver spot and forward agricultural commodity price information via mobile phones. The service is based on Dialog's Tradenet platform – and derives on-line agri-produce price information from three Dedicated Economic Centers at Dambulla, Meegoda and Narahenpita. Dialog Tradenet is a	Farmers	Sri Lanka	Active

Subsector / Segment	Name of Service/ Product	Description/Summary	Target Users	Country	Status
		repository for national-level market information built on a suite of digital technologies. Tradenet encompasses the collation, comparison, qualification and subsequent dissemination of trade enablement information to large numbers of stakeholders minimizing information arbitrage.			
	Mandi Bhav	Tata Teleservices (TTSL) partnered with Impetus Technologies to launch a Mandi Bhav as a VAS targeting rural farmers. Via this service, subscribers on the Tata Indicom network can get real-time spot market prices on 500 commodities from over 3,000 large markets (mandis) across India. The service is targeted toward farmers and agricultural commodity traders who need updated information on current prices of various commodities across the country.	Farmers	India	Active
	KRIBHCO Reliance Kisan Limited	Reliance Telecommunications and Krishak Bharati Cooperative Limited (KRIBHCO), a fertilizer producing cooperative, formed a joint venture in June 2009, called KRIBHCO Reliance Kisan Ltd. This JV was again primarily a rural distribution model for telecom and nontelecom products. Reliance, in late 2009, announced a full suite of upcoming VAS targeting mGov services in Maharashtra and Kerala which would include market price information as well.	Agricultural value-chain	India	In pilot
	Compañía Argentina de Granos (CAGSA)	CAGSA is a major food broker in Argentina; they simplify the logistics of transporting harvested grain and corn to their distribution centers, deliver supplies such as fertilizer, and provide various agri-business services to their members. Syncrologix Mobile Solutions' SmartTasks application is an application for the BlackBerry Enterprise Solution. It offers a way to build BlackBerry-specific reporting and data capturing forms that process requests for various CAGSA services.	Agricultural value-chain	Argentina	Active
	Portal CONAPROLE	Access to information through Internet connection and providing SMS services to cooperative partners with information on their referrals, quality of milk delivered, receivable balances, detail of liquidations and purchases, as well as general information about the Cooperative's activities, information and connections.	Dairy producers	Uruguay	Active
	Virtual City AgriManagr	AgriManagr automates produce purchasing transactions and reduce your costs while improving relationships with your customers and suppliers. Virtual City's AgriManagr solution has been used in the Dairy, Tea, Coffee and Cotton industries.	Workers in dairy, tea, coffee and cotton sectors	Kenya	Active
	Mkulima Farmer Information Service	Mkulima FIS is a farmer information resource and helpline available over mobile phones and the Web. It is a mobile IVR (Interactive Voice Response), service that uses USSD (Unstructured Supplementary Services Data) to lead a farmer through a set of options as they seek information for a particular issue.	Farmers	Kenya	Not yet active

Subsector / Segment	Name of Service/ Product	Description/Summary	Target Users	Country	Status
	iCow – Green Dreams	iCow is a voice based mobile app developed for the dairy industry. iCow uses voice prompts to help farmers monitor their dairy cow fertility cycle from the time the cow is inseminated until she delivers.	Dairy farmers	Kenya	Not yet active
Agriculture, Animal husbandry, Fisheries & Forestry • Other rural SME & micro-businesses					
Agriculture, Animal husbandry, Fisheries & Forestry • Extension services	DigitalICS	To improve the efficiency of their certification and inspection processes, CEPCO introduced a new system that uses software called DigitalICS. The m-app is used by internal inspectors who visit each plot of land and fill out a survey regarding the farmer's growing practices, the status of the land plot and the farmer's equipment. Inspectors can record audio and take pictures to augment the survey with visual evidence, questions and comments from farmers and other kinds of qualitative data. The survey data is uploaded to a Web-based application that helps evaluators review the inspections and take appropriate action.	Agricultural associations	Mexico	Active
	Farmer's Friend (Grameen)	Farmer's Friend (Powered by Google SMS) offers farmers an affordable and targeted way to search for agricultural tips through a SMS-based database. Keywords in the query are matched against the database and the farmer receives a reply with a tip related to his or her query terms.	Farmers	Uganda	Active
	mAgri (IKSL, IFFCO, GSMA)	A voice message service which provides agricultural advice in the form of minute-long voice messages in local languages. Farmers receive five messages, each one minute long every day, except on Sundays. There is also a helpline service, which gives farmers access to experts on farming and veterinary medicine.	Farmers	India	Active
	National Farmers Information Service (NAFIS)	NAFIS (the National Farmers Information Service) is a voice service that offers agricultural extension information which farmers can access through mobile phones. NAFIS is updated through the Web , and the IVR is created automatically through a Text-to-Speech engine in both Kiswahili and Kenyan English.	Farmers	Kenya	Active
	Avaaj Otalo (Voikiosk)	Avaaj Otalo is a voice-based community forum that connects farmers in Gujarat, India to relevant and timely agricultural information over the phone. Farmers call up a phone number, and then navigate through audio prompted menus to ask questions, listen to answers to similar questions, and listen to archives of a popular radio program for Gujarati farmers. The number farmers can call is toll-free.	Farmers	India	Active
	Nutrient Manager	The Nutrient Manager decision tool for rice has already been released and used with CD and Web-based applications in the	Farmers	Philippines	planning only

Subsector / Segment	Name of Service/ Product	Description/Summary	Target Users	Country	Status
		Philippines. To reach more farmers, especially those without computers, the Philippines has been selected as the country to develop and provide, through a partnership with the public and private sector, a mobile phone–based IVR application that sends farmers a text message with a field-specific fertilizer guideline based on information they provide about their rice field. This tool is set to be released in mid-2010.			
	Kenya Farmer's Helpline (KenCall)	The service which primarily targets individual farmers will also be accessible to agriculture extension facilities, so as to complement existing efforts to support and engage the SHFs with detailed and varied agricultural information on how to improve production (growing, harvesting and rearing), planning (agricultural inputs and planting), negotiating and selling.	Farmers	Kenya	Active
	Distance Diagnostics through Digital Imaging (DDDI)	The Distance Diagnostics through Digital Imaging system allows textural information and descriptive images to be submitted directly from Extension offices, for rapid diagnosis by resource professionals. The system utilizes conventional software and hardware which has proven to be effective and reliable.	Farmers, livestock workers, field workers	Honduras, Mexico, Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Panama, Dominican Republic	Active
	1920 (Govi Sahana Sarana)	The Sri Lankan Ministry of Agriculture's agricultural advisory services have been expanded with the creation of a hot line, 1920, which can be used to obtain information from the Advisory Council. Callers can ask advisors questions from any phone, the first three minutes of the call are free. The service helps farmers in solving their various problems such as agriculture related technical matters, inputs and marketing problems.	Farmers	Sri Lanka	Active
	Farmers' Text Center (FTC)	An SMS based service for answering agriculture related queries.	Farmers	Philippines	Active
	eExtension Service	The Philippine eExtension Service is an addition to Techno Gabay, a national extension system that has the goal of providing farmers with access to best practices and latest science and technology to improve agricultural methods and increase agricultural productivity.	Farmers	Philippines	Active
	Información Mensajeria Móvil	Información Mensajeria Móvil is a series of text message-based subscription services. Subscribers can choose services such as training, best practices, advisory and agriculture news, science and technology, fishing and aquaculture, rural opportunities and credit instruments.	Farmers	Colombia	Active
Agriculture, Animal husbandry, Fisheries & Forestry • Innovation	Nano Ganesh	Nano Ganesh is a GSM Mobile based remote control system exclusively for the use with water pump sets in agriculture areas. The need of Nano Ganesh arose from the routine problems faced by the farmers in operating the pumps. These problems include fluctuations in power supply,	Farmers	India	In pilot

Subsector / Segment	Name of Service/ Product	Description/Summary	Target Users	Country	Status
		difficult terrain, fear of animals on the way to pumps, hazardous pump locations along rivers or water storage beds, shock hazards and rains.			
Agriculture, Animal husbandry, Fisheries & Forestry • Research	EpiCollect – A PLATFORM FOR CREATING APPS, NOT AN APP ITSELF	We provide a generic framework, consisting of mobile phone software, EpiCollect, and a Web application. Data collected by multiple field workers can be submitted by phone, together with GPS data, to a common Web database and can be displayed and analyzed, along with previously collected data, using Google Maps (or Google Earth). Similarly, data from the Web database can be requested and displayed on the mobile phone, again using Google Maps.	Field workers	None yet	Active

Subsector / Segment	Name of Service/ Product	Description/Summary	Target Users	Country	Status
Resource Management • Water	WaterReporter	The solution uses open source software, Web-based GIS and relatively simple software on mobile phones, allowing water-quality test data from field kits to be sent in and centrally monitored and analyzed.	Field workers, labs, rural people in areas lacking potable water	South Africa	In pilot
	Grundfos Lifelink	A Lifelink system is a single-point water supply with a submersible borehole pump that is powered by energy from solar panels. Water is pumped to an elevated storage tank, whereupon it is led by gravity to a tap unit in a small house. The tap unit also serves as a payment facility.	People getting water from a community pump	Kenya	Active
	SMSONE	SMSONE is basically a very-local newsletter. A local youth buys the franchise rights for a village for $20 to be the local reporter, then signs up 1,000 names. The info is entered in a database and the subscribers get a text introducing the kid as their village's reporter. The subscribers don't pay anything. SMSONE's service can give farmers instant updates about crop pricing or news of a seed or fertilizer delivery a town away. SMSONE subscribers get a text when the pipes are about to be turned on at local water taps.	Villagers	India	Active
Resource Management • Land	n/a				
Resource Management • Environment & Climate	Greenpeace India – SMS Lead Generation	The SMS lead generation campaign is a filter mechanism designed to source 'warm prospects'. An SMS text message was sent to 56,137 people, all qualified as potential warm prospects with an interest in environmental issues.	Campaigners, NGOs	India	No longer active

Subsector / Segment	Name of Service/ Product	Description/Summary	Target Users	Country	Status
Labor, Migration and Human Development • Employment	Mobenzi	Mobenzi is a new software service designed to create work in impoverished communities in South Africa. Even among the unemployed, mobile phones are common, and Mobenzi pays them to perform simple tasks, via SMS on their phones.	Job seekers	South Africa	In pilot
	Jana	Jana is a service that enables mobile phone subscribers to earn money and accumulate savings by completing simple micro-tasks for large corporate clients.	Job seekers	Africa	Active
	Babajob	Babajob.com is a job Website and mobile portal dedicated to connecting informal sector workers – cooks, maids, drivers, guards, etc.- and employers to India and eventually worldwide.	Job seekers	India	Active
	KerjaLokal (Grameen) – NOT TARGETED AT RURAL	KerjaLokal is a blue collar job search service that can be accessed via the mobile phone. The KerjaLokal.com microsite can be accessed from a mobile device through a WAP browser.	Job seekers	Indonesia	Active
	Mobile for Good (M4G) – NOT TARGETED AT RURAL	M4G delivers vital health, employment and community content via SMS on mobile phones in order to inform and empower disadvantaged individuals and help bridge the digital divide, the widening technology gulf which exists between rich and poor countries.	Job seekers	Kenya, Cameroon, Tanzania, Uganda, Nigeria, Nepal	Active
	Kazi560	Subscription service to receive SMS alerts of new jobs available in Kazi560's database.	Job seekers	Kenya	Active
	Freedom Fone – A PLATFORM, NOT AN APP IN ITSELF	Freedom Fone is an information and communication tool, which marries the mobile phone with Interactive Voice Response (IVR), for citizen benefit. It provides information activists, service organizations and NGO's with widely usable telephony applications, to deliver vital information to communities who need it most.	Job seekers	Zimbabwe	Active
Labor, Migration and Human Development • Education, learning & training	BridgeIT and Text2Teach	BridgeIT is a program that uses mobile phones to bring educational videos to rural classrooms in Tanzania. Text2Teach is an educational program which aims to enable teachers and students to access over 900 multimedia educational materials like video, pictures, text or audio files via Short Message Service (SMS) in the Philippines and was initiated by BridgeIT.	Teachers, students	Philippines, Tanzania	Active
	Project MIND COMPLETED PROJECT	The objectives of this project are to test the feasibility and acceptability of using short message system (SMS) technologies for delivering nonformal distance learning (DL) to different socio-economic, cultural and gender groups; and to determine the motivation of users for distance learning purposes.	Teachers, students	Mongolia, Philippines	Active
	MILLEE	With a donation of 450 cellphones from Nokia, they deployed MILLEE games with 400 rural children in 20 villages in India. They compared their learning gains against 400 children in another 20 villages. They deployed MILLEE games with another group of children from the urban slums.	Teachers, students	India	Active

Subsector / Segment	Name of Service/ Product	Description/Summary	Target Users	Country	Status
		The MILLEE games target an entire academic year of the local, official English curriculum.			
	Question Box / Open Question	Question Box is Open Mind's initiative that helps people find answers to everyday questions like health, agriculture, business, education and entertainment. It provides easy access to information in hard-to-reach areas and breaks through technology, language and literacy barriers. We do this through hotlines connected to live operators or SMS. Open Question is a simple software to start your own Question Box project.	Rural people	India, Uganda	Active
	Project ABC	The purpose of the pilot program is to use information technology (mobile phones) as a complement to traditional literacy training, providing households with the opportunity to practice their literacy skills via SMS.	Students, low-literacy people	Niger	In pilot
	Multimedia Word and Drumming Strokes games – NOT TARGETED AT RURAL PEOPLE	Based on an analysis of 25 traditional Chinese games currently played by children in China, we present the design and implementation of two culturally inspired mobile group learning games, Multimedia Word and Drumming Strokes. These two mobile games are designed to match Chinese children's understanding of everyday games.	Students	China	Active
	BBC Janala – NOT TARGETED AT RURAL PEOPLE	BBC Janala ('Window'), launched in November 2009 is a unique multi-platform (including mobile, internet and TV) project that harnesses multimedia technology to provide affordable education to potentially millions of people in the Bangladeshi-speaking community. By dialing 3000 users can access hundreds of English language audio lessons and quizzes.	Bangladeshi-speakers	Bangladesh	Active
	M4Lit – NOT TARGETED AT RURAL PEOPLE	The m4Lit project set out to explore the viability of using mobile phones to support reading and writing by youth in South Africa. In the pilot phase of the project a mobile novel (m-novel) was written and published in September 2009 on a mobisite and on MXit.	Students	South Africa	Active
	M4Girls	The M4girls project is a partnership between Nokia, Mindset Network, and the Department of Education (North West Province/South Africa) to test the provision of educational content on a mobile phone platform to girl learners.	Teachers, students	South Africa	No longer active
	Voices of Africa Mobile Reporting – A PLATFORM, NOT AN APP ITSELF	The training program combines several face to face workshops with practical assignments for an optimum learning experience. During the initial workshop trainees are introduced to the basics of mobile reporting. When they are familiar with the mobile phone, trainees go back to their communities and practice their newly acquired skills by making short video reports about diverse topics in their communities. They publish each report on the training Website and receive individual feedback by email or Skype from our professional coaches.	Trainee reporters	Ghana, Cameroon, Kenya, Tanzania, South Africa	Active

Subsector / Segment	Name of Service/ Product	Description/Summary	Target Users	Country	Status
	ICT Bites	The project was set up to deal with the shortage of qualified teachers. There is a special focus in the project on in-service education of Licensed Teachers, teachers with only a few weeks of formal teacher education. The project will use available infrastructure and media to Develop models for communication and distribution of learning material for different technical environments (broadband, VSAT, mobile phones, CD/DVD, memory cards etc).	Teachers	Tanzania	In pilot
	Dr Math	Dr Math provides tutors to help with mathematics homework. Pupils use Mxit on their mobile phones. Tutors are from University of Pretoria. The service runs from 14:00 – 22:00 Sunday – Thursday. Tutoring is mostly in English, but some in Afrikaans.	Students	South Africa	Active
Labor, Migration and Human Development • Rural Youth	Jokko Initiative	Tostan is adding a new component to its community empowerment program (currently reaching over 800 communities in eight African countries), to teach the practical uses of standard cell phone capabilities and SMS texting. Mobile phones will increasingly serve as the platform for services provided by governments, health clinics, schools, and banks. The Jokko Initiative will provide a new generation of girls with access to the valuable tools of communication technology, and training in its applications for community engagement and positive social change.	Rural youth, rural women	Senegal	Active
Labor, Migration and Human Development • Rural Women opportunities	n/a				
Labor, Migration and Human Development • SMEs and micro businesses / private sector development	Trade at Hand	Trade at Hand is an ITC service which objective is to make innovative use of mobile phones by business exporters from developing economies. There are four solutions: Market Prices, consists in sending, via SMS, product prices on international markets; Market Alerts is a Web-to-SMS tool that enables Business Support Organizations to transmit business opportunities, contacts and market news to targeted business people; mCollect allows national market price collecting and food security institutions to use the SMS channel to gather price information from their networks of rural market price collectors; Mobile Marketplace, offers a virtual marketplace to small-scale producers who have access to a mobile phone, enabling them to advertise their products to big buyers.	Farmers, exporters, food security institutions, buyers	Burkina Faso, Mali, Mozambique, Senegal, Liberia	Active
	TiendatekWeb – NOT TARGETED AT RURAL	The first product is a point-of-sale software application that allows micro-retailers to record all store expenses and revenues directly on a mobile phone; the camera even serves as a bar code reader which allows them to record sales and inventory at the product level. All applications run on smart phones that have touch-screens and	Micro-retailers	Latin America	Active

Subsector / Segment	Name of Service/ Product	Description/Summary	Target Users	Country	Status
		synchronize wirelessly with Web servers.			
Labor, Migration and Human Development • Migration	n/a				
Labor, Migration and Human Development • Miscellaneous	JavaRosa – A PLATFORM, NOT AN APPLICATION IN ITSELF – NOT TARGETED AT RURAL	JavaRosa is an open-source platform for data collection on mobile devices. It is a project of Open Rosa, a member of the Open Mobile Consortium. JavaRosa has been designed for a wide and ever increasing variety of applications including taking survey data, following disease management, guiding health workers through treatment protocols at point of care, and collection of medical records.	All people	Uganda, various	Active
	FrontlineSMS – NOT TARGETED AT RURAL	FrontlineSMS is award-winning free, open source software that turns a laptop and a mobile phone into a central communications hub. Once installed, the program enables users to send and receive text messages with groups of people through mobile phones. What you communicate is up to you, making FrontlineSMS useful in many different ways.	All people	Over 50 countries	Active
	CellBazaar – NOT TARGETED AT RURAL	CellBazaar leverages the simple, widespread power of SMS to bring the market to your phone. By sending simple text messages to 3838, you can post items for sale, look for items to buy, and obtain current market prices of products or services. Alternatively, WAP provides an even faster experience as you browse a simple graphic menu to access the entire marketplace.	Buyers and sellers	Bangladesh	Active
	GeoChat – A PLATFORM, NOT AN APP ITSELF	GeoChat is a flexible open source group communications technology that lets team members interact to maintain shared geospatial awareness of who is doing what where -- over any device, on any platform, over any network. GeoChat allows teams to stay in touch one another in a variety of ways: over SMS, over email, and on the surface of a map in a Web browser. GeoChat allows networks of organizations and individuals to form cross-organizational virtual teams on the fly, linking field to headquarters -- keeping everyone on your team connected, in sync, and aware of who is doing what, and where.	Teams	Various	Active

Subsector / Segment	Name of Service/ Product	Description/Summary	Target Users	Country	Status
	Mesh4X – A PLATFORM, NOT AN APP ITSELF	Mesh4x allows organizations to create seamless cross-organizational information sharing between different databases, desktop applications, Websites, and devices. It allows you to create or join a shared data mesh that links together disparate software and servers and synchronizes data between them automatically. You choose the data you wish to share and others do the same, enabling dispersed groups within or across organizations to see and synchronize data. Using Mesh4X, changes to data in any one location in the mesh are automatically synchronized to every other location. For cases where no Internet access is available at all, there is no longer any need for the slow transport of files physically between locations. Mesh4X gives you the option to synchronize all data via a series of SMS text messages.	Organizations	Various	Active
	Mobilisr – A PLATFORM, NOT AN APP ITSELF	Mobilisr is an open source enterprise class mobile messaging platform for NGOs around the world. The Praekelt Foundation and Cell Life, South-African based organization, are collaboratively developing an open source enterprise-level messaging platform.	NGOs	South Africa	In pilot
	Open Data Kit – A PLATFORM, NOT AN APP ITSELF	Open Data Kit (ODK) is an open source mobile data collection system designed so that components can reconfigured as needed. The system harnesses rapidly evolving functionality on mobiles and on the internet into an easy to use package. The mobile client, ODK Collect, is built on the Android platform and can collect a variety of data types: text, location, photos, video, audio, and barcodes. ODK Aggregate is a Web server built on Google's App Engine infrastructure. It provides a free and scalable repository where collected data can be stored, exported into a number of formats or visualized on a Google Map. Instead of closed solutions with limited lifetimes, ODK builds on open technologies and open standards that guarantee interoperability and enable future capabilities. By using the XForms standard, ODK can share complex forms and data with systems such as OpenMRS, EpiSurveyor, and the OMC's JavaRosa.	Various	Sub-Saharan Africa	Active
	Rapid Android – A PLATFORM, NOT AN APP ITSELF	Rapid Android is a unique platform where, for the first time ever, a phone can now be used not only as a data entry tool but a data aggregation platform. Rapid Android allows users to use the Android phone as a mini-server, in addition to using it as an	Anyone entering data in the field	Various (UNICEF)	Active

Subsector / Segment	Name of Service/ Product	Description/Summary	Target Users	Country	Status
		SMS client, allowing users in the field to enter data, to create surveys, and rapidly analyze data in the field. Rapid Android is a complete two-way SMS solutions that unlike other tools on the market, allows for analysis and processing on the actual phone.			
	RapidSMS – A PLATFORM, NOT AN APP ITSELF	RapidSMS is a platform created from the same underlying pieces of computer code. Each one was crafted to solve a specific problem of a field office. The underlying code-base is open-source, so anyone can use it and build upon the platform. RapidSMS is designed to be customized for the varied needs and constraints of UNICEF and the developing world. Each RapidSMS product is an SMS-based tool that enables mobile data collection and messaging.	Anyone entering data in the field	Various (UNICEF)	Active
	Mobile Researcher – A PLATFORM, NOT AN APP ITSELF	Mobile Researcher is a SaaS platform which transforms the ubiquitous mobile phone into a cutting-edge research tool. Leverage Web and mobile technologies to design and deploy surveys to fieldworkers in minutes, monitor, manage and communicate with your team and analyze responses in real-time. Using Mobile Researcher, the process of data collection, capture, storage and analysis takes place instantly with data available immediately from anywhere in the world. Manage surveys, people and data from your Web-based console.	Field researchers	Multiple	Active
	InSTEDD GeoChat – A PLATFORM, NOT AN APP ITSELF	InSTEDD GeoChat is a unified mobile communications service designed specifically to enable self-organizing group communications in the developing world. The service lets mobile phone users broadcast location-based alerts, report on their situation, and coordinate around events as they unfold, linking field, headquarters, and the local community in a real-time, interactive conversation visualized on the surface of a map. Once you create a GeoChat group, you may use it as the text equivalent of a push-to-talk radio: send the group a message on the Web , by email, or by SMS, and the rest of the group receives it.	Groups	Cambodia, Thailand	Active
	Text to Change – A PLATFORM, NOT AN APP ITSELF	With the Text to Change concept we offer an interactive Mobile SMS Quiz with knowledge questions linked with a rewarding system (incentive). By means of this edutainment and this interactive way of communicating, we tend to reach out to millions of people in Africa and around the world in order to spread the message of our partners and make it a subject of discussion. The SMS Quiz is designed to raise and help resolve key issues around local development programs.	Various	Uganda, Cameroon, Tanzania, Namibia, Madagascar	Active
	Sembuse and MXit – A PLATFORM, NOT AN APP ITSELF	Sembuse allows users, for 15% of the cost of a normal 160 character SMS message in Kenya, to send one with 1000 characters in it. Sembuse is a mobile social network. It's	Various	East Africa, South Africa	Active

Subsector / Segment	Name of Service/ Product	Description/Summary	Target Users	Country	Status
		a way for East Africans to connect with each other via short messaging, cheaper than normal SMS messages.			
		MXit is a free instant messaging software application developed by MXit Lifestyle in South Africa that runs on GPRS/3G mobile phones and on PCs. It allows the user to send and receive one-on-one text and multimedia messages to and from other users, as well as in general chat rooms.			

Subsector / Segment	Name of Service/ Product	Description/Summary	Target Users	Country	Status
Governance / Political • E-Government and administration relevant to rural development	eSMS – NOT TARGETED AT RURAL	eSMS is an exclusive SMS Gateway established by the Kerala State IT Mission for use by various government departments for providing departmental services over mobile phones.	Citizens	India	Active
	1919 / GovSMS – NOT TARGETED AT RURAL	Now in Sri Lanka by dialing 1919 using any phone you have the access to all the services offered by the government. The beauty of that is service is available in Sinhala Tamil and English. This makes accessing the government services a much better experience and makes the life really easy when it comes to deal with government agencies or departments.	Citizens	Sri Lanka	Active
	Mamamayan Muna – TXT CSC	TXT CSC is a support mechanism of the Mamamayan Muna flagship program of the Civil Service Commission (CSC) under the Public Assistance and Information Office (PAIO). It seeks to provide improvement on government frontline services, act on requests, recommendations, complaints and other concerns of the citizen in an upfront, courteous, and efficient manner.	Citizens	Philippines	Active
Governance / Political • Awareness raising					
Governance / Political • Other m-government services	Disaster and Emergency Warning Network (DEWN) – NOT TARGETED AT RURAL	The DEWN is an innovation based on widely available mobile communications technologies such as short messages (SMS) and cell broadcast (CB), aimed at rendering a cost effective and reliable mass alert system. The network connects mobile subscribers, police stations, identified religious/social community centers and even the general public to a national emergency alarming center.	Citizens, first responders	Sri Lanka	Active
	Ushahidi	The Ushahidi Platform was built for information collection, visualization and interactive mapping. Ushahidi, which means testimony in Swahili, is a Website that was initially developed to map reports of violence in Kenya after the post-election fallout at the beginning of 2008. The volunteer team behind Ushahidi rapidly developed a tool for Kenyans to use SMS, email, or the Web to report and map incidents of violence.	Citizens, NGO, media, election monitors	Kenya, India, Mexico, Lebanon, Afghanistan, DR Congo, Zambia, Philippines	Active
	SMS e-Service	The e-Service is a communication and information sharing forum between citizens, Ministry of State and Registration of Persons, Public Sector Reform and Performance Contracting (PSR&PC) and the Directorate of e-Government. The project will enable citizens to access government services through mobile phones and to query the manner services are delivered and to obtain real time feedback regarding requirements, costs and status of the most commonly demanded public services.	Citizens	Kenya	Active

Subsector / Segment	Name of Service/ Product	Description/Summary	Target Users	Country	Status
Rural Finance, Infrastructure & ICT • Mobile Money, m-banking and micro-finance related services	Ekgaon CAM, and, Self-Help MIS	CAM is a mobile information services framework for rural areas in the developing world. CAM is a three-tier document-based architecture for providing remote rural information services for SHGs in Microfinance. The CAM framework consists of the CAMBrowser, a single mobile phone application, CAMForm paper forms, equipped with embedded processing instructions and the CAMServer, an on-line service that links CAM with Web-based services.	Microfinance institutions	India	In pilot
	Zero (ZMF)	The ZERO platform converts new generation low cost NFC mobiles with large storage capacities as a secure, self-sufficient bank branch, with biometrics based customer ID, for customer enrolment for no-frills accounts and all types of transactions in the village with the local Customer Service Point operator acting as a Teller. mZERO (mobile version of ZERO) is available as a self-service payment option for customers on the mobile phone SIM to enable both over-the-counter and remote payments.	Rural people	India	Active
	MAP – NOT TARGETED AT RURAL	Once an individual has been through the simple biometric identification process – via one of our Data Capture Stations based in bank branches, or one of our mobile stations available in rural areas – they are issued a smartcard and PIN tied to a bank account. Individuals can access a wide range of services, using this card in conjunction with point-of-sale terminals (deployed to agent networks, petrol stations, grocery stores, Savings and Credit Co-operatives, bank locations and high traffic retail locations), ATMs at bank branches, mobile phones or via the internet.	All people	Uganda	Active
Rural Finance, Infrastructure & ICT • Agricultural insurance services	Kilimo Salama	Kilimo Salama (Safe Agriculture) is an insurance designed for Kenyan farmers so they may insure their farm inputs against drought and excess rain. The project, which is a partnership between Syngenta Foundation for Sustainable Agriculture, UAP Insurance, and telecoms operator Safaricom, will offer farmers who plant on as little as one acre insurance policies to shield them from significant financial losses when drought or excess rain are expected to wreak havoc on their harvests.	Farmers	Kenya	Active
Rural Finance, Infrastructure & ICT • Transport	Starbus (*bus)	The system is a proof-of-concept engineered to create a bottom-up, transportation information infrastructure using only GPS and SMS. The system, *bus, involved the development of a hardware device (a *box) containing a GSM modem and a GPS unit, that can be installed on a vehicle and used to track its location. The *box communicates via SMS with a server connected to a basic GSM phone. The server runs route a prediction algorithm and users can send SMS messages to the server to find when a bus will arrive at their location.	Bus users	Kyrgyzstan	In pilot
Rural Finance, Infrastructure & ICT	Gaon Ki Awaaz	Gaon Ki Awaaz, which means Village Voice in the Avhadi language, sends out twice-daily news calls to subscribers directly over their	Villagers	India	In pilot

Subsector / Segment	Name of Service/ Product	Description/Summary	Target Users	Country	Status
• Broadcasting & program related		mobile phones. Launched in December 2009, the project recently expanded to 250 subscribers spread over 20 villages.			
	4400 Initiative – NOT TARGETED AT RURAL	UNICEF Nepal has a Website with a special meta-site just for young people called the Voices of Youth. Now, every week on a popular youth-oriented radio program, the radio team frames a topic or a question and invites the listeners to respond via a free text message to an established short code, 4400. The responses are then posted on a forum on the UNICEF Voices of Youth (VOY) meta-site, or the Freedom Express debate platform.	Youth	Nepal	Active
	CGNet Swara – NOT TARGETED AT RURAL	CGNet Swara is a new audio-based citizen journalism service in Chhattisgarh, India. Citizen journalists can call a phone number to record news, and listeners can call in to hear news recorded by citizens around them CGNet Swara moderators use a Google SMS channel (a free SMS group service in India) to send out an SMS after a news report is published. The SMS includes the number recipients can call to hear this report..	Citizens	India	Active
	Managing News – A PLATFORM, NOT AN APP ITSELF	Managing News originated as a news aggregation and republishing platform heavily integrated with RSS/Atom. Users can track a diverse set of RSS/Atom feeds, visualize them, and republish selected reports on a platform that allows for mapping and pluggable visualizations. Managing News has subsequently added SMS functionality to the system. The system is based on Drupal, and integrates several open source projects including OpenLayers, SimplePie, and many Drupal plug-ins.	Citizens	Afghanistan	Active
Rural Finance, Infrastructure & ICT • Printed media					
Rural Finance, Infrastructure & ICT • Miscellaneous	SocialTxt	SocialTxt is a mobile messaging platform that uses the available advertising space on 'please call me' (PCM) messages, to communicate selected information to a specific target audience. Through use of the PCM advertising space, SocialTxt's objective is to give nonprofit organizations the ability to reach a potential 900,000 individuals in South Africa per day with essential information aligned toward the Millennium Development Goals.	All people	South Africa	Active

Annex D: Mobile Applications Ecosystem for Agricultural and Rural Development

Players	Assets & Capabilities	Roles	Incentives & Business Model	Limitations , Constraints & Threats
Technology & ICT service providers				
Mobile network operators	• Mobile infrastructure • Extensive retail outlets / agent networks • Large customer bases that include low-income segments • Strong branding • Customer trust • Customer service structures • Ability to make good margins on low ARPUs	• Provide infrastructure and communications service • Host applications, databases and/or take app development on board • Provide incentives to app providers & hosts in the form of bulk data discounts, etc.	• Acquire customers • Manage churn • Increase ARPUs • Capture additional revenue opportunities • Meet service obligations and CSR goals	• Regulatory limitations on providing financial services, e.g. issuing e-money, on-phone advertising, etc. • Shareholder pressure for faster, higher returns • Strategic focus that may not include some rural applications
Mobile Platform & OS providers	• Technology and expertise to enable the simplified creation and distribution of applications • A successful platform would realize economies of scale that could accrue to app providers	• Provide the back-office, underlying systems for creating and/or distributing applications • Provide payment mechanism (m-money or operator billing)	• Provide an efficient, effective way to create and distribute useful applications to encourage providers and mobile network operators to embrace the platform	• Most platform providers have limited scale/scope • Strategic focus more often focused on urban and developed markets • Competition from other platform providers
Handset suppliers – Basic 2G	• Brand recognition • Extensive distribution networks • Large customer bases • Customer service structures	• Provide the software capabilities to enable a wide range of apps • Provide the hardware capabilities to make apps easy to use	• Increased app availability could improve handset sales • Meet CSR goals • Increased penetration among rural, lower income users	• Shareholder pressure for faster, higher returns • Strategic focus that may not include rural applications • Smartphones
Smartphone suppliers – 3G Mobile, Tablets, Netbooks	• Increased functionality • Rapidly expanding user base	• Provide the software capabilities to enable a wide range of apps • Provide the hardware capabilities to make apps easy to use	• Customer loyalty and lock-in	• Ecosystem providers (such as Google & Apple) • Commodification
Software/ Application Providers	• Creativity/Innovation, ideas • Technical skills to develop applications • Knowledge of a specific sector or part of society where need exists	• Develop applications • In developing countries, need to seek partnerships with platform providers, handset vendors, mobile network operators etc.	• Earn revenue from selling the application • Meet a community need / development objective	• Small-scale • Require platforms or partnerships to distribute applications
Content Providers				
Civil Society (Local Community based Organizations)	• Local contacts and knowledge in low-income markets • Credibility and trust • Relevant operations	• Undertake research, especially on lower income segments • Engage in operational partnerships with mobile app providers • Mobile app awareness & education	• Enhance social and economic impacts of their activities • Drive development in general, in line with organizational mission	• Philanthropy-based, not-for-profit funding models limit scale • Cultures and business processes may not lend themselves to partnering with business
Civil Society / NGOs, (Int'l)	• Credibility and trust • Financial resources or relationships • Expertise from international experiences	• Undertake research, especially on lower income segments • Build agents & small retailers' capacity	• Enhance social and economic impacts of their activities • Drive development in general, in line with	• Philanthropy-based, not-for-profit funding models limit scale • Cultures and business processes may not easily

Players	Assets & Capabilities	Roles	Incentives & Business Model	Limitations , Constraints & Threats
		• Engage in operational partnerships with mobile app providers • Mobile app awareness and education	organizational mission	lend themselves to partnership with business
ARD Government Departments	• Reach into rural areas • Information about the people / economies in rural areas • Financial, technical resources of the government	• Making their services/ information available through m-apps • Promotion/ marketing • Financing through PPPs	• More efficient, effective provision of government services • Rural development	• Lack of technical knowledge to develop applications
Extension workers	• Knowledge • Presence in rural areas	• Provide training, advice via mobile apps • Support rural users to learn to use the apps	• Improve training, knowledge, skills of rural people	• Lack of technical knowledge about mobile or ICT apps
Educators & trainers	• Knowledge • Presence in rural areas • Trust	• Provide educational tools via mobile apps • Support app development through capacity building	• Improve educational outcomes	• Lack of technical knowledge about mobile or ICT apps
Employment agencies	• Contact with a network of employers and job seekers	• Provide job seekers and employers with relevant contacts & opportunities via m-apps	• Improve service to both job seekers and employers	• Lack of technical knowledge about mobile
Employers	• Existing periodic payroll distribution to employees	• Offer direct deposit of wages into mobile money accounts • Provide information and benefit dissemination through mobile apps	• Reduce cost of payroll processing, risk of cash handling • Offer greater employee convenience	• Cultural resistance
Media - Broadcasting	• Branding • Reach • Network infrastructure	• Provide content for applications	• Increase audience • Increase revenues • CSR	• Lack of technical knowledge • Lack of rural knowledge
Media - Print	• Branding • Reach • Distribution network	• Provide content for applications	• Increase audience • Increase revenues • CSR	• Lack of technical knowledge • Lack of rural knowledge • High cost
Financial service providers to users				
M-Money services / engines (mobile network operator or bank based, or independent)	• Existing infrastructure which enhances and increases usefulness of transaction apps	• Provide payment engine for apps with transaction component • NFC payments	• Acquire customers &/or increase volumes	• Existing financial services, e.g. credit cards, PayPal
Credit card or payment network operators	• Existing infrastructure which could enhance & increase usefulness of some transaction apps	• Provide payment facilities for some customers in apps with transaction component	• Make new inroads, acquire customers	• Mobile money, NFC payments via mobile phone
Banks / MFIs	• Banking infrastructure • Ability to facilitate forex clearing & settlement • Regulatory compliance expertise • Retail outlet networks • MFIs have service presence among low-income segments • MFIs conduct regular communication with low-income clients	• Offer banking services via mobile • Hold float or accounts in customers' names • Handle cross-border transactions, manage foreign exchange risk • Ensure compliance with financial sector regulation • Introduce low-income segments to mobile	• Gain access to new clients • Reduce cost of delivering financial services • Establish presence in new customer segments and new areas • Meet service obligations and CSR goals • Capture add'l revenue • Safer & lower-cost methods of disbursement and collection	• Narrow customer base • Lack of experience with, and in some cases interest in, low-income customers • Stringent regulatory requirements with significant compliance burdens • Back office systems may not be linked with mobile money platforms

Players	Assets & Capabilities	Roles	Incentives & Business Model	Limitations , Constraints & Threats
	• MFIs have knowledge of low-income clients' habits and needs	money • Educate end users	• Improve business efficiencies	• Cultural resistance
Insurance companies	• Infrastructure • Regulatory compliance expertise • Provide a potentially valuable service that is under-utilized in rural/agricultural regions of developing nations	• Offer insurance services via mobile • Ensure compliance with financial/insurance sector regulation • Introduce low-income segments to mobile insurance • Educate end-users	• Reduce cost of delivering financial services • Establish presence in new customer segments and new geographic areas • Capture additional revenue • Safer and lower-cost methods of disbursement and collection • Improve business efficiencies	• Narrow customer base • Lack of experience with, and in some cases interest in, low-income customers • Lack of data about low-income customers • Cultural resistance
Financial Service Agents (E.g., mobile money agents)	• Physical points of presence • Customer trust • Knowledge of customer usage habits and needs	• Perform cash-in and cash-out functions • Identify potential new m-apps	• Earn commissions on transactions • Increase traffic and sales potential (for agents who are retailers)	• Liquidity shortfalls • Basic business skills gaps • Limited ability to partner with large corporations
Financiers				
IFIs & Donors	• Financial resources • Best practices expertise	• Provide financing • Provide business development assistance • Provide technical assistance	• Support development objectives • Creation of profitable businesses	• Lack of local knowledge, legal systems, etc. • Lack of integration with business/ commercial communities
Venture Capital providers	• Private capital	• Flexible, informal or formal financing for new businesses	• New opportunities for investment • Exclusivity period for investment	• Usually want high Return on Investment • High levels of competition remove incentive to invest
Commercial Banks	• Access to capital and large balance sheets	• Provide loans to businesses • Advise on exit strategy for investors (such as VCs)	• Expand customer base	• High cost infrastructure • Low risk model, only prepared to invest in businesses at Stage 2 level
USFs & ICT Development Agencies	• Capital assets which can be used to finance ICT projects with RD/Universal Access focus	• Provide smart subsidies to private sector players to develop or expand rural m-apps	• Promotes Universal Access and expands the USF's role in ICT growth and development	• Staff capacity may be limited
Government ARD Departments	• Funds to support government development objectives	• Support pilot projects / test concepts	• Expand agri services	• Few funds • Inflexible
Users				
End users (farmers, householders, youth women)	• Relevant needs	• Use mobile apps to improve their lives	• Reduce risk of carrying cash • Increased access and affordability of payment, remittance, & other financial services • Convenience of remote payment, remittance, and other services	• Lack of awareness • Limited mobile literacy • Cultural and psychological resistance
Cooperatives	• Local contacts and knowledge in low-income markets • Credibility and trust • Relevant operations • Co-ops conduct regular	• Build the capacity of agents and small retailers • Engage in operational partnerships with mobile app providers • Mobile app awareness	• Increase sales of co-op members • Enhance social and economic impacts of their activities • Drive development in	• Lack of technical capacity to develop applications • Little incentive to expand to nonmembers or small farmers

Players	Assets & Capabilities	Roles	Incentives & Business Model	Limitations , Constraints & Threats
	communication with low-income clients • Co-ops have knowledge of low-income clients' habits and needs	and education	general, in line with organizational mission	
Rural Produce Buyers/ Food Processing Plants	• Warehouses • Transfer points to end buyer	• Aggregation points and provide economies of scale	• Lower cost of supply • Increase quality of supply by supporting apps that improve farmers' position	• May be short of funding (though Kenya & Sri Lanka example showed buyer willing to invest in improved quality and efficiency)
Product companies with interest in the rural market (e.g., FMCG)	• Financial resources to spend on marketing & research	• Participants	• Broaden customer reach • Reduce customer acquisition costs	• Strategic focus that may not include using RD oriented apps
Marketing organizations	• Knowledge of market characteristics and needs • Reach • Ability to create awareness of applications	• Create awareness, education • Targeting • Sales outlet for rural producers	• Generate income through sales • Increase the use/membership of a given organization's services	• Size, reach • In some cases have limited technical capabilities • May require complex, multi-partner structure to create an application
Retailers / traders	• Physical points of presence	• Accept mobile payments • Use mobile payments in B2B transactions, payment of wages • Build customer trust	• Reduce costs	• Customer demand (or lack thereof) • Business partner willingness to transact by mobile
Veterinarians	• Ability to help maintain, improve animal health	• Provide advice, expertise	• Improved animal health • Increase income	• Lack of knowledge of mobile technology
Others				
ICT & Banking Regulators	• Authority to impose regulation and monitor and enforce compliance	• Provide enabling environment for m-apps • Protect stability of financial system • Encourage and protect behavior change	• Financial stability • Growing sector	• Lack of experience with convergence of financial and telecom regulatory regimes • Lack of financial and technical capacity
Government ICT & allied Policy Makers	• Enabling policy environment	• Reduce cost of doing business • Support entrepreneurial skills development through education & policy	• Promote financial inclusion • National socio-economic development	• Limited funds

Annex E: Summary of Lessons by Subsector

Mobile Applications	Country	Lessons		
		Development Impact	**Ecosystem (players, platform, hyper-local content/service, etc)**	**Business Model (objectives, revenue, sustainability, scalability, financing)**
1. Agriculture, Animal husbandry, Fisheries & Forestry				
Manobi KACE, DrumNet, b2bpricenow.com GoogleTrader	Senegal, Ghana, Kenya Philippines Uganda	• Better access to market information leads to increased income. • Linking suppliers and buyers directly, cutting out the middlemen, removing information asymmetry leads to increased income.	• Local content on market prices created by local staff in market resource centers (MRCs) is responsible for KACE's value creation as well as supporting their virtual market using broadcast radio and linkages between buyer & seller • Platforms, such as Ovi Life Tools (OLT), could ensure wider availability of applications and therefore scalability. • Partnerships with mobile network operators are vital for leveraging their networks and services, reaching users, cost management, etc.	• Affordability can limit the entry of smallholder farmers, thus planned multi-level services are effective (market info at no cost, leading to value added market linkage assistance at a price can migrate beneficial participation).
DrumNet	Kenya	• As above	• Pilot integrated major buyers, buyer-producer contracts, bank, farm produce pick-up & transportation, mobile recording & accounting, and value chain management.	• But trying to do everything (i.e., incorporate all players in a value chain) at once can lead to failure, even of a well-conceived and potentially impactful application. Organic step-by-step growth is more feasible (see Virtual City below). • Attempting to transit from NGO developed applications with donor support to a private sector technology owner in one step seems challenging.
Virtual City	Kenya	• Supply chain automation improvements (mobile & ICT) in specific market segments lead to reduced transactional and logistical costs • These benefits, as well as greater accuracy of farm gate measurements impact farmer (income), buyer (cost reduction) & market productivity for the segment.	• This model has relied on one major player (e.g., national scale buyer) financing an application that is deemed good for the buyer dominated ecosystem • Also improved farmer credit worthiness and can indirectly draw banks to the value chain.	• Applications focused on meeting/ automating specific customer needs without including full value chain can grow at a rate that matches need and capabilities.
Dialog Tradenet, RML, DatAgro	Sri Lanka, India, Kenya, Chile	• Micro, granular information (market pricing, weather advisories) results in increased income.	• A specialized agriculture information company can be key to providing trusted information. • Farmers trust and see value in specialized hyper-local	• Popularity and impact still do not guarantee profitable scalability without either the benefit of large market size or effective packaging for efficient multi-market

Mobile Applications	Country	Lessons		
		Development Impact	Ecosystem (players, platform, hyper-local content/service, etc)	Business Model (objectives, revenue, sustainability, scalability, financing)
			content from trusted suppliers (e.g. based in local market centers or cooperatives)	replication • Partnerships with farmer cooperatives to define the types of information they need
Manobi	Senegal, Niger & Mali	• Produce traceability yields global markets • Better supply chain linkages improve revenues • Market knowledge increases everyone's income	• Mobile operators provide access • Market researchers input market data into system via mobile device • Financial service providers offer financial/payment services • Local government provides government services	• Freemium model: Free entry-level services, Added value services for a fee, 3rd party services for a higher fee. • Financing: 1st (free stage) is funded by donors; second (added value) stage has fee to the farmers, 3rd (3rd party services) stage is multiple fee model with all participants in the value chain paying a fee.
b2bpricenow.com	Philippines	.	• Attaching an application to a successful bank guarantees transactions by piggybacking on the bank's existing clientele (i.e. guaranteeing transaction flows) and through the bank's due diligence on participants, use of the bank's existing infrastructure such as account and card facilities (thereby lowering the cost of customer acquisition. • The bank also shouldered the cost of promotion, roadshows and cooperative training, since it gained on transaction volume.	• It is possible to launch an e-marketplace economically if the objectives appeal to several interested stakeholders, such as technology suppliers, agri media, bank, which all share costs. • Also, the primary players were limited to cooperatives, cooperative buyers & buyers, thus publicity was easily targeted. • The application started as an e-commerce service for the cooperatives and major farmers. b2bpricenow.com is expanding the service to include farmers that are not account holders with LandBank. b2bpricenow strategy to add more subscribers is premised upon migrating services to mobile phones, though the functionality on mobile phones is not totally fulfilled yet.
e-Dairy, 1920, Farmers Texting Service	Sri Lanka, Philippines	• Targeted relevant information, like expert advice, can result in increased production	• Government information on productivity and sector issues combined with ICT implementing resources can generate practical m-ARD concepts	• Clear objectives (such as increasing milk production by 30 percent) are correlated with apps that graduate from the pilot/ concept stage. • Main challenge is formulation of plan to migrate from Government led to effective PPP to leverage private capacity for efficiency & growth
Esoko	N. Sudan, Burkina Faso,	• Reduced travel and communications costs by	• Platform can be applied to any application or industry that	• Private businesses can be leveraged to participate and

Mobile Applications	Country	Lessons		
		Development Impact	Ecosystem (players, platform, hyper-local content/service, etc)	Business Model (objectives, revenue, sustainability, scalability, financing)
	Cote d'Ivoire, Ghana, Nigeria, Mali, Rwanda, Tanzania, Zambia, Kenya, Mozambique, Uganda, Malawi, Mozambique, Madagascar	offering targeted procurement or extension messages to different users • Increased cross border trade through more transparent facilitation of supply and demand information • Reduction in market inefficiencies through improvement in supply chains, more equitable pricing and better access to markets for farmers and buyers. • Stabilize supplies (by avoiding over production) as well as prices. • Awareness improves farm-gate prices, reduces spatial arbitrage between markets, enables the introduction of new products such as weather insurance	would benefit from direct access to a mobile phone based-population, specifically one that requires low-cost usage. • Challenging to develop a flexible platform that can be offered in multiple countries to overcome limited market sizes (i.e. limited market size because based in one country).	subsidize the cost for lower income groups • Offer different tiers of subscriptions for individuals, businesses, and enterprises • Franchises are used for replication/scaling-up
2. Resource Management				
Lifelink, Nano Ganesh, Water Reporter, SMSONE	Kenya	• Improved access to clean and safe water facilitated by using m-apps for purchase and payment • Increased convenience and cost savings in managing and safeguarding water pump sets in agriculture areas, by using mobile phone as remote control for these pumps • Improved water quality monitoring, by using field workers and local people provided with mobile phones to overcome geographic challenges	• Use of m-Money for direct payment makes a water supply system ecosystem (finance, technology supplier, local community, user) more feasible • Local teams collect data that is directly useful to subscribers	• Educating people on the value of clean water is important to adoption of a good ground water supply project. • Local development (irrigation) is also important to increase value. • Alternative income streams are needed to sustain projects, such as promotional messages
3. Labor, Migration & Human Development				
Text2Teach	Philippines, Tanzania, Chile	• Increased access to updated educational content through downloads of teaching materials via mobile networks • Improved coordination of rural education through improved contact with local teachers • Improved student performance and classroom environment as witnessed from the high average scores in science; improved teacher-pupil, and pupil-pupil interaction, and generally upbeat classroom	• Working in collaboration with government departments	• Engaging the public sector to put in their share of resources to match the grant provided by Nokia helps in securing the projects' sustainability because of the stake they have placed in the project.

Mobile Applications	Country	Lessons		
		Development Impact	Ecosystem (players, platform, hyper-local content/service, etc)	Business Model (objectives, revenue, sustainability, scalability, financing)
		environment		
Project Mind	Philippines	• Rural inhabitants can take distance learning programs through courseware in SMS format, and SMS based testing systems		• Needs to have high mobile phone penetration rates and familiarity with text messaging
MILLIE	India	• Improved education outcomes through the use of context-specific games for language learning	• Handset vendors (Nokia in this case) appear willing to sponsor children and education related initiatives	• Challenge is creating partnerships to fund the roll-out of the games, and local educational partners to allow the usage of the MILLEE games as part of their curricula
BBC Janala	Bangladesh	• Access to affordable English language lessons via mobile phones (each 3-min lesson costs less than half the price for a cup of tea in a Dhaka tea store)	• mobile network operators partnership and sponsorship is vital as they agreed to cut the cost of calls to the service by 75%	• There can be significant interest in English language learning m-apps (750,000 calls after first month of launch)
Mobile for Good (Kazi560), Souktel	Kenya, Cameroon, Tanzania, Uganda, Nigeria, Nepal, Palestine, Iraq, Somaliland	• Inform and empower disadvantaged individuals by delivering vital health, employment and community content via SMS. • In Kenya 60,000 have found employment through the Kazi560 job service	•	• Applications could be designed to enable franchises, in order to facilitate deployment in other countries • Revenues from premium services can be used to subsidize services to lower income users • Employment m-apps has high potential of becoming financially sustainable m-apps (Kazi560 is already financial sustainable, and Souktel covers over 80% of its running costs)
Jana, Mobenzi	All countries, South Africa	• Addition income streams by using mobile phone for microwork/microtasks outsourced by local or overseas clients, such as market research and surveys • Access to flexible work opportunities as it can be conducted during spare time • Use of automated algorithms to evaluate quality and compensate workers encourages high quality delivery	• Network of mobile phone based microworkers can be developed, and individual agents mobilized to provide large scale services as private contractors • Mobile-based platforms can be built to conduct simple microwork • Brings commercial companies & advertisers into the rural ecosystems	• Some companies are interested in marketing amongst low income groups • Challenge in finding sufficient work for agents/microworkers • Jana provides interesting approach for commercial companies to limited rural affordability & could support m-applications while creating income for the targeted rural end users
Open Data Kit (ODK), RapidSMS, Frontline SMS, JavaRosa	Sub-Saharan Africa, UNICEF, over 50 countries	• Numerous areas related to tracking, monitoring, and/or coordination of health programs, human rights, disaster relief, election	• Open source community developed kits/ platforms could be very useful for m-apps focused on development purposes	• Open platform can be utilized for various data collection needs. Already used by numerous projects/ organizations such as

Mobile Applications	Country	Lessons		
		Development Impact	**Ecosystem (players, platform, hyper-local content/service, etc)**	**Business Model (objectives, revenue, sustainability, scalability, financing)**
		monitoring, missing persons in natural disasters, etc. • Improved access to food programs in Ethiopia and Malawi due to improved food distribution • Connect and amplify voice of women and youth by virtually linking rural individuals, groups, and communities; and providing virtual platform for information exchange, broadcasting ideas, and organizing advocacy work (refers to Jokko Initiative in Senegal, which uses the RapidSMS platform)	• Virtual communities/networks can be formed using simple SMS platforms, allowing instantaneous two-way communications on a large scale	Google.org and Google Earth Outreach, Grameen's Community Knowledge Worker program, Episurveyor, etc. • ODK is limited to Android based phones
4. Governance / Political				
Ushahidi	Kenya + several other countries	• Access to critical geo-referenced information; on issues such as political instability, violence, natural disasters, health related epidemics, etc. • Can be applied to track natural resources such as water, soil types, land fertility, etc.	• Crowd-sourcing can be viable way to aggregate contributors from all over the world • Crowd-sourced players have been found to provide better information than mainstream media due to higher quantity of information and wider geographic coverage	• Leveraging crowd-sourcing can provide accurate and critical information about specific events, which can be harnessed for social objectives • Challenge in filtering and quality control of user generated data • The model is inherently useful for public sector, security & aid scenario purposes and has thus relied on external finance, but has potential to level its GIS features into commercial marketing
TXT CSC, 1919, SMS e-Service	Philippines, Kenya	• Improved access to public information and services through a convenient, voice-based hotline • Access to public information and services, and tracking service status on a 24x7 basis • Time and cost savings by not having to travel to larger cities/centers for such information	• Other government ministries' support to the fronting agency is needed • Government agencies in-charge of e-Government can be leveraged to deploy m-apps	• Integrated government information from different departments bring more value • Challenge in moving beyond being a library of information, to a transactional basis • Need to ensure that other ministries update their information on a regular basis • Users can be charged and may be willing to pay for m-apps provided by the government (five shilling per call) if it brings sufficient time and cost savings
CGNet Sawa	India	• Access to citizen journalism for disenfranchised tribal groups through voice calls for hyper-local news, and improved public accountability as news items have resulted in concrete	• Buy-in from the affected political players can reduce resistance • Moderators are needed to ensure quality of news	• Users' willingness to pay up to half of daily spent for call charges • Possibility of selling news feeds to local media for sustainability

Mobile Applications	Country	Lessons		
		Development Impact	Ecosystem (players, platform, hyper-local content/service, etc)	Business Model (objectives, revenue, sustainability, scalability, financing)
		corrective actions		
5. Rural Finance, Infrastructure and ICT				
Kilimo Salama	Kenya	• Small scale farm input insurance can be transacted using mobile phones, and transaction cost can be reduced to cost of an SMS • Increased farmers' security against crop losses, and more diversified crop types and higher yield • Potential to protect rural inhabitants against other forms of unexpected life events, as usage can be extended to other insurance products such as funeral coverage and personal accident	• Identifying farmers and their crop types and farming methods (such as inputs) means that other extension services can be offered. • Higher quality inputs, such as drought resistant crops, could potentially reduce potential losses.	• Good extension services, such as training, are essential in order to educate the market about a product or new technique that could carry risk, to increase usage and adoption. • A win-win result in the early stage of implementation creates trust.

Annex F: Detailed Case Study Information Sheets

Completed information sheets for the 92 m-ARD apps studied are available at http://www.worldbank.org/ict/m-ard.

Annex G: Kenya Case Study

Annex H: Philippines Case Study

Annex I: Sri Lanka Case Study

These Annexes are attached as separate documents.

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Contents

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1 FULL ANNEX F PROFILES (80)

Subsector *I.e., Which of Typology Subsectors* Agriculture, Fisheries & Forestry	Name of Application and References Esoko: • http://www.esoko.com/ • IFC • http://www.fara-africa.org/media/uploads/File/NSF2/RAILS/Innovative_Farmer_Advisory_Systems.pdf • http://en.wikipedia.org/wiki/Esoko	Country(s) / Region Benin, Burkina Faso, Cameroon, Ghana, Cote d'Ivoire, Madagascar, Mali, Togo

Segment / Activity
i.e., which Segment in the Typology

Agro-marketing / trade

Description of Application
Note whether it is purely information or transaction based

Esoko can be configured for specific markets and commodities and the application will automatically send customized SMS messages to subscribers. You can get current prices from many of the 300 markets in their system, or Esoko can send a special alert whenever someone is selling or buying a commodity you trade in. There are four key services provided by the platform:

1. Live market feeds: real-time SMS alerts on market prices and offers that are automatically delivered to subscribers. Users can submit offers into the system directly using SMS.
2. Direct SMS marketing: businesses can target specific groups of users and target procurement or extension messages to reduce their travel and communication costs.
3. Scout polling: enterprises can set up automatic SMS polling for field activities to track inventories, crop activities etc. to monitor and report on crop cycles and yields.
4. Online profiling and marketing: any user or business gets a customizable web space that can advertise their goods and services. This space can be updated using Esoko's mobile2web content management service.

Esoko for Business
For businesses or associations, they can create an Esoko Market Network and save money by sending out SMS messages to suppliers, distributors or members. Users can prospect for new business, advertise offers, share prices, or reinforce training, all via SMS. Users can also create a professional web page on Esoko to market goods and services to international buyers.

Esoko for Public Segment
For public projects, NGOs, associations, or Governments, users can improve how programs manage information by using Esoko mobile services. Users can standardize data entry across departments, improve the speed, accuracy and cost of data collection, push time-sensitive advisory messages to thousands, and setup members to get helpful market alerts. The Esoko team can train users to transform the way projects work and revitalize the public sector.

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* In 2005 TradeNet signed a three year agreement with USAID's MISTOWA program to adapt the product and make it available to their target beneficiaries (MISTOWA's mission was to increase regional trade in West Africa by 20%).
Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent*	**Lead role(s)** Esoko is a market information system provider that collects and

Esoko Networks Ltd.	distributes prices and other information from over 300 markets.

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

Esoko's business model involves subscription fees, government and NGO funding. Subscription fees are based on market segment: Trader / Researcher - Bronze Level - $25; Small Business, Exporter – Silver Level - $250; Farmers Group, Business, Small NGO - Gold - $1,500; Large Business, NGO, Government – Platinum - $8,000.

The first and most developed application on the platform is "Esoko Market Live", a market information system for the agri-business Segment. Esoko integrates national markets and leverages private businesses to participate and subsidize the cost for lower-income producers. Esoko's business model consists of different tiers of subscriptions for individuals, businesses and enterprise partners.

Customer feedback indicates a reduction in market inefficiencies through improvement in supply chains, more equitable pricing and better access to markets for farmers and buyers.

Other key players	Roles	Incentives / Business model
1. IFC	Equity investor (signed June 25/2010)	Provision of financing to facilitate expansion and profitability
2. Licensees	Licensees in each new country of operation	Most licensees are public projects, government initiatives or NGOs seeking to establish commercial market information systems

Year of commencement	Maturation Cycle Position *Emerging / Expanding / Mature*	Status *E.g., Pilot / Rolling out / Established*
2005 (as TradeNet)	Expanding	Established

Comment on maturation / status of development

Esoko has developed a strategy to expand its operation in Africa and Asia through franchising. Esoko operates its own franchise in Ghana (Esoko Ghana – 100% owned) in order to showcase the product and provide feedback for product development. Esoko Networks has licensed its platform in 8 African countries and Afghanistan. Most licensees are public projects, government initiatives or NGOs seeking to establish commercial market information systems.

Esoko is a public/private partnership, with 70% of the investment coming from private social entrepreneurs from the United States and the UK, and the remainder from public projects focused on Development in African Agriculture Markets.

Costs of the application & evidence of cost recovery & profit/sustainability,
E.g., Development of the technical systems & content; maintenance & skills

No information available.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

Market information systems have a high development impact in industries where they are implemented as dissemination of pricing information empowers producers, particularly in low income economies. Markets in Ghana and elsewhere in Sub-Saharan Africa are inefficient. These markets are characterized by the following constraints: long transaction cycles between producers and consumers; poor access to appropriate and timely market information; low product volumes of varied quality offered by small scale and individual producers; and poorly structured and inefficient markets. The lack of market information represents a significant impediment to market access especially for small producers: it substantially increases transaction costs and reduces market efficiency. The marketing chain consists of multiple middlemen, each taking a margin at every stage of the chain, and price variations in space and time are often large and erratic.

In case of 'Esoko Market Live', Esoko is helping farmers to increase their incomes by giving them better access to markets and by empowering them to negotiate better transaction terms. In addition, Esoko's platform will promote cross border trade through more transparent facilitation of supply and demand information. The Esoko platform has the potential to stabilize supplies (by avoiding over production) as well as prices. It is expected that awareness created by Esoko platform will improve farm-gate prices, reduce spatial arbitrage between markets, enable the introduction of new products such as weather insurance in Africa and may lead to the foundation of a formal commodities exchange. (source: IFC)

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

No information available.

SWORB *[Maybe summary of other sections]*	**Strengths** • Customer feedback indicates a reduction in market inefficiencies through improvement in supply chains, more equitable pricing and better access to markets for farmers and buyers. • The Esoko platform has the potential to stabilize supplies (by avoiding over production) as well as prices. • It is expected that awareness created by Esoko platform will improve farm-gate prices, reduce spatial arbitrage between markets, enable the introduction of new products such as weather insurance in Africa and may lead to the foundation of a formal commodities exchange	**Weakness** • Need for electricity for rural farmers to charge phone and use service • Cost of service
	Opportunity • Global expansion • The platform can be applied to any application or industry that would benefit from direct access to a mobile phone based-population, specifically one that requires low-cost usage.	**Risks and barriers** Other agricultural information service providers exist and could target the same markets.

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

The application is growing and appears to be valuable to users. Since there is a demonstrable benefit to market participants, user demand should be strong in new markets.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

The platform can be applied to any application or industry that would benefit from direct access to a mobile phone based-population, specifically one that requires low-cost usage. As the system already exists in 9 countries, it has proven its replicability. The company plans to expand throughout Africa and Asia and now has an equity investment from IFC to help it do so.

Hurdles include:
• Financial sustainability
• Developing flexible platform so can be offered in multiple countries to overcome limited market sizes
• Obtaining and aggregating content
• Spurring customer adoption.

Further study / research questions	**Select for case study**
	No

Contact Mark Davies (founder) Accra, Ghana corp@esoko.com (+233) 021 258803	**Comments on contacts made, arrangements, etc.**

Subsector *I.e., Which of Typology Subsectors* Agriculture, Fisheries & Forestry, Labor, Migration and Human Development	Name of Application and References Nokia Life Tools: • http://www.nokia.com/corporate-responsibility/society/mobile-technology-for-development/nokia-life-tools • http://europe.nokia.com/services-and-apps/nokia-life-tools • http://zunia.org/uploads/media/knowledge/ICTU53_ENG_WEB1267098006.pdf (page 10) • http://www.hse.fi/NR/rdonlyres/BEFB15DC-19FC-45B3-9705-9CF9C964658B/0/Vanhanenesitys_1304.pdf	Country(s) / Region India, Indonesia, China

Segment / Activity
i.e., which Segment in the Typology

Agro-support, Agro-marketing / trade, "Education, learning & training"

Description of Application
Note whether it is purely information or transaction based

Nokia Life Tools is a software suite embedded in certain Nokia phones to provide agricultural, educational and entertainment services to emerging markets. It uses SMS to provide the information. The agricultural part of the service is provided in conjunction with Reuters Market Light, which had previously delivered its information via local post offices. It costs around 60 rupees ($1.25) a month. Localised information provided includes weather conditions, advice about crop cycles, and general tips and techniques, as well as market prices for crops, seeds, fertilizers and pesticides. The educational tools provide simple English and general knowledge courses in local languages. In the case of India, these were supplied in conjunction with mobile learning company EnableM. Another service aimed at the developing world is Ovi Mail, which has the potential to be the first digital identity for many people in emerging markets. Unlike most other email services, an Ovi Mail account can be created and used directly on a Nokia device without ever having to use a PC.

In China, Nokia launched Ovi Life Tools in May 2010 with six major partners - 39.net, Beijing Nongxintong Technology Co. Ltd., Beijing Etiantian Net Educational Technology Co. Ltd (Beijing Sizhong Ltd.), British Council, Kongzhong Corporation and Sina.com.

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS, email	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* The application is only available on certain Nokia handsets and Nokia is working to expand this selection.

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* Nokia	**Lead** role(s) Develop and distribute the Life Tools software.

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

The Life Tools business model is subscription based, with Basic and Premium packages. The service is also available on a one-off per use basis. In addition, Nokia collects some advertising revenue.

According to extensive Nokia consumer research, nearly half of emerging market customers state that they would rather connect to the Internet over a mobile phone than a computer. As a result, in 2008 Nokia introduced Ovi Life Tools. Workers in the agricultural Segment lack information and would benefit from additional income opportunities. Life Tools helps to address these needs. The tools provided in each country are based on local needs identified through research and working with partner information providers.

Other key players	Roles	Incentives / Business model
1. Data processing	Another partner company processes the details,	Generate revenue through

company	tags each piece of information with location or crop	information tagging
2. Editorial desk	An editorial desk translates stories into news feeds which are then matched to the subscribers' profiles	Revenue generated through translating stories to feeds

Year of commencement 2008: research 2009: launch	Maturation Cycle Position *Emerging / Expanding / Mature* Expanding: China launched in May 2010 and African countries are expected to be added in 2010	Status *E.g., Pilot / Rolling out / Established* Established

Comment on maturation / status of development

The existing applications appear to be mature, but Nokia is looking for ways to expand the service.

Costs of the application & evidence of cost recovery & profit/sustainability,
E.g., Development of the technical systems & content; maintenance & skills

No information available.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

Farmers have responded well to the service. Most appreciate the fact that the information is customized to their location and crops. The information provided by the service is also relevant to the season and to the stage of crop growth. Getting the information at the right time – on how to protect a crop, which crops to grow in that area, how to treat the soil between crop cycles – helps farmers to make the right decisions about what to plant and when, and to reduce losses and optimize income.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

No information available.

SWORB *[Maybe summary of other sections]*	**Strengths** • Customized to specific locales and languages • Information is timely	**Weakness** • only available on a few Nokia devices • complex service to set-up in each new market
	Opportunity • international expansion • additional information services • additional devices	**Risks and barriers** Competitors find a way of providing similar service first and getting companies, governments, associations etc locked in

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

Nokia's research suggests that farmers in particular see value in the application. If the service can successfully customize the content for each locale and provide the information in a timely, affordable, easily digestible format, then there is no reason to believe that farmers in other countries would not embrace this application.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

The service is replicable as it is already in multiple countries. To customize the application and roll-out a full suite of services in each country requires much research and numerous partners. These characteristics could slow the expansion of this application. A potential hurdle could be its availability on certain Nokia devices only.

Further study / research questions	Select for

Will Life Tools be offered on non-Nokia devices?	**case study**
	No

Contact	**Comments on contacts made, arrangements, etc.**
Hemant Madan: hemant.madan@nokia.com Director, Product and portfolio management, Nokia Life Tools	

Subsector *I.e., Which of Typology Subsectors* Agriculture, Fisheries & Forestry	Name of Application and References Reuters Market Light: • http://thomsonreuters.com/content/corporate/articles/RML_wins_award • http://thomsonreuters.com/content/press_room/tf/tf_gen_business/2008_10_21_Mobile_Service_India • http://www.icrier.org/pdf/WorkingPaper246.pdf • http://lirneasia.net/wp-content/uploads/2008/05/Mobile-2.0_AgInfo.pdf	Country(s) / Region India

Segment / Activity
i.e., which Segment in the Typology

Agro-support

Description of Application
Note whether it is purely information or transaction based

Since its launch in 2007, over 200,000 farmers in 15,000 villages across 10 states in India have subscribed to RML. It provides localized and personalized information via SMS text messages on weather, market prices, local and international agriculture and commodity news, and crop advisory tips enabling farmers to make informed decisions, reduce waste and maximize their profits.

RML subscribers receive:
• Daily weather updates for the next 24 hours and covers: minimum temperature, maximum temperature, probability and precipitation of rainfall and relative humidity. Farmers can plan inter-cultural operations accordingly as the weather forecasts address the production risk.
• Price updates and arrival information of select commodities from the regulated markets in the state. Farmers can subscribe for two commodities and receive market data from three markets of his choice. They can change the markets on demand according to specific needs. This helps farmers decide where and when to sell their produce.
• Presently, RML is covering 17 crops including varieties: cotton, maize, paddy (Basmati and PUSA), wheat, potato, cabbage, pea, cauliflower, green chilli and kinnow. It provides market data on these crops from 60 markets across the state.
• Crop Advisory Tips are sourced from the Indian Council for Agriculture Research and/or Punjab Agricultural University. RML is in the process of becoming associated with PAU to offer best-in-class advisory tips in the most timely manner.
• The service provides news related to agriculture, state government schemes, price trends and commodity movements.

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* The service has its origins in an initiative conceived by a Reuters employee whilst on a year's Fellowship at Stanford University as part of the university's Digital Vision Program. The mode of delivery is via SMS but they expect to include other modes such as voice and/or WAP in the future. Information delivered in local languages would have the highest impact, but this often requires handsets capable of handling Unicode fonts. Most farmers according to RML only possess low end handsets which are not capable of handling Unicode fonts. An IVR solution would be the easiest to use especially in areas with low literacy rates but RML finds this currently too costly to implement.
Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* Thomson Reuters	**Lead role(s)** Information service provider

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

Currently RML operates on a direct-selling approach whereby users buy scratch cards which enable them to register for the service for a specific amount of time. Currently this service is network agnostic in all the states where RML operates and they utilize a bulk SMS service provider to push messages to users, irrespective of the telecommunication network they are subscribed to.

Other key players	Roles	Incentives / Business model
1. SMS service provider	RML uses a bulk SMS service provider to push messages to users on any mobile network	Paid for distribution of SMS
2. Nokia Life Tools	RML has partnered with Nokia Life Tools for content sharing initially just in Maharashtra but also plans to expand this partnerships across India.	See Nokia Life Tools profile
3. Information providers	Weather, crop advisory information as well as local news are generally obtained via agreements and partnerships with third party sources, which are both private and state level institutions	Paid for provision of information

Year of commencement	Maturation Cycle Position	Status
2007	*Emerging / Expanding / Mature* Expanding	*E.g., Pilot / Rolling out / Established* Established

Comment on maturation / status of development

RML employs more than 300 full-time content professionals, offering news and data on more than 150 crops, 1,000 markets and 2,000 weather locations across 12 states of India. The service crossed the $1 million sales mark in 2009. As the business model becomes established in India and as our distribution and marketing strategy matures, we expect to expand the benefit of our pioneering business to millions of farmers in India, and to other emerging markets in the near future. RML is considering technologies other than SMS to deliver its services.

Costs of the application & evidence of cost recovery & profit/sustainability,
E.g., Development of the technical systems & content; maintenance & skills

While exact investment data is not available, media interviews with senior personnel suggest that so far they have invested at least USD 2 million and expect that it will take a few more years to break even (Dingra, 2009). The service crossed the $1 million sales mark in 2009.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

RML provides localized and personalized information via SMS text messages on weather, market prices, local and international agriculture and commodity news, and crop advisory tips enabling farmers to make informed decisions, reduce waste and maximize their profits.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

No information available.

SWORB	Strengths	Weakness
[Maybe summary of other sections]	The lack of third party sources to provide accurate and timely market price information does however give them a competitive advantage over other potential competitors.	The business model relies on selling scratch cards through various distribution points. However they still do not have a reliable database of addresses for subscribers and through their own studies it has been revealed that existing subscribers have had difficulty in renewing their subscriptions.

		With respect to market prices they are reliant on their own data collectors to ensure accuracy of price data. This creates a substantial overhead in employing staff to collect prices from the markets that they cover.
	Opportunity If they could partner with network operators they could concentrate more on content and leave sales and distributions to the operators.	**Risks and barriers** Emergence of third party information providers, especially since the process is labour-intensive and India is not short off inexpensive workers

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

Since its launch in 2007, over 200,000 farmers in 15,000 villages across 10 states in India have subscribed to RML. (as of April 2010). The fact that the current trend in the subscription packages has been towards longer duration ones suggest that users are finding value in the service. However there has been some unhappiness among users about the cost, with a rate of INR 15/ month being flouted as a more reasonable package by farmers (Preeti, 2009). However given their current costs in relation to sales and distribution, RML has been reluctant to reduce prices and counter that documented cost-savings for farmers from using this service means that it will continue to remain a premium service.

Their philosophy has been that economies of scale would be required before they break even and hence are trying to expand as fast as possible to cover other states as well. As part of this strategy RML intends to expand to 12 more states by the end of 2010.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

The lack of a suitable information provider for market prices has meant that they have had to employ their own dedicated price collectors for the mandis that they cover.

As the service expands they will need to go into partnerships and agreements with more and more third party entities to ensure that they can provide localized and context specific information. This is especially true with respect to crop and location specific advisory information that is piped to users.

Further study / research questions	**Select for case study** No

Contact	**Comments on contacts made, arrangements, etc.**

Subsector *I.e., Which of Typology Subsectors* Agriculture, Fisheries & Forestry	Name of Application and References DigitalICS: • http://www.digitalicslatino.org/ • http://ictupdate.cta.int/en/Feature-Articles/A-standard-system	Country(s) / Region Mexico

Segment / Activity
i.e., which Segment in the Typology

Extension

Description of Application
Note whether it is purely information or transaction based

The Coffee Growers Association of Oaxaca (CEPCO) currently works with 33 smaller organisations across the state of Oaxaca, covering a total of 2760 producers, 90% of whom own less than two hectares of land. CEPCO's coffee is certified as organic and fair-trade. They employ 30 trained internal inspectors to perform yearly inspections and 17 extension agents to train farmers in organic practices. All of their inspectors and extension workers are experienced coffee producers.

To improve the efficiency of their certification and inspection processes, CEPCO introduced a new system that uses software called DigitalICS. DigitalICS, a mobile-phone based application has been designed, developed, evaluated and successfully deployed at CEPCO. The system is live and is being used to inspect and evaluate 50% of the cooperative members (more than 1,000 farmers). The mobile application is used by internal inspectors who visit each plot of land and fill out a survey regarding the farmers growing practices, the status of the land plot and the farmers equipment. Inspectors can record audio and take pictures to augment the survey with visual evidence, questions and comments from farmers and other kinds of qualitative data. The survey data is uploaded to a web-based application that helps evaluators review the inspections and take appropriate action. Reports are automatically generated for internal records, programming follow-up training, external aid requests and certification purposes.

Technology *E.g., voice, video, sms, email, GPS, multi-media* Survey software, data card, photos	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* While the current system still cannot ensure that inspectors actually visit coffee farms, this issue could be solved in the future by using GPS technology to determine the locations of the farms and the times of the inspectors' visits. One other development would be to give inspectors access to the historical data of each of their farms directly from the cell phone. This would give them a better overview of each farms' production and allow them to tailor their advice accordingly. Making the data available online – together with audio, video and photos – could improve product marketing by providing a direct link between producers and consumers. Solar chargers could be used to charge phone batteries in the field, while refinements to the DigitalICS software could reduce its power use.

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* UC Berkley's School of Information	<u>Lead</u> role(s) Developed the app for CEPCO

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

DigitalICS was developed specifically for agricultural cooperatives, and is the first such open-source system to

support mobile data collection. With the program installed on cell phones, CEPCO's inspectors can now complete surveys in the field by entering data into their phones rather than onto paper forms. The application prompts inspectors through every step of the survey process, with both text and audio. The latter option compensates for the small screen on the phone, and helps farmers with literacy problems to follow the process. The cooperative can easily customise the surveys to suit new conditions or different languages.

Preliminary estimates indicate that DigitalICS could save CEPCO more than US$10,000 a year by reducing the time taken for evaluation, inspection and manual data entry, and from printing and stationary costs. Allowing for the investment in software development, the purchase of 10 cell phones (at US$340 each), hardware, and operating expenses, including web hosting, technical support and hardware maintenance (totalling US$600 a year), the costs of installing DigitalICS could be recouped within the first year.

Other key players 1. inspectors	Roles With the program installed on cell phones, CEPCO's inspectors can now complete surveys in the field by entering data into their phones rather than onto paper forms.	Incentives / Business model Employed by CEPCO
2. CEPCO	Coffee Growers Association of Oaxaca	Support the interests of coffee growers

Year of commencement 2008	Maturation Cycle Position *Emerging / Expanding / Mature* Emerging	Status *E.g., Pilot / Rolling out / Established* Established

Comment on maturation / status of development

The system is fully developed and implemented. There are a number of additional features being considered. While the current system still cannot ensure that inspectors actually visit coffee farms, this issue could be solved in the future by using GPS technology to determine the locations of the farms and the times of the inspectors' visits. One other development would be to give inspectors access to the historical data of each of their farms directly from the cell phone. This would give them a better overview of each farms' production and allow them to tailor their advice accordingly.

Making the data available online – together with audio, video and photos – could improve product marketing by providing a direct link between producers and consumers. Solar chargers could be used to charge phone batteries in the field, while refinements to the DigitalICS software could reduce its power use.

Costs of the application & evidence of cost recovery & profit/sustainability,
E.g., Development of the technical systems & content; maintenance & skills

No information available.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

The evaluators were especially happy with the increased efficiency provided by the automated system. They had been frustrated at having to organise and sort through paper inspection reports and other related handwritten documents used in the previous system. Evaluators felt that the paper-based system led to more errors, due to the manual work required.

For the inspectors, they found that the phone was easier to carry than lots of paper forms. They complained that the phone battery ran out too quickly, but this was solved in some cases by taking a second battery. The inspectors were also concerned that they would be held responsible for any damage to or loss of the phone.

Many producers felt that data collection by cell phone was more secure than on a paper form that anyone could read. Farmers also mentioned that they liked that the inspectors took pictures of them and their crops, as it made them feel more responsible and respected for their work.

Evaluators mentioned that requiring images and audio recordings of producers increased the accountability of inspectors to actually visit the farms, and of producers to follow organic practices. One evaluator commented that

it is easier to determine whether the internal inspector has cheated and not visited the coffee plantations.	

Quantifiable benefits

Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

Preliminary estimates indicate that DigitalICS could save CEPCO more than US$10,000 a year by reducing the time taken for evaluation, inspection and manual data entry, and from printing and stationary costs. Allowing for the investment in software development, the purchase of 10 cell phones (at US$340 each), hardware, and operating expenses, including web hosting, technical support and hardware maintenance (totalling US$600 a year), the costs of installing DigitalICS could be recouped within the first year.

SWORB *[Maybe summary of other sections]*	**Strengths** Efficiency, accuracy, security, accountability	**Weakness** Phone battery life
	Opportunity GPS, put data online, solar charger	**Risks and barriers**

Market potential assessment

E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

A comparison with the 2007 data, collected using paper forms, showed that it was 38% faster to perform one inspection using DigitalICS and 69% faster to perform one evaluation, due to the reduction in time-consuming manual paperwork. Instead, all the data was entered only once in the field, and automatically transferred and consolidated for evaluation and reporting. (The reduction in inspection time is less significant, since much of the inspectors' time is taken up with walking from one plantation to another.)

Preliminary estimates indicate that DigitalICS could save CEPCO more than US$10,000 a year by reducing the time taken for evaluation, inspection and manual data entry, and from printing and stationary costs. Allowing for the investment in software development, the purchase of 10 cell phones (at US$340 each), hardware, and operating expenses, including web hosting, technical support and hardware maintenance (totalling US$600 a year), the costs of installing DigitalICS could be recouped within the first year.

It should be noted that CEPCO's earlier internal control system and procedures were already quite advanced, and have received significant external recognition and awards. Other cooperatives may benefit even more from the standardisation and automation provided by DigitalICS. But if the basic organisational and procedural structures are not in place, some cooperatives may not be able to introduce the system without substantial improvements to their current operations.

Replicability / hurdles / issues

Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

The cost analysis may be different for South Asia or Africa, where labour costs are much lower, reducing the financial benefit that can be obtained through efficiency gains. And, in countries where transportation between farms and the cooperatives' offices is expensive, it might be more cost-effective to transmit inspection data via the cell phone network, if possible.

While DigitalICS saves money on a yearly basis, the system still requires technical support and maintenance for it to be sustainable. A local service provider would have to be willing to provide this service for a reasonable fee.

Further study / research questions	**Select for case study** No

Contact Yael Schwartzman Email: yaelsf@gmail.com	**Comments on contacts made, arrangements, etc.**

Subsector *I.e., Which of Typology Subsectors* Agriculture, Fisheries & Forestry	Name of Application and References DatAgro: • http://www.datadyne.org/programs/mip/datagro • http://zunia.org/uploads/media/knowledge/ICTU53_ENG_WEB1267098006.pdf	Country(s) / Region Chile

Segment / Activity
i.e., which Segment in the Typology

Agro-support

Description of Application
Note whether it is purely information or transaction based

The DatAgro project is taking advantage of the high penetration rate of cellphones in Latin America to allow rural farming cooperatives in Latin America, beginning with Chile, to define the types of information most critical to their lives and livelihoods and receive it via text messages. Based on extensive consultations with the Chilean cooperative performed by project partner FIA, the Foundation for Agrarian Innovation has created content for distribution via SMS.

The system, which uses MIP technology created by DataDyne.org, is designed to work even over slow, less-than-GPRS networks, by using the latest techniques in data compression/decompression to transmit and receive by enhanced SMS. This aspect of the project, by allowing viewing of news and information on commonly used cell phones, will enormously expand the population able to benefit from the system.

DatAgro uses open source technology for farmers to use text messaging to access locally-relevant information that improves productivity--including market prices, local weather reports, agricultural information and news reports.

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* The system, which uses MIP technology created by DataDyne.org, is designed to work even over slow, less-than-GPRS networks, by using the latest techniques in data compression/decompression to transmit and receive by enhanced SMS. This aspect of the project, by allowing viewing of news and information on commonly used cell phones, will enormously expand the population able to benefit from the system. The need for compression and the ability to work at less than-GPRS speeds will diminish as faster networks expand into more rural areas.
Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* Datadyne.org, Zoltner Consulting Group	**Lead role(s)** Operates the system that processes the information which is sent via SMS

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

The DatAgro project is taking advantage of the high penetration rate of cellphones in Latin America to allow rural farming cooperatives in Latin America, beginning with Chile, to define the types of information most critical to their lives and livelihoods and receive it via text messages. Based on extensive consultations with the Chilean cooperative performed by project partner FIA, the Foundation for Agrarian Innovation has created content for distribution via SMS. DatAgro uses open source technology for farmers to use text messaging to access locally-relevant information that improves productivity--including market prices, local weather reports, agricultural information and news reports.

Entel PCS is helping to support the project with the technological platform, telephony equipment and competitive pricing for mass SMS messaging.

Other key players	Roles	Incentives / Business model
1. UNESCO	UNESCO is responsible for financial support, and the provision of educational content for rural agrarian farmers.	Development
2. COOPEUMO	COOPEUMO is a local agrarian cooperative of fruit farmers in the town of Peumo, and responsible for the local implementation of the project among cooperative members.	Represents interests of co-op members
3. El Mostrador / El Mercurio	El Mostrador and El Mercurio are responsible for sending up-to-date news feeds, for which users will be able to choose preferred news streams.	News feed provision
4. Foundation for Agrarian Innovation	Provides the locally relevant content	Development

Year of commencement	Maturation Cycle Position *Emerging / Expanding / Mature*	Status *E.g., Pilot / Rolling out / Established*
2009	Expanding	Rolling out

Comment on maturation / status of development

There are nearly 200 farmers/users receiving messages daily (as of June 2010). They represent two different project in Chile – DatAgro and Yo Agricultor. Yo Agricultor is a sophisticated web portal for farmers supported by the Chilean government. They are using MIP to send messages to further their outreach to groups that have more limited internet access.

Costs of the application & evidence of cost recovery & profit/sustainability,
E.g., Development of the technical systems & content; maintenance & skills

No information availabile.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

Farmers can now find information about supply prices, product prices, the weather, and what's going on in international markets. The farmers have stressed the importance of the information they receive and the convenience of the MIP platform.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

No information available.

SWORB *[Maybe summary of other sections]*	Strengths Relevance, convenience, timeliness	Weakness Customization difficulties, SMS message length
	Opportunity Geographic and service type expansion	Risks and barriers Competitive mobile information services

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

The project is now expanding beyond the beta testing stage, and we are working with local partners to continue and expand DatAgro. MIP technology can also be used for applications besides agriculture. Currently, it is being used in a joint project with the Pan American Health Organization to send messages about the management of childhood illnesses to doctors and nurses in Lima, Peru. Basic, low-end mobile phones are the main point of access for information for impoverished communities across the world, but they seldom have access to the internet because of the high cost of access. Almost all mobile phones can, however, receive SMS messages, which can be used to

provide farmers with agricultural information that can be used to improve productivity and their businesses. The challenge is to develop a reliable and scalable way to send relevant, internet-based information by SMS messages. There is a huge opportunity to reach a large number of people with basic, but essential, information via their mobiles.

Replicability / hurdles / issues

Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

It can grow elsewhere, but will require the creation of partnerships in new countries to supply timely, relevant information to end-users.

The main challenge lies in being able to provide the right content for each individual user's needs. Further complicating this is the need to be able to send information without requiring a human editor, who will bottleneck the process. In other words, MIP has solved the challenge of sending information from the internet via SMS messages; we now need to ensure that the content sent is valuable to the user. Another limitation is that text messages transmit a maximum of 160 characters. This makes it difficult to ensure that SMS messages contain useful information. Even when a system chooses relevant information successfully, there is no guarantee that the first 160 characters of the message will accurately convey its meaning.

Further study / research questions	**Select for case study**
	No

Contact	**Comments on contacts made, arrangements, etc.**
Joel Selanikio, Director, Datadyne.org	

Subsector *I.e., Which of Typology Subsectors* Labour, Migration and Human Development	Name of Application and References BridgeIT- Text2Teach: • http://mobileactive.org/bridgeit-mobiles-classroom • http://mobileactive.org/case-studies/bridgeit • http://www.iyfnet.org/bridgeit • http://en.wikipilipinas.org/index.php?title=Text2Teach • JR Demecais, Senior Development Specialist, Text2 Teach, Ayala Foundation Inc. "Re: Questionnaire-World Bank." Email correspondence. 20 September 2010.	Country(s) / Region Philippines

Segment / Activity
i.e., which Segment in the Typology

Education, Learning & Training

Description of Application
Note whether it is purely information or transaction based

BridgeIT is a program that uses mobile phones to bring educational videos to rural classrooms - a mobile teaching tool deployed in The Philippines and Tanzania, is changing the way teachers and students interact. The program develops videos in the subjects of math, science, and life skills, and provides schools with the technology necessary to use the videos in their classroom - everything from the mobile phones that receive the videos to the televisions that play them. Teacher training and lesson plans that promote the integration of the educational videos into regular classroom activities are also provided.

Text2Teach
Text2Teach is an educational program which aims to enable teachers and students to access over 900 multimedia educational materials like video, pictures, text or audio files via Short Message Service (SMS). It is a project the Department of Education (DepEd), initiated by BridgeIT, a global program developed jointly with Nokia Philippines, the International Youth Foundation and the United Nations Development Program (UNDP). The program is headed by: Ayala Foundation Inc., DepEd, Southeast Asian Ministries of Education Organization-Innotech (SEAMEO-Innotech) and Globe Telecommunications.

The program narrows the digital divide by means of creating a sustainable, scalable and replicable platform for delivering digitized education content to in-classroom TV sets through mobile technology. The introduction of the platform is expected to enhance the method of teaching basic education in public elementary schools. The education department began the project in 2003 with more than 700,000 public elementary students from 203 schools enjoying Text2Teach technology. It provided 5th and 6th grade science teachers with content-rich educational resources, including up to 120 science videos. Selected video is downloaded via satellite to a digital video recorder connected to a television set in the classroom. The videos focus on subjects such as space, ecology, geology or human anatomy as part of text2teach lesson plan. Teachers benefit through the training in effective teaching skills and instructional strategies.

The digitized education content of the platform is patterned after the Basic Education Curriculum (BEC). This offers teachers the convenience of scheduling and integrating the program with their lesson plans.

Technology *E.g., voice, video, sms, email, GPS, multi-media* mobile, SMS, Video	**Technical development path** *Note any past or expected changes and what impact technological change could have on the application and its viability* Text2 Teach is part of DepEd's ICT4E (Information Communication Technology for Education) program which uses the latest technology, like the Internet and laptop computers, to help improve education in the country. The education department began the project in 2003 with more than 700,000 public elementary students from 203 schools enjoying Text2Teach technology. It provided 5th and 6th grade science teachers with content-rich educational resources, including up to 120 science videos. Selected video is downloaded via satellite to a digital video recorder connected to a television set in the classroom. The videos focus on subjects such as space, ecology, geology or human anatomy as part of text2teach lesson plan. Teachers benefit through the training in effective teaching skills and instructional strategies.

In trying to replicate the project in other countries, organizers quickly learned that the technology that worked in the Philippines would not be easily adapted to Tanzania. "We had gone into the Tanzania project thinking that we were going to use the model that we used in the Philippines, which was with a satellite-mobile-SMS system, as in a satellite download to a master set-top box in the classroom, but we realized pretty quickly that wasn't going to be very feasible in the Tanzania context. So we had to shift gears, and look toward the long-term sustainability of the project," said Place.

That look towards long-term sustainability led the BridgeIT team to mobile phones. The program cut out the satellite server and concentrated on a direct mobile-to-mobile delivery service. The majority of the $2 million invested in the project went to the purchase and installation of equipment packages (phones, cables, televisions, power strips) for each school, teacher training, video production and development, and teacher monitoring and evaluation.

The present set-up in the Philippines still makes use of mobile technology and the Nokia Education Delivery (NED) software. The NED platform makes use of already existing gadgets which are easy to procure – TV, mobile phones, SIM cards. It then taps Globe's (a mobile service provider) network, and this allows schools in even very remote areas – for as long as they have Globe signal – whether 2G or 3G – to download education videos. This makes education very mobile.

Leading Ecosystem Player	Lead role(s)
E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent Ayala Foundation, Inc.	Plays the lead coordinating role among the numerous partners involved in this project • Project Management and implementation • Partner and resource mobilization • Schools validation and coordination • Technical support and help desk • It is also expected to raise counterpart funds from the public sector to ensure the sustainability of the program

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

Lessons via video are an effective way to reach a large number of students in a cost-effective manner. The real basis of the program is trying to improve learning gains among students, and to try to improve teaching methodologies in the classroom. Using mobile phones allows for the on-going dissemination of new content. Once the new system is in place, the coordinators can be in touch with teachers and schools throughout the country on an on-going basis.

Other key players	Roles	Incentives / Business model
1. Department of Education (DepEd)	• 3% cost share (TV racks, venue for 3-day teachers training) • Coordination and introduction and use of the Text2 Teach platform in selected schools • Initial coordination with the LGUs • Curriculum development – it is responsible for defining the curriculum-based objectives of the program	Improving education; Providing teachers with teaching resources
2. Nokia Philippines	• Program development • Funding support to implement the program to 350 public elementary schools • Technology development- Nokia Education Delivery (NED) software	Technology development /innovation, funding support
3. United Nations Development Programme (UNDP)	• Program development	Advocacy purposes
4. Southeast Asian	• Content development	Advocacy purposes

Ministries of Education Organization-Innotech (SEAMEO-Innotech)	• Primary local training coordinator and project manager	
5. Globe Telecommunication	• Mobile communications service provider • Development of new technology for content delivery	Mobile service provision; Part of the their corporate social responsibility (CSR)

Year of commencement 2003	Maturation Cycle Position *Emerging / Expanding / Mature* Expanding	Status *E.g., Pilot / Rolling out / Established* Established

Comment on maturation / status of development

Text2Teach is mature, but is still seeking new ways to expand its programming. The program extended its service in other subjects providing pre-loaded Nokia N95 8GB mobile phone with 387 interactive educational videos in English, Math and Science.

Costs of the application & evidence of cost recovery & profit/sustainability,
E.g., Development of the technical systems & content; maintenance & skills

Text2 Teach operates on a grant provided by Nokia. This grant covers the project management, implementation, cost of the mobile phones and majority of the operation costs.

Ayala Foundation's role, among others, is to raise counterpart funds from the public sector to ensure project sustainability and impact.

The counterpart strategy between the public and private sector enables the program to move on a larger scale addressing an education need not just for specific areas but for the whole public elementary school system itself. Engaging the public sector to put in their share of resources to match the grant provided by Nokia helps in securing the projects' sustainability because of the stake they have placed in the project.

All project funding is coursed to Ayala Foundation which in turn handles the operations and transaction payments of the program.

Cost sharing the distribution (As of October 2010):
- Local Government Unit (LGU)- 23%
- Schools and DepEd (local branches)- 3%
- Text2 Teach Alliance- 74%

Text2 Teach is a non-profit program. It is sustained by grants, it doesn't charge its users, and as such, the program has no payback period.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

- More than 120,000 5th and 6th grade Science, Math and English students in more than 200 schools have benefited from the project;
- Reduction of absenteeism;
- Student performance was increased as seen from the high average scores in science, teacher-pupil, pupil-pupil interaction got a boost and there was a generally upbeat classroom environment;
- Around 920 teachers have been trained to use the system including the locally produced video and Teacher's Guide material;
- Teachers have access to a library of over 100 KnowledgeBox and 270 locally produced Science, Math and English videos; and
- Teachers have been provided 480 lesson plans to support these video packages.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

According to Ayala Foundation, the quantifiable benefit of the program is measured through the total number of

public elementary schools in the Philippines which is approximately 39,000. How many of them actually make use of the platform needs to be empirically validated.

That said, the program has had third party evaluations in the past and will have independent evaluation again soon. The impact of the program is measured in terms of:

1. Third party evaluation of the UP National Institute for Math and Science Education (Pilot phase: 2003-2004) and UP Demographic Research and Development Foundation (ELSA: 2005-2007). Another third party evaluator will be invited to determine the impact of the NED phase (2009-2011).
2. National Achievementment tests (ie RAT, DAT and NAT) comparative results (NED phase)
3. Compiled feedbacks and anecdotes received via SMS to the Text2 Teach Help Desk
4. Project-End Questionnaire answered by schools

SWORB *[Maybe summary of other sections]*	**Strengths** • Ease of updating educational content, improved contact with local teachers • In-line with DepEd's Basic Education Curriculum • Convenience of using mobile technology to reach rural areas • Capacity to impact performance on different subject areas • Tapping existing technological resources (TV, mobile phones, SIM cards) • Relevant educational content		**Weakness** • Cost of telecommunications requires support • Limited number of videos, and limited primarily to Science, Math and English, hence may not be flexible • Dependent on one telco provider (Globe), and as such is also dpenedent on the presence and quality of its services in the areas.
	Opportunity • Inclusion and expansion of different subjects areas • Technological developments in wireless/mobile technology can allow more efficient and direct delivery of content (as what was done in Tanzania); and allows direct access to the Internet	**Risks** • Technological obsolescence • There are available teaching videos in the Internet that provide more variety and a direct access to content for teachers without having to go through an organizational intermediary • Financial sustainability • Keeping content updated/relevant basic education curriculum	**Barriers** • Capacity of teachers to embrace technology and be able to understant and localize the content • Local community support

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

In the Philippines, over seven years, BridgeIt has been implemented in 290 schools, training 1,476 primary school teachers, and benefiting 976,000 rural and urban students.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

The platform used in the Philippines has already been replicated and operating in Tanzania and Chile. There are plans to replicate the model in other countries.

Further study / research questions	**Select for case study** Yes

Contact Mr. JR Demecais *Senior Development Specialist*	**Comments on contacts made, arrangements, etc.** Contact with local partners, particularly Globe Telecom CSR was established. Unfortunately, their knowledge of it is primarily in the technical side and we were instead endorsed to Ayala Foundation, Inc.

Text2 Teach Ayala Foundation, Inc. M:(+63) 9178607764 L: (+632) 752.1186 www.ayalafoundation.org	Ms. Marisse Catangay, is the Project Manager of Text2Teach and is from Ayala Foundation. Her landline is 752-1185, email :catangay.mc@ayalafoundation.org.ph. Correspondence and queries were answered by Mr. Demecais, and his responses were cleared with Ms. Catangay.

Subsector *I.e., Which of Typology Subsectors* Labour, Migration and Human Development	Name of Application and References Trade at Hand: • http://www.intracen.org/trade-at-hand/ • http://ictupdate.cta.int/en/Feature-Articles/Encouraging-foreign-exchange	Country(s) / Region Burkina Faso, Mali, Mozambique, Senegal, Liberia

Segment / Activity
i.e., which Segment in the Typology

SMEs and micro-businesses / private Segment development

Description of Application
Note whether it is purely information or transaction based

Trade at Hand is an ITC service which objective is to make innovative use of mobile phones by business exporters from developing economies. The service started to serve agricultural product exporters and now moves on to other economic Segments. Since 2006, Trade at Hand projects lead to the creation of four solutions:
• "Market Prices", consists in sending, via SMS, product prices on international markets, in real time;
• "Market Alerts" is a Web-to-SMS tool that enables Business Support Organisations to transmit business opportunities, contacts and market news to targeted business people;
• "mCollect" allows national market price collecting and food security institutions to use the SMS channel to gather price information from their networks of rural market price collectors;
• "Mobile Marketplace", offers a virtual marketplace to small-scale producers who have access to a mobile phone, enabling them to advertise their products to big buyers (i.e. exporters).

Trade at Hand was designed to be self-sustainable in countries where the service is launched.

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* Trade at Hand started in 2006 with a project aimed at strengthening fruits and vegetables exporters from Burkina Faso and Mali, by providing them with daily price quotes via SMS, indicating the price of their products on international markets (Market Prices). Lately, a price collection system was also developed to complement the market price dissemination service. The Market Alerts, mCollect and Mobile Marketplace solutions were added after Market Prices. Trade in Hand is in the process of expanding the implementation scope, by developing new services and going beyond simple market information into mobile business process solutions. To this effect, the ITC has built a 3-year, multi-country programme and invites donors and private organisations interested in supporting mobile solutions for developing countries, to join this innovative program.

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* International Trade Centre	Lead role(s) Developed the application and manages its roll-out.

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

Mobile phones are used to enhance export opportunities and encourage cross-border trade among developing countries. The project consists of three parts, Market Prices and Market Alerts, both of which provide market information, and mCollect, a market information collection system which, while still operating as a pilot project,

makes the gathering and distributing of market information much easier and helps to promote agricultural trade throughout West Africa.

One of the main objectives of Trade at Hand is to become a self-sustainable service that integrates perfectly to local realities, in countries where the service is launched. Subsequently, the management of Trade at Hand is given to local organizations. ITC currently works at making this possible.

Other key players	Roles	Incentives / Business model
1. Société Nationale de Gestion du Stock de Sécurité Alimentaire in Burkina Faso and Industry	provide domestic and foreign price information to wholesale businesses, traders and farmers	Market information system provider
2. Malian Chamber of Commerce	provide domestic and foreign price information to wholesale businesses, traders and farmers	Market information system provider
3. Senegalese Export Promotion Agency	provide domestic and foreign price information to wholesale businesses, traders and farmers	Market information system provider
4. Rungis International Market in France	provides pricing data for the Market Prices service. The mCollect service relies on field workers to collect local pricing information	Market information system provider

| Year of commencement

2006 | Maturation Cycle Position
Emerging / Expanding / Mature

Expanding | Status
E.g., Pilot / Rolling out / Established

Established |
|---|---|---|

Comment on maturation / status of development

In 2009, ITC introduced mCollect to Trade Support Institutions in three countries, Burkina Faso, Mali and Senegal. Trade Support Institutions (TSIs) in Benin and Ghana have also expressed interest in using both Market Prices and Market Alerts. So far, ITC has only worked with the Trade at Hand project in West Africa but they are currently developing plans to extend the service further to East Africa.

Costs of the application & evidence of cost recovery & profit/sustainability,
E.g., Development of the technical systems & content; maintenance & skills

No information available.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

These services are appreciated by users as they increase market transparency, raise exporters' negotiating power, and help trade support institutions reach their clients in a faster, more effective way.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

No information available.

| SWORB
[Maybe summary of other sections] | Strengths
Local and international pricing data | Weakness
Local pricing collection is labour intensive |
|---|---|---|
| | Opportunity
International expansion | Risks and barriers
Existing competitive services (Esoko?) |

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

To date, a hundred sub-Saharan fruits and vegetable exporters are subscribed to Market Prices, eighteen trade

support institutions were trained on Market Alerts and a hundred initial users try ITC Mobile Marketplace. So far, these services have been implemented in eight countries five of which are in sub-Saharan Africa. The 3-year, multi-country programme ITC will soon be launching will enable to scale-up the number of mobile service users and their enterprise competitiveness.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high The service is used in 8 countries. The mCollect service requires either developing or partnering with a network of people who can collect pricing data at locales throughout any new country of operation.

Further study / research questions	**Select for case study**
	No

Contact	**Comments on contacts made, arrangements, etc.**
Raphaël Dard Enterprise Competitiveness International Trade Centre Palais des Nations, CH-1211 Geneva 10, Switzerland T+41 22 730 0587 Trade-at-Hand@intracen.org	

Subsector *I.e., Which of Typology Subsectors* Agriculture, Fisheries & Forestry	Name of Application and References Nano Ganesh: • http://www.nanoganesh.com/html/product.html • http://en.wikipedia.org/wiki/Nano_Ganesh • http://www.kseboa.org/news/nano-ganesh-mobile-phone-application-to-operate-irrigation-pumps-remotely.html • http://www.business-standard.com/india/news/tata-indicom-launches-nano-ganesh/363659/	Country(s) / Region India

Segment / Activity
i.e., which Segment in the Typology

Innovation

Description of Application
Note whether it is purely information or transaction based

Nano Ganesh is a GSM Mobile based remote control system exclusively for the use with water pump sets in agriculture areas. The need of Nano Ganesh arised from the routine problems faced by the farmers in operating the pumps. They are, fluctuations in power supply, difficult terrain, fear of animals on the way to pumps, hazardous locations of the pumps along the river or water storage beds, shock hazards, rains etc.

With the help of Nano Ganesh Mobile Modem:
• A farmer can control the pumps from any distance.
• He can check an availability of power supply at the pump end.
• He can acknowledge the on / off status of the water pump.
• In some models, a farmer gets an alert call if there is a theft attempt of the cable or pump.

A Nano Ganesh Instrument is connected to the existing starter. A farmer has to simply dial a number dedicated for a Nano Ganesh set and then punch his on or off code for the control of the pump set.

Technology *E.g., voice, video, sms, email, GPS, multi-media* GSM remote control system	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* The Nano Ganesh modem is also available with a device, called "Nano Ganesh Hanuman", that alerts the owner of attempts to steal the modem, cable, or the pump itself.

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* Ossian Agro Automation	**Lead** role(s) Produces the Nano Ganesh instrument and software to make the system function

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

The need of Nano Ganesh arised from the routine problems faced by the farmers in operating the pumps. They are, fluctuations in power supply, difficult terrain, fear of animals on the way to pumps, hazardous locations of the pumps along the river or water storage beds, shock hazards, rains etc.

With the help of Nano Ganesh Mobile Modem :
• A farmer can control the pumps from any distance.
• He can check an availability of power supply at the pump end.
• He can acknowledge the on / off status of the water pump.

- In some models, a farmer gets an alert call if there is a theft attempt of the cable or pump.

Tata Teleservices plans on providing the service throughout India, which has 14.1 million irrigation pumps.

Other key players 1. Nokia	Roles Nokia recognised Nano Ganesh at the All Innovators contest in Barcelona with a prize of $25,000 and expressed interest in distributing the application worldwide	Incentives / Business model Distribution
2. Tata Indicom	Provides the mobile service	SMS service provision

Year of commencement 2008	Maturation Cycle Position *Emerging / Expanding / Mature* Expanding	Status *E.g., Pilot / Rolling out / Established* Rolling out

Comment on maturation / status of development

The inventor says nearly eight years of research and development and an investment of over Rs 1 crore has gone into making Nano Ganesh possible and affordable. In July 2009, Tata have launched a pilot project as part of the inauguration at Sojitra in Anand district of Gujarat.

Costs of the application & evidence of cost recovery & profit/sustainability,
E.g., Development of the technical systems & content; maintenance & skills

The inventor says nearly eight years of research and development and an investment of over Rs 1 crore has gone into making Nano Ganesh possible and affordable.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

A farmer pays Rs 2.700 (for the modem). There are people who offer to switch on and switch off the pumps for farmers at a cost of Rs 2,500. Thus, the payback on the investment in Nano Ganesh is obvious. Additionally, two handsets one permanently mounted on the starter panel and another with the farmer are required to run the application."As most farmers now have a cell phone, only one additional handset is really needed," the inventor says, adding that the connection from which the call is made can even be a landline.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

A farmer pays Rs 2.700 (for the modem). There are people who offer to switch on and switch off the pumps for farmers at a cost of Rs 2,500.

SWORB *[Maybe summary of other sections]*	Strengths Simplicity, affordability, large potential market	Weakness Potential for theft
	Opportunity Expand to other countries and other industries	Risks and barriers Could be imitators/competitors

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

There are 14.1 million irrigation pumps in India. Other industries that pump water could also use such an application.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs

regulatory change, investment too high Should be easily replicable, so a potential hurdle to its expansion could be imitators.	

Further study / research questions	**Select for case study** No

Contact Santosh Ostwal, CEO, Ossian Agro Automation Phone : +91-20-24472277 Email : shostwal@yahoo.co.in	**Comments on contacts made, arrangements, etc.**

Subsector *I.e., Which of Typology Subsectors* Agriculture, Fisheries & Forestry	Name of Application and References Google Trader (Grameen AppLab): • http://www.grameenfoundation.applab.org/section/uganda-ag-apps • http://www.weinformers.net/2010/05/26/google-trader-farmers-africa/	Country(s) / Region Uganda

Segment / Activity
i.e., which Segment in the Typology

Agro-marketing / trade

Description of Application
Note whether it is purely information or transaction based

Google Trader helps buyers and sellers to find each other. Users can broadcast a message by sending an SMS, allowing them, for example, to list the products that they are selling or to find space on a truck to take their goods to market.

This application was developed in response to discussions with Uganda's rural producers and consumers where it was revealed that they face challenges linking with markets. Transport networks are inefficient, and knowledge of market conditions, even those nearby, is lacking for most small producers. To address this need, AppLab deployed a simple market system for buyers and sellers to find one another with fewer transaction costs by using the mobile phone to list their offerings and search for those with whom they are likely to transact business. Akin to a classified ad system or bulletin board, we believe this application will increase transparency and enable small producers to realize higher prices when dealing with larger traders, thus increasing their incomes. Google Trader is primarily in English but will respond to the primary commands in three local languages.

Initial pilots of Google Trader in banana-producing regions in Western Uganda confirmed the appeal to small producers, who said that they feel more confident about their ability to reach buyers and receive better compensation for their produce. Widespread adoption will likely lead to lower transaction costs, greater efficiencies and higher price transparency across various markets, bringing increased incomes to smallholder farmers. It may also increase efficiencies and lower transaction costs for other traders and buyers in the value chain, enabling them to save time and transport costs, which results in greater wealth for all involved, especially the producers who tend to be among the poorest.

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* The emergence of something to replace SMS could have an impact on Google Trader. Also, other services that offer farmers information via voice (e.g. Question Box) could be better suited to areas where literacy is a concern.

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* Grameen AppLab	<u>Lead</u> role(s) Developed and tested the app

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

Google Trader is a simple market system for buyers and sellers to find one another with fewer transaction costs by using the mobile phone to list their offerings and search for those with whom they are likely to transact business.

Akin to a classified ad system or bulletin board, we believe this application will increase transparency and enable small producers to realize higher prices when dealing with larger traders, thus increasing their incomes. Google Trader is primarily in English but will respond to the primary commands in three local languages.

Other key players	Roles	Incentives / Business model
1. Google	Hosting the service, branding, marketing	Corporate social responsibility
2. MTN	SMS provider	Provision of SMS

Year of commencement	Maturation Cycle Position *Emerging / Expanding / Mature*	Status *E.g., Pilot / Rolling out / Established*
2009	Emerging	Rolling out

Comment on maturation / status of development

Initial pilots, started in November 2009, of Google Trader in banana-producing regions in Western Uganda confirmed the appeal to small producers. The service is commercially available through MTN Uganda.

Costs of the application & evidence of cost recovery & profit/sustainability,
E.g., Development of the technical systems & content; maintenance & skills

No information available.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

Initial pilots of Google Trader in banana-producing regions in Western Uganda confirmed the appeal to small producers, who told us they feel more confident about their ability to reach buyers and receive better compensation for their produce. Widespread adoption could lead to lower transaction costs, greater efficiencies and higher price transparency across various markets, bringing increased incomes to smallholder farmers. It may also increase efficiencies and lower transaction costs for other traders and buyers in the value chain, enabling them to save time and transport costs, which results in greater wealth for all involved, especially the producers who tend to be among the poorest.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

No information available.

SWORB *[Maybe summary of other sections]*	Strengths Simple service, inexpensive	Weakness Requires literacy, can enough information fit in a text message?
	Opportunity International expansion	Risks and barriers Other agricultural information services

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

The small initial trial was received favourably by farmers, who see a better ability to reach buyers and could see a better price for their produce. MTN is charging for the text messaging involved in this service, but Google does not charge, so service provider sustainability appears to depend on Google's good will.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

It can grow elsewhere and only requires either Google, or another SMS service provider.

Further study / research questions	Select for case study
	No

Contact	Comments on contacts made, arrangements, etc.
Eric Cantor AppLab Director	

Subsector *I.e., Which of Typology Subsectors* Resource Management	Name of Application and References WaterReporter: • http://www.betavine.net/resources/index.php/WaterReporter • http://www.mobileactive.org/testing-waters-water-quality-reporter • http://spatialdatamanagement.uct.ac.za/water-quality-reporter/system-description/	Country(s) / Region South Africa

Segment / Activity
i.e., which Segment in the Typology

Water

Description of Application
Note whether it is purely information or transaction based

In South Africa, access to safe drinking water is enshrined in the constitution as a basic human right. Ensuring that water is safe everywhere, however, has been a difficult and expensive problem to overcome. The University of Cape Town first piloted its solution in the Hantam municipality of the Northern Cape - a remote, sparsely populated and semi desert area with long distances on gravel roads between communities and lack of electricity in some areas. Even getting staff to go around the entire area required huge resources. Using local people to do field tests, sending in their results by cell phone, data could be analysed quickly and more frequently. The solution uses open source software, web-based GIS and relatively simple software on the phones, allowing test data from field kits to be sent in and centrally monitored and analysed.

Technology *E.g., voice, video, sms, email, GPS, multi-media* Data, GIS	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* Aquatest, the water quality testing system, is still under development, but the Water Quality Reporter is up and running – on mobile phones with reporting via SMS. The Java version of the Water Quality Reporter is a mobile survey form application; users answer different questions regarding the water samples (such as where the sample was taken, what the results were, whether the sample was treated, when the sample was taken, etc…), and are able to transmit the data via GPRS to a centralized database. Although the application was designed to run on most basic feature phones, an SMS reporting system was also developed for field workers whose phones do not support J2ME (the Java Mobile Edition).

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* University of Bristol, University of Cape Town	Lead role(s) Developed and tested the application

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

In South Africa, the need to monitor drinking water quality from thousands of sources over vast areas presented huge problems. Many boreholes and wells were simply not being monitored. Returning samples to labs for testing was simply too expensive and time-consuming, and sending out teams to intervene was also a huge task.

The challenge which the Spatial Data Management Research Team at Capetown University were faced with was to impliment use of a field test developed by the Aquatest programme, and a way of reporting test results back in a simple, fast and low-cost way. Then, ultimately, to provide ways for appropriate interventions to be made at a local

level to improve water quality where necessary.

The University of Cape Town first piloted its solution in the Hantam municipality of the Northern Cape - a remote, sparsely populated and semi desert area with long distances on gravel roads between communities and lack of electricity in some areas. Even getting staff to go around the entire area required huge resources.

Using local people to do field tests, sending in their results by cell phone, data could be analysed quickly and more frequently. The solution uses open source software, web-based GIS and relatively simple software on the phones, allowing test data from field kits to be sent in and centrally monitored and analysed.

Other key players	Roles	Incentives / Business model
1. Gates Foundation	The foundation provided funding of USD 13 million to the Aquatest program globally	Philanthropy
2. JavaRosa	Helped with the development of the Java app	Mobile Java software developer
3. Field workers	Testing water quality	Employed as testers, or could be locals who will benefit from finding clean water source

Year of commencement 2009	Maturation Cycle Position *Emerging / Expanding / Mature* Expanding	Status *E.g., Pilot / Rolling out / Established* Rolling out

Comment on maturation / status of development

Aquatest was scheduled to launched in early 2010. The Water Quality Reporter system in South Africa was piloted in 2009 with an older water test in four regions in the eastern and northen Cape of South Africa. The SMS program is running in Alfred Nzo and Amathole regions, while the Java program is running in Chris Hani and Hantam districts. In Hantam, where the project has been running for seven months, seven field workers have submitted 742 tests through the WQReporter. In Chris Hani, where the project has been running for three months, 11 field workers have submitted 193 test results.

Costs of the application & evidence of cost recovery & profit/sustainability,
E.g., Development of the technical systems & content; maintenance & skills

No information available.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

The system is encouraging more frequent testing of water, and creating a feedback system that allows the field workers to have problems addressed more quickly.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

No information available.

SWORB *[Maybe summary of other sections]*	Strengths Unique, important service provided	Weakness Billing system
	Opportunity Expansion geographically	Risks and barriers

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

It appears to have wide applicability given the scarcity of safe water in so many countries. The project could require a way to charge or pay for airtime / SMS charges rather than having field workers pay the charges and get reimbursed later.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

Water Quality Reporter is part of a global initiative, so replication should be feasible.

One challenge faced during the pilot was the distance between the sites; there wasn't a lot of opportunity for one-on-one training because the test areas were so remote. Thus, the WQReporter platforms (both Java and SMS) have to be simple and accessible to the reporters who may not have much experience with mobiles. Users with less mobile familiarity use the SMS system, while users with more mobile experience use the Java application.

Furthermore, although the project is funded by the Gates Foundation, researchers were limited by the infrastructure of South Africa's mobile phone payment system. The University of Cape Town team can't have the charges for airtime used for the WQReporter billed directly to them, so they have to rely on field workers to use their own airtime to participate and then compensate workers for that airtime.

Further study / research questions	**Select for case study**
	No

Contact	**Comments on contacts made, arrangements, etc.**
Ulrike Rivett Associate Professor and Research Team Leader ulrike.rivett@uct.ac.za	

Subsector *I.e., Which of Typology Subsectors* Agriculture, Fisheries & Forestry	Name of Application and References Farmer's Friend (Grameen AppLab): • http://www.grameenfoundation.applab.org/section/uganda-ag-apps#1 • http://ictupdate.cta.int/en/Regulars/Techtip/TechTip-Crop-management-advice	Country(s) / Region Uganda

Segment / Activity
i.e., which Segment in the Typology

Extension services

Description of Application
Note whether it is purely information or transaction based

Farmer's Friend (Powered by Google SMS) offers farmers an affordable and targeted way to search for agricultural tips through an SMS-based database. Keywords in the query are matched against the database and the farmer receives a reply with a tip related to his or her query terms.

To address the information needs of the farming community, AppLab and its partners piloted Farmer's Friend, which provides crop and livestock pest and disease control information, planting, storage and harvesting tips, as well as regional weather forecasts. The technical farming information is provided by Busoga Rural Open Source Development Initiative (BROSDI,http://www.brosdi.or.ug/), a local NGO that works with a network of farmers to collect and share local farming techniques. Weather reports are provided on a daily and monthly basis by the Government of Uganda's Department of Meteorology (DOM) within the Ministry of Water and Environment. Answers to common questions are provided in English.

Throughout the development of this service, we have been able to involve more than three thousand rural Ugandans, many of them farmers, in continued market research to understand the usefulness of this content. We have integrated their feedback into the product and will continue to do so. Scaling the application nationally across Uganda will, we believe, lead to increased knowledge of farming techniques and more informed agricultural decision-making based on access to weather information. This in turn can translate into improved productivity and output, and result in increased income and food security for the farmers it was designed to benefit.

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* The service is available via SMS, or via the internet.

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* Grameen AppLab	Lead role(s) Developed and tested the app

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

Farmer's Friend offers farmers an affordable and targeted way to search for agricultural tips through a SMS-based database. The technical farming information is provided by Busoga Rural Open Source Development Initiative (BROSDI,http://www.brosdi.or.ug/), a local NGO that works with a network of farmers to collect and share local farming techniques. Weather reports are provided on a daily and monthly basis by the Government of Uganda's Department of Meteorology (DOM) within the Ministry of Water and Environment. Answers to common questions are provided in English. The Service is currently free, though MTN Uganda, the only mobile operator offering the service, might start charging regular SMS fees for the service.

Other key players	Roles	Incentives / Business model
1. Busoga Rural Open Source Development Initiative	Provides technical farming information	An NGO seeking to improve farming techniques
2. Department of Meteorology	Provides weather reports	Government service
3. Google	Provides the SMS service	Philanthropy

Year of commencement	Maturation Cycle Position *Emerging / Expanding / Mature*	Status *E.g., Pilot / Rolling out / Established*
2009	Emerging	Rolling out

Comment on maturation / status of development

Throughout the development of this service, we have been able to involve more than three thousand rural Ugandans, many of them farmers, in continued market research to understand the usefulness of this content. We have integrated their feedback into the product and will continue to do so. Scaling the application nationally across Uganda will, we believe, lead to increased knowledge of farming techniques and more informed agricultural decision-making based on access to weather information.

Costs of the application & evidence of cost recovery & profit/sustainability,
E.g., Development of the technical systems & content; maintenance & skills

No information available.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

Farmer's Friend was of the services used to answer farmers' questions in the Grameen Foundation's Community Knowledge Workers (CKW) initiative. From the range of applications available to the CKWs, this was the most popular as users receive instant, practical answers on a wide range of topics.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

No information available.

SWORB *[Maybe summary of other sections]*	Strengths Fast, free, practical, wide scope	Weakness Requires MTN's charity to remain free
	Opportunity International expansion, increased content	Risks and barriers Competitive services

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

The application has growth potential and receives good user feedback from early experiences. However, it is difficult to say if the service is sustainable economically.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

Replications requires the recruitment of new data providers and new telecom partners in any new country that attempts to replicate Farmer's Friend.

Further study / research questions	Select for case study
	No

Contact	Comments on contacts made, arrangements, etc.
Eric Cantor AppLab Director	

Subsector *I.e., Which of Typology Subsectors* Labour, Migration and Human Development	Name of Application and References Mobenzi: • http://www.betavine.net/resources/index.php/Mobenzi • http://www.mobenzi.com/ • http://www.mobileactive.org/mobenzi-creating-jobs-with-mobiles	Country(s) / Region South Africa

Segment / Activity
i.e., which Segment in the Typology

Employment

Description of Application
Note whether it is purely information or transaction based

Mobenzi is a new software service designed to create work in impoverished communities in South Africa. Even among the unemployed, mobile phones are common, and Mobenzi pays them to perform simple tasks, via SMS on their phones.

In 2009, Clyral partnered with the South African Business Trust through their Shared Growth Challenge Fund. With their partners help, they have grown their original software platform into what is now Mobenzi, and piloted it in impoverished areas using low-income people to offer a 'human interface' resource.

The idea was to create a network of agents with software installed on their phones, which Mobenzi could then offer as a resource to organizations commercially.

This model builds on existing ideas such as Amazon's pioneering 'Mechanical Turk' concept, allowing 'crowdsourcing', or the payment of small rewards to people in return for help with what they called Human Intelligence Tasks. Mobenzi is an adaptation of this concept into a new business model for simple use on mobile phones in Africa.

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* For payment of agents, Mobenzi is exploring various mechanisms for processing payment transactions. Agents with their own bank accounts can complete a mobile form to set up their account for electronic fund transfers. Some agents may prefer to simply be sent a corresponding amount of airtime.

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* Clyral	<u>Lead</u> role(s) Developed and implementing the software/app.

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

Normal 'free text' cannot be easily turned by into usable data. For instance, simply asking a thousand farmers "What do you grow on your farm?" will not usually get answers that can easily be fed into a computer for analysis. The challenge for Clyral was to find a way to use the potential of poor but literate phone users to categorise data, and offer all kinds of data processing tasks commercially – providing real and empowering income for participants.

With their partners help, they have grown their original software platform into what is now Mobenzi, and piloted it in impoverished areas using low-income people to offer a 'human interface' resource. The idea was to create a

network of agents with software installed on their phones, which Mobenzi could then offer as a resource to organizations commercially.

Other key players	Roles	Incentives / Business model
1. Mobenzi agents	Perform tasks for businesses	Paid work via mobile app
2. Organizations requiring data processing	Provide data to Mobenzi to be formatted and sent to agent	Receive data processing at low cost
3. South African Business Trust	Funding	Investor

Year of commencement	Maturation Cycle Position *Emerging / Expanding / Mature*	Status *E.g., Pilot / Rolling out / Established*
2009	Emerging	Pilot

Comment on maturation / status of development

During a two week trial run in December 2009, agents completed Mobenzi tasks using company owned phones, under supervision and together at a central location. Since May 26, 2010 however, a group of agents have been working independently as private contractors to Mobenzi on a new pilot project.

These changes in the way the pilot is being run are allowing Mobenzi to test the scalability of the concept. The company can now manage recruitment of new agents, assignment of tasks, monitoring of quality and disbursement of funds all from a central office.

Costs of the application & evidence of cost recovery & profit/sustainability,
E.g., Development of the technical systems & content; maintenance & skills

No information available.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

The main benefit is in providing employment opportunities in areas where opportunities are scarce. Mobenzi agents don't have to worry about transportation problems related to work since it is through their mobile. Also, the tasks can be done in spare time, in addition to another job or schooling.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

No information available.

SWORB *[Maybe summary of other sections]*	Strengths Easy to learn	Weakness Unclear about demand for service by organizations
	Opportunity International expansion	Risks and barriers Lack of available work for Mobenzi agents

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

The demand to be a Mobenzi agent will likely be very high in countries with high levels of unemployment. The contstraint is likely to be in finding enough organizations that require the human processing services offered through Mobenzi. The service could prove extremely valuable for the agents, but it is not clear if it will be valuable to organizations supplying the work.

Replicability / hurdles / issues *Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high* The hurdles are all related to finding enough work to supply Mobenzi agents. The regulatory and investment hurdles will be very minor in comparison.		
Further study / research questions		**Select for case study** No
Contact Mark Fowles, co-founder of Clyral info@clyral.com	**Comments on contacts made, arrangements, etc.**	

Subsector *I.e., Which of Typology Subsectors* Rural Finance, Infrastructure & ICT	Name of Application and References Kilimo Salama: • http://kilimosalama.files.wordpress.com/2010/02/syngenta_kilimo-salama_release_final3.pdf • http://kilimosalama.files.wordpress.com/2010/02/kilimo-salama-fact-sheet-final11.pdf • http://www.syngentafoundation.org/__temp/Sample_farmers_brochure.pdf	Country(s) / Region Kenya

Segment / Activity
i.e., which Segment in the Typology

Agricultural insurance services

Description of Application
Note whether it is purely information or transaction based

Kilimo Salama is a weather index based insurance product protecting farmers' investment in farm inputs (seed, fertilizer and chemicals) against extreme weather risk (drought or excess rainfall) using solar powered weather stations to monitor rainfall and mobile payment technology to collect premiums and payout to farmers.

The product is an initiative of the Syngenta Foundation for Sustainable Agriculture in cooperation with Kenyan Insurer UAP Insurance and mobile telecom operator Safaricom. Other key ecosystem partners, in addition to smallholder farmers are: the agribusinesses MEA Limited, Seed Co and Syngenta East Africa (as agro input partners), an increasing number of "Agro-vets" (local agricultural input stocks), and the NGO CNFA/AGMARK who provides training and selection of stockists.

The initiative is a three year project to develop agricultural insurance products in Kenya and build the smallholder farmers into a sustainable market for the Kenyan insurance industry, with significant benefits in terms of increased output and income security. The initiative develops insurance products with agri-businesses committed to working with smallholder farmers.

The project offers farmers who plant on as little as one acre insurance policies to shield them from financial losses when drought or excess rain is expected to wreak havoc on their harvests. Since such products have not been available before, it is potentially revolutionary to small-holder farmers' livelihood.

Technology *E.g., voice, video, sms, email, GPS, multi-media* M-Pesa	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* The success of the app requires a wide network of modern automated weather stations.

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* Syngenta Foundation for Sustainable Agriculture	Lead role(s) Developed the app and coordinates the service

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

Kilimo Salama is an insurance designed for maize and wheat farmers so they may insure their farm inputs against drought and excess rain. Reflecting Kenyan farmers" cash flow, where farmers invest in their farm as they plant, farmers can insure as little as 1 kg of maize seed or fertilizer. This pay as you plant type of insurance allows farmers to try out insurance, a product they have never bought before and which has a negative reputation in Kenya. Kilimo Salama is distributed in a new way that is relevant to farmers, through local agro-vets, of which there are an estimated 8,400 in Kenya. This year, there are close to 40 stockists distributing Kilimo Salama in five regions in

Kenya. This distribution channel is a first for agricultural micro insurance. Local agro-vets register Kilimo Salama using a scanner with tailor-made software that allows for paperless registration and immediate confirmation to the farmer of the policy. The technology used allows transaction costs to be as little more than the cost of an SMS (5 Ksh). Agro-vets collect premiums and transfer these in bundles through MPesa to the insurance company. This method is also a first for agricultural micro insurance. The insurance uses automated weather stations to monitor the rainfall. Based on the stations measurements and a predefined formula of crop rainfall needs, payouts are made. This method enables farmers as small as one acre to be insured. This method of using weather stations measurement in combination with a predefined crop growth formula is often referred to as index based insurance. If the weather stations measurement and related rainfall formula shows that there is a payout, these are sent to individual farmers using MPesa.

As described above, the smallholder farmer is investing in an insurance product, which costs him only half of the real cost since the input suppliers are sharing the cost, and which leverages extensive potential income benefits in an average year, through his/her confidence in upgrading of practice, while repaying the investment in a poor year.

The input suppliers are making an investment of 5% of their sales price in order to increase their market share by attracting the small-holder farmers to their up-scale product.

The insurance industry is making a large investment in marketing, technology and M-PESA transaction costs to develop a product which would otherwise by virtually impossible to reach. Safaricom for its part has offered discounted GPRS data transmission rates to Syngenta and UAP based on bulk purchases, even though the individual transactions may be small and would otherwise attract a higher transaction cost to the project sponsors.

Syngenta Foundation has led the project to date and has made capital investments in the development of the IT systems - i.e., the server platform, the weather stations, mobile phones with scanner adapted cameras - as well as setting up the helpline, training and information services.

Syngenta Foundation's objective is to develop an insurance product and marketing system that is to the benefit of small-holder farmers, improving their productivity and livelihood, while offering a sustainable and commercially profitable business model for the insurance industry at large (to UAP and eventually beyond) to maintain, scale up and replicate.

UAP's role has of course been to develop a viable insurance product from the information it receives. The company's investment has been in terms of providing management support to the venture, developing its own new product documentation and deployment, and in hosting the team at its offices.

Other key players	Roles	Incentives / Business model
1. Safaricom/M-Pesa	M-Pesa provides the means of providing farmer payouts	M-banking service provider
2. Agro-dealers	Sell the insurance when farmers purchase seeds etc	Additional product to sell farmers
3. UAP Insurance	Provides the insurance	Profits from provision of micro-insurance services that it would not have otherwise been able to provide

Year of commencement	Maturation Cycle Position *Emerging / Expanding / Mature*	Status *E.g., Pilot / Rolling out / Established*
2009	Emerging	Rolling out

Comment on maturation / status of development

The pilot began with 200 farmers and has since grown to 12,000. The plan is to then expand into Eastern Kenya in 2011 and to all key farming areas of the country by 2012, with the goal of eventually offering the insurance to as many as 50,000 Kenyan farmers. The product is now available from 54 stockists distributing Kilimo Salama in the five regions in Kenya.

Costs of the application & evidence of cost recovery & profit/sustainability,
E.g., Development of the technical systems & content; maintenance & skills

the smallholder farmer is investing in an insurance product, which costs him only half of the real cost since the input suppliers are sharing the cost, and which leverages extensive potential income benefits in an average year, through

his/her confidence in upgrading of practice, while repaying the investment in a poor year.

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Syngenta Foundation's objective is to develop an insurance product and marketing system that is to the benefit of small-holder farmers, improving their productivity and livelihood, while offering a sustainable and commercially profitable business model for the insurance industry at large (to UAP and eventually beyond) to maintain, scale up and replicate.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

Kilimo Salama offers farmers an insurance that protects them from weather risks as against their farm produce. By insuring their farm inputs, they are more confident that they can plant the following season even after a bad season due to the payout.

The insured farmers also receive tailored extension messages by SMS using the local weather information from the nearby automated weather stations. They can also make use of a free-call voice helpline service manned to seek answers to specific question. This enables farmers to improve their practices and productivity and make the best of the rains in years when the conditions are suitable to crop growth.

The high quality weather stations mean that up–to-date full climate data is available to farmers. This full set of weather data (rainfall, temperature, windspeed, sunlight) allows for prediction of incidence of diseases, such as blight or aflatoxin, and other potential risks. The information, in combination with the knowledge about farmers' proximity and mobile numbers, enables farmers in Kilimo Salama to receive up-to-date text messages that enables farmers improve their practices, consequent productivity, and food security in years when rains are good. Kilimo Salama thus offers a comprehensive package to farmers by helping them to become better farmers, as well as protecting them in case of weather risks.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

The experience of the initial pilot indicates that farmers who only insured 10-20% of their input purchase in the first, increased their insurance to 50% of inputs in the next year, after the indexed insurance had made major payouts (80% of purchase value) to the farmers. In addition to providing the farmers with greater confidence in their purchases, it has tended to attract more farmers to purchase the higher grade seeds, fertilizer and chemicals. While carrying greater risks if uninsured, these create higher yields in normal years, and thus farmers are more confident to increase their proportion of higher yield inputs, thus providing them with more outputs and higher income. While the absolute value of the insurance benefit, on inputs only, is relatively small in monetary payout terms, the fact of the insurance availability leverages the higher yield and higher income for the farmers.

The order of magnitude of the benefit of planting 1 acre with higher yield maize seeds compared to lower yield seeds could amount to production of several (e.g., 5-10) additional 90KG bags of maize. The monetary value of a 50%+ improvement in production – minimum 5 additional bags of crop harvest - due to this improved practice leveraged by the insurance costing a few hundred KSh could be 6000 KSh (around USD 75) per growing season x2, i.e., up to USD 150 in the year.

SWORB [Maybe summary of	**Strengths** • Strategic combination of sound distribution, automated weather monitoring and mobile	**Weakness** • Currently few high quality weather stations in the country, which can be

other sections]	technology, • Benefits of increased income to users • Can increase service usage by partnering with other mobile apps like KACE, DrumNet and Farmers' helpline for extension services.	trusted as reliable data providers • High training costs. Agro-dealers must be effectively trained to be able to deliver such a high technology system. This will be evident when they expand their distributor channels
	Opportunity • Transformation of smallholder farmers' perceptions of the risks associated with higher yield techniques. • Proof of concept of the benefits to smallholders of index-linked insurance, and growth of insurance through the agricultural sector • Provides confidence to farmers on being able to farm in the next season even after a bad harvest • Can increase usage of other insurance products, e.g., funeral coverage, personal accident, as suspicion of insurance decreases; current insurance penetration is just 6%	**Risks and barriers** Risk • High yield techniques can backfire on the farmers without critical information and education Barriers • Smallholder suspicion of insurance • Smallholder lack of knowledge re best seeds to plant regionally, how to apply fertilizer and chemicals, etc. • Cost and effectiveness of the information and education / extension services • The premium is high and currently sponsored; the farmers pay 5% and input suppliers pay 5%. It could therefore take awhile to be sustainable and one has to always seek partners to sponsor premiums

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

The Syngenta Foundation and UAP have a goal of eventually offering insurance to as many as 50,000 Kenyan farmers. The pilot began with 200 farmers and has since grown to 12,000.

The experience of the initial pilot indicates that farmers who only insured 10-20% of their input purchase in the first, increased their insurance to 50% of inputs in the next year, after the indexed insurance had made major payouts (80% of purchase value) to the farmers.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

For the product to be scaled up, several items must be considered. The main issues to be addressed are i) affordability of the product, and ii) farmer education and extension service (see above.

There are various possible solutions to the affordability issue. The first and simplest one is to lower the premium price, either through premium sharing between recipient and input marketer, as in the Kilimo Salama case, or in absolute terms. Reducing the product cost in absolute terms would have a direct and negative impact on the scope and value of the insurance coverage. Without appropriate training to communicate the reduced coverage to all farmers, farmers could easily feel cheated in years of total crop loss when they do not receive a matching payout. The goal should therefore be to structure insurance offers with comprehensive coverage, affordable premiums, and appropriate training. Costs of premiums could also be lowered by subsidizing agricultural insurance externally, either by government or by a donor agency.

Another form of subsidy could be from the COP15 (PROTECT THE POOREST), which will provide at least $150 billion a year by 2020 to help the world's poorest and most vulnerable people deal with the impact of climate change and develop in a low carbon manner, where funds can go to subsidizing premium payments of farmers.

On the education front, the Syngenta and UAP experience is that the product cannot be safely scaled up without major expenditures on financial and agricultural education of the farmers. It is understood that IFC intends to invest significantly in this for Kenya. The education will include the following elements:

- Field days (barasa's) with agricultural partners – essentially extension service;
- Radio shows in conjunction with the Helpline and SMS based information service;
- Training of distributors (the agri-business input stockists thus far).

As regards replicability, since the concept of weather index insurance for farmers was developed, several pilots have been launched around the world (Mexico, Morocco, India, Malawi, Rwanda, Tanzania, etc.).

However, in order to create an impact similar to that of microfinance, the foremost challenge is to reach sustainable scale, and to accompany scaling up with a commensurately large-scale, specially tailored extension service. Only in India has a commercial insurer, ICICILombard, reached some scale, selling some 40-50,000 policies per season. But even they consider that after five years they are still very much in the early stages of product development.

Further study / research questions	Select for case study
	Yes

Contact	Comments on contacts made, arrangements, etc.
Rose Goslinga, Agricultural Insurance Initiative Coordinator, Syngenta Foundation for Sustainable Agriculture syngenta.foundation@syngenta.com	

Subsector *I.e., Which of Typology Subsectors* Resource Management	Name of Application and References Grundfos LIFELINK: • http://www.grundfoslifelink.com/ • http://www.ebst.dk/publikationer/Corporate_Social_Innovation_-_Case_studies/pdf/CSI_Cases_web.pdf • http://www.danishwaterforum.dk/Docs/2009/Globalchallenges_web_171209.pdf • http://www.investindk.com/visNyhed.asp?artikelID=23730	Country(s) / Region Kenya

Segment / Activity
i.e., which Segment in the Typology

Water

Description of Application
Note whether it is purely information or transaction based

This project, created by GrundFos Group, a leading manufacturer of water pumps based in Denmark, brings together water supply and mobile money (m-Pesa). A LIFELINK System is a single-point water supply, using a submersible pump that is powered by solar panels. Water is pumped to an elevated, tower-mounted 10,000 litre storage tank, whereupon it is fed by gravity to a multiple tap water supply unit in a small building, from which villagers draw water. The tap unit also serves as the payment facility; villagers turn the water taps on and off with an electronic key. The electronic key stores their own personal "water account" which can be topped up, in minimum Kshs 100 amounts, from their m-Pesa accounts.

The operating objective is to establish the LIFELINK system in collaboration with local water authorities and/or local village water committees. Management of the system is undertaken by commercial entities or community based organizations on a commercially viable or self-sustaining basis. The capital cost of the system is conceived to be financed by a bank or donor, while the operating cost is essentially a maintenance contract with Grundfos LIFELINK and one watchman or local on-site manager.

Whereas the system is essentially a single point supply, there is great potential for the local water committee or operating entity to extend pipes from the LIFELINK system to the local school, clinic, houses, or to various public service points.

Since the pumping system runs on solar power and daily supply is gravity fed from a large tank with capacity to hold several days' supply, the system is very reliable and all components have an expected operating life of over 20 years. Groundfos LIFELINK undertakes to provide online monitoring (via a Safaricom data channel) and to provide preventive and as-required maintenance for a set annual fee, to ensure continuous operation.

The m-application innovation is that the water is paid for using a cashless, electronic system via the m-Pesa mobile money service. Villagers purchase their electronic key (a one-time start-up cost) from the local water committee or local operating entity, and load up the key using their m-Pesa private accounts. Access is virtually universal, since there are 10 million m-Pesa account holders in Kenya and virtually no households in Kenya are without at least one mobile handset - now available from Kshs 1,600 (USD 20) – or without an m-Pesa account.

Villagers are able to fill their jerrycans as they would at any other communal commercial source of water, while using their electronic key to control the tap. The price of the water, at Kshs 2-5 per 20L jerrycan is compatible with the other sources.

The system has the huge advantage of offering a cashless system, whereby the payments accruing to the local community are directed to the bank supplying the loan and to Grundfos LIFELINK to pay for the maintenance contract. The only cash dealings required are:
i.   Initial payment for the electronic key;
ii.   Payment to a watchman or on-site water manager; and
iii.   Use or distribution of year-end revenue surplus, if applicable.

Technology *E.g., voice, video, sms, email,*	Technical development path *Note any past or expected changes and what impact technological change could*

GPS, multi-media M-Pesa	*have on the application and its viability* Technological developments should only enhance this business model – both on the water pumping side of the business, and the mobile-banking side.
Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* Grundfos LIFELINK	<u>Lead</u> role(s) Developed and distributes the LIFELINK system (hardware and software)

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

The business model supporting LIFELINK is based on the profit generated from selling the initial water system to the community and on subsequent after sales service charges. This model is possible because in many African countries, they currently pay to acquire safe water. In Kenya, residents pay 2-5 Schilling per 20 liters, a price that LIFELINK aims to match. Furthermore the business model is founded on leveraging the economic power of larger communities and the power of global industrial players. Grundfos provides industrial products, Safaricom provides tele infrastructure and mobile banking and the micro financing institutions provides financing. The Grundfos LIFELINK business model creates opportunity for people having little to spend on water each day, but where a lot of small transactions from many people makes it possible for a community to buy a LIFELINK water system. The LIFELINK team is currently working on establishing a model for building a profitable local service organization, that will support the communities when they need after sales service, a real challenge when it can take up to two days to get to the installation site. The 2015 goal for the LIFELINK project is to touch 1,5 million people in rural areas around the globe. The project is aimed to expand to other African countries, South East Asia and Central & South America.

There are approximately 19,000 boreholes country-wide, the vast majority of which use hand-pumps and many are either inefficient or have fallen into disrepair. LIFELINK plans each installation, upon request from a local community or authority, after carrying out a demand and socio-economic study to determine need, benefits and commercial viability, as well as an inspection of the nearest borehole to determine its suitability for installation of the system. Unsuitability could be due to low volume yield, the water table at too great a depth for practical purpose, or the borehole itself being too old or in poor condition. LIFELINK's experience to date is that approximately 50% of existing boreholes can be converted to house the system, thus the potential for the LIFELINK solution is up to 10,000 wells.

Other key players	Roles	Incentives / Business model
1. Community	The community borrows money to purchase/install the LIFELINK system	Simplifies provision of water
2. Community bank	Lends community money and takes payments on loan through M-Pesa	Gets new clients with an effective repayment system
3. Safaricom/M-Pesa	Network / M-Pesa operator	Provides the mobile network

Year of commencement	Maturation Cycle Position *Emerging / Expanding / Mature*	Status *E.g., Pilot / Rolling out / Established*
2009	Emerging	Pilot

Comment on maturation / status of development

The pilot in Kenya started in 2009 is designed to test the technology in preparation for expansion to the rest of East Africa, then to other regions.

Costs of the application & evidence of cost recovery & profit/sustainability,
E.g., Development of the technical systems & content; maintenance & skills

The key financial and operational business parameters are the following:
- Capital cost: The one-point system, including initial study and design, complete with all components and building, fully installed and commissioned is in the range Kshs 2-3 million (maximum USD 40,000);

- Cost of the water: The price paid by villagers for water elsewhere it is available communally or commercially is in the range Kshs 2-5 per 20L jerrycan.
- Capacity and daily volume: In order to repay a bank loan (e.g.,) at 15% interest rate for the full capital cost, and to cover the essential maintenance contract (KES 200,000 per year) and local watchman/manager, it would be necessary to sell an average of 12,000 litres per day (600 jerrycans) at a price of Kshs 5 per 20L.

Detailed spreadsheet analysis indicates that a village or catchment area of 1,800 population (300 households) drawing 40L per day would meet this objective. Larger populations could theoretically afford to reduce the price of the water and still meet the objective.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

The water system has significantly improved the lives of the community by the following;
- Access to clean and safe water. Rural communities in many cases lack access to safe and clean water. They draw water from impure water sources (rivers and lakes), which exposes them to waterborne diseases. In the two areas visited where the water system has been set, vilages experienced numerous cases of dysentery and typhoid every month. These have since ceased with the availability of the Grundfos LIFELINK system.
- Income-generating Opportunities. Some systems are supporting irrigation of crops through the greenhouse system, vegetable patches and watering their animals. This form of agriculture provides more sustainability for agri-business due to lack of reliance on the seasonal rains. Communities are able to provide for their family and sell their produce. Also, some villagers are selling water to communities that are much further from the water-point, this has provided an extra source of income with good returns. A villager buying a 20litre jerrican at Kshs 2-5 sells it for Kshs 15-20; in some locations water vendors with the Grundfos 'water key' are able to sell more due to its trusted source.
- Closed payment system. The closed payment system thru m-Pesa provides a reliable and cash-free solution that avoids issues related to mismanagement of funds in community projects, which have been a major obstacle for community projects to become successful.
- Monotoring and transparency of the water systems: The constant monitoring via Grundfos remote management system provides insurance to both community and investor or donor that technical failures will be reported automatically to either Grundfos or a local service provider for prompt action. This is part of the service and maintenance agreement. The monitoring of water consumption and income generated can also be displayed at any given time and reported to both community and investor/donor.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

Some villagers are selling water to communities that are much further from the water-point, this has provided an extra source of income with good returns. A villager buying a 20 litre jerrycan at Kshs 2-5 sells it for Kshs 15-20; in some locations water vendors with the Grundfos 'water key' are able to sell more due to its trusted source.

SWORB *[Maybe summary of other sections]*	**Strengths** • Unique and beneficial application of mobile money to help leverage pumping and solar technologies to make clean water available to rural populations • Use of m-Pesa merely takes a commonly accepted method of payment, and normal price for clean water, and creates a cashless and relatively interference-free means to pay for the water. • Constantly monitored and managed water supply provides a very reliable system for the long term.	**Weakness** • The mobile application itself does not overcome the developmental issues to create value which villages are willing to pay for, when a less desirable but "free" source of water is available during the rainy season. • Needs education, local organization, and overcoming of inertia.
	Opportunity • With a sustainable business model could be scaled up and replicated on a grand scale.	**Risks and barriers** Risks • If bank or other commercial financing is

	• Can also be replicated based on donor support, with few risks attached.	used for the pumping station, possible failure due to unstainable year-round demand and revenue. Barriers • Population – cannot be implemented commercially if population is not large enough to sustain demand. • Local politics, lack of will to overcome the challenges of creating a viable business model, even where the figures could make sense.

Market potential assessment

E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

There are indications that the model is gaining traction.

In March 2010, Grundfos announced that it won a contract from the Red Cross in Kenya for 100 Lifelink water supply systems over the next five years. The contract will bring the Lifelink concept from its current test level among 3,000 people in Kenya into a commercial product. Peter Todbjerg Hansen, managing director of Grundfos Lifelink, said that the Red Cross has chosen a donation model where the organisation selects the villages that will be supplied with a system, which is then paid for by Red Cross. The 100 systems will cover the water supply for approx. 150,000 people.

Replicability / hurdles / issues

Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

The LIFELINK solution is inherently scalable, on the basis of a commercial or cooperate style investment with equity contribution and bank finance, to population catchment areas above 2,500 population, where demand is sufficient to create cumulatively safe year-round revenue flows.

It is also scalable if the project sponsors, with suitable partnership(s), develop the systems locally to extend and diversify the water supply to local institutions, agricultural/horticultural projects and private users.

It appears that the solution can roll out with a combination of financing models, namely:
• Commercial, with at least 30% equity investment;
• Cooperative with suggested Kshs 2000 per household investment, in locations above 2,500;
• Donor supported (requiring less than 100% capital contribution, depending on community size and demand profile).

The Kenyan solutions can also be replicated in other countries, provided the business model concerns are addressed. The Excel model demonstrates scenarios based on various parameters and has been used to develop the above three investment scenarios.

Further study / research questions	**Select for case study**
	Yes

Contact	**Comments on contacts made, arrangements, etc.**
Dan Prangsgaard PR Manager, Corporate Communication dprangsgaard@grundfos.com	

Subsector *I.e., Which of Typology Subsectors* Agriculture, Fisheries & Forestry	Name of Application and References FADECO Telecentre & Community Radio: • http://comunica.org/radio2.0/archives/166 • http://www.mobileactive.org/state-sms-and-mobile-technology-community-radio-stations	Country(s) / Region Tanzania

Segment / Activity
i.e., which Segment in the Typology

Agro-support

Description of Application
Note whether it is purely information or transaction based

Sometimes farmers send text messages to our office mobile number. Radio station FRC 100.8 FM signed a contract with an SMS management company in Dar es salaam and has been allocated 2 short code numbers. The question is delivered directly to a computer via a web managed system. The station is able to print off the message, respond directly or email the question to experts. The farmer receives a received note on his/ her mobile phone immediately to confirm the message is received at FADECO. After the question/ request is processed, the station makes a radio program with the response. Unfortunately, the station cannot call nor text individual farmers who send questions as they do not have the money. So when the station has the answer, in a radio program, they just broadcast the response on the radio to the benefit of the individual farmers that asked the question and of many other farmers who may be listening.

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS, radio	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* Technology to make it cheaper to respond to farmers' queries via SMS would help the service be more targeted

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* Family Alliance for Development and Cooperation (FADECO) community radio	**Lead** role(s) Sends SMS, develops programs with responses to farmer queries

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

In 2008, the radio program partnered with SMS management company Push Mobile to help manage the incoming messages. The SMS messages are delivered to a computer via a web-based platform, where someone can then print off and respond to the message. Typical incoming messages include questions, comments about improvements, acknowledgements, greetings to friends, news, adverts, or announcements.

Through this, the station was able to step away from a one-to-one scale of communication. It was also able to incorporate premium SMS as a form of revenue for the station. Sekiku explained that Push Mobile allocated a short code number and for every SMS received, the station receives 50 Tanzania Shillings.

Other key players	Roles	Incentives / Business model
1. FADECO Telecentre	Assistance with ICTs	Economic Development
2. Push Mobile	SMS management	SMS service provider

Year of commencement 2008	Maturation Cycle Position *Emerging / Expanding / Mature* Mature	Status *E.g., Pilot / Rolling out / Established* Established

Comment on maturation / status of development

The service is quite straight-forward and does not require further technical development. The service has been operational since 2008.

Costs of the application & evidence of cost recovery & profit/sustainability,
E.g., Development of the technical systems & content; maintenance & skills

The station receives 50 shillings for every text received via one of their short codes. The station indicates that it doesn't have money to send a text back to farmers confirming that they are making a Subsector to address a specific question. This suggests that there may be some issues about sustainability.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

The target users are farmers. The benefit comes in the form of detailed answers to their SMS-submitted agricultural questions in the form of a radio program. These answers should benefit the farmers by allowing them to improve the conduct of their agricultural business.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

a) better prices, b) less time wasted, c) reduced crop losses, d) fewer journeys, e) more volume production

SWORB *[Maybe summary of other sections]*	**Strengths** Customized answers to specific questions	**Weakness** Potentially slower response to a question since production of a radio show is required
	Opportunity Expand the areas covered (more stations), provide answers via mobile	**Risks and barriers** Other services that could provide more timely answers

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

It is not clear whether this application will grow or not. There is clearly value to the farmers, and the station generates a small amount of revenue through receiving short-code SMS message. However, the station cannot afford to reply to farmers' questions via SMS, suggesting that the financial sustainability of this service is questionable. However, demand would likely be solid if attempts were made to expand the service.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

Replicability appears to be a challenge in that to significantly expand the area served would require offering the program on other community radio stations. This would either require other stations to find experts to answer the agricultural questions, or for FADECO to scale-up its ability to respond to questions, which may not be realistic.

Further study / research questions	**Select for case study** No

Contact Joseph SekikuFADECO Community Radio	**Comments on contacts made, arrangements, etc.**

Subsector *I.e., Which of Typology Subsectors* Agriculture, Animal Husbandry, Fisheries & Forestry	Name of Application and References Edairy: • http://www.stockholmchallenge.org/project/2010/establish-mobile-enabled-network-livestock-farmers-who-will-be-provided-technical-assis • http://en.edairylanka.lk/ • http://www.icta.lk/en/icta/90-general/702-icta-initiates-e-dairy-project-to-increase-milk-production.html • http://www.futuregov.asia/articles/2009/dec/16/sri-lanka-introduces-ict-dairy-farmers/ • Phone conversations with Mr. Rodgrio from e-Dairy	Country(s) / Region Sri Lanka

Segment / Activity
i.e., which Segment in the Typology

Extension services

Description of Application
Note whether it is purely information or transaction based

e-Dairy is a pilot project initiated in the district of Dambadeniya in 2009, which enables dairy farmers to request veterinarian services via SMS and touch screen computers. The service received the Manthan Award South Asia in 2008.

The service enables dairy farmers to request veterinarian services ranging from animal health, artificial insemination, prices and other dairy extension services via a simple SMS. The service is available on mobile and CDMA phones, as well as touch screen computers. The farmer types in a pre-assigned personal identification code number and the code number of the service he wishes to obtain. The request is then sent via SMS to all registered suppliers. If a supplier wishes to transact with the farmer, he then gets in touch with the farmer directly. Farmers usually obtain feedback within a few hours. So far 300 farmers have been registered for this service. The project also provides complementary training in the use of computers and the Internet.

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* The initial choice of CDMA phones could change over time.

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* Information and Communication Technology Agency (ICTA)	**Lead role(s)** Lead the development and funding of the system

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

No steps are being taken at present to recover costs through usage fees. Farmers only pay the standard cost of an SMS when submitting a request to the service, which is recovered by their respective mobile operator. However, the e-Dairy service itself doesn't generate any revenue from the SMS.

Rationale for dairy farmers:
According to the Chief Operating Officer of ICTA, Mr. Reshan Dewapura, the government discovered that 55 percent of the country's milking cow population at a given time wasn't pregnant. Low pregnancy rates are due to a lack of timely access to artificial insemination and breeding services, which results in a loss of approximately 30-35 days worth of milk (approximately 300 litres of milk or LKR 12,000). The e-Dairy service was introduced to

address this issue, with the aim of providing farmers speedier access to such services.

Other key players	Roles	Incentives / Business model
1. Dambadeniya Development Foundation	Managing the initial pilot project	Economic Development
2. Social Performance Development Center	Operates the service	Development
3. Dialog Axiata	Provided a special SMS gateway	Revenue from SMS

Year of commencement	Maturation Cycle Position *Emerging / Expanding / Mature*	Status *E.g., Pilot / Rolling out / Established*
2009	Emerging	Pilot

Comment on maturation / status of development

An initial funding proposal for the deployment of similar services in Jaffna and Mannar submitted to the USAID has been accepted. e-Dairy is awaiting the final word on this matter. The investment cost of the three-year project is USD 1.2 million and will include additional services such as webcams that can remotely connect farmers with technicians and/or other personnel in other parts of the country to obtain information.

With the conclusion of the civil war, the North, East and Anuradapura areas of the country are seen to have high potential for this service. However, dairy farmers in these locations are more remote than Dambadeniya which may require additional effort for increasing service uptake.

Costs of the application & evidence of cost recovery & profit/sustainability,
E.g., Development of the technical systems & content; maintenance & skills

The initial investment cost, the majority of which went towards building the mobile component of the service, was LKR 10 million (approximately USD 100,000). The average cost of operation is Rs. 600,000 (approximately USD 6,000) a year. However, no steps are being taken at present to recover these costs through usage fees.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

The service provides farmers the opportunity of increasing incomes through improved access to information on animal health and market prices, and "just-in-time" services, potentially lowering costs and increasing revenue through improved market opportunities.

According to the DDF, milk production could be increased by 30 percent if artificial insemination services are requested and supplied in a timely manner. The ICTA further estimates that farmers can enjoy an additional income of LKR 30,000 (USD 262) per additional calf obtained per year, through the program.

Farmers can also benefit from access to market prices. Dairy farmers are usually paid every 15 days. Usually, once farmers' hand over their produce at a milk collection center, they don't know what price they will finally get for their produce. Using the e-dairy service, they can obtain prices before the milk is handed over at collection centers, safeguarding them from being cheated.

An official evaluation survey is being planned for the end of the year.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

According to the Dambadeniya Development Foundation, if artificial information could be introduced within the effective time after the signs of the milk cow entering heat, milk production could be increased by 30%. The ICTA estimates that if a dairy farmer gets a calf each year, through this e-dairy programme he or she will be able to get an addition income of LKR30,000 (US$262) per year.

There are 560,000 milk cows in Sri Lanka. Out of these at a given time only 45 % are milk-producing animals while 55% are dry. The 55 are dry due to lack of pregnancy. They are not pregnant because there is no facility to induce pregnancy by artificial insemination within nine hours after the signs of heat are observed. If a pregnancy

that could have been induced by artificial insemination is missed by the AI not being introduced within the effective timeframe of nine hours 30 to 35 days of milking are missed. In terms of quantity of milk the loss is 300 litres of milk and in terms of money the loss is about Rs.12,000. If artificial information could be introduced within the effective time after the signs of heat, milk production could be increased by 30%. What is required to ensure this 30% increase is improvement in information and service.

The project is first deployed in the Northwestern Province to evaluate the performance, and the ICTA expects the milk production to increase by 50 per cent within two years' time.

SWORB *[Maybe summary of other sections]*	**Strengths** • Unique service which is not currently offered by anyone else in the country	**Weakness** • Issues with technology as well as mobile connection/ signal even if it is usually resolved within half an hour.
	Opportunity • There is a longer-term vision to making this initiative sustainable via partnerships with other operators. • Opportunities for donor funding to both scale up the operation as well as to assist in business development.	**Risks and barriers** • Dependent on donor funding and donations. Despite willingness to explore business relationships with service providers, there is no clear plan as yet.

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

The ICTA estimates that if a dairy farmer gets a calf each year, through this e-dairy programme he or she will be able to get an addition income of LKR30,000 (US$262) per year.

There are 560,000 milk cows in Sri Lanka. Out of these at a given time only 45 % are milk-producing animals while 55% are dry. The 55 are dry due to lack of pregnancy. They are not pregnant because there is no facility to induce pregnancy by artificial insemination within nine hours after the signs of heat are observed. If a pregnancy that could have been induced by artificial insemination is missed by the AI not being introduced within the effective timeframe of nine hours 30 to 35 days of milking are missed. In terms of quantity of milk the loss is 300 litres of milk and in terms of money the loss is about Rs.12,000. If artificial information could be introduced within the effective time after the signs of heat, milk production could be increased by 30%. What is required to ensure this 30% increase is improvement in information and service.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

An initial funding proposal for the deployment of similar services in Jaffna and Mannar submitted to the USAID has been accepted. e-Dairy is awaiting the final word on this matter. The investment cost of the three-year project is USD 1.2 million and will include additional services such as webcams that can remotely connect farmers with technicians and/or other personnel in other parts of the country to obtain information.

With the conclusion of the civil war, the North, East and Anuradapura areas of the country are seen to have high potential for this service. However, dairy farmers in these locations are more remote than Dambadeniya which may require additional effort for increasing service uptake.

No efforts appear to have been made to make the model sustainable. However discussions with the project implementers suggest that they are considering partnering with mobile operators to increase service reach as well as to make the initiative more sustainable. There have been some initial discussions with some mobile operators to create special packages for registered farmers, but so far they have not led to any concrete plans. The system itself might not be difficult to replicate, but it is unclear if other countries experience the same types of dairy production issues.

There are no plans, at present, to offer similar services via technologies such as voice and WAP; however, e-Dairy is willing to undertake development of these interfaces if the necessary funding and partner support is available.

Further study / research questions	**Select for case study**
	Yes
Contact Reshan Dewapura, ICTA Chief Operating Officer	**Comments on contacts made, arrangements, etc.**

Subsector *I.e., Which of Typology Subsectors* Agriculture, Fisheries & Forestry	Name of Application and References WAMIS-NET: • http://www.resimao.org/html/en/region/network • http://www.isicad.org/isicad/index/english/mis	Country(s) / Region West Africa

Segment / Activity
i.e., which Segment in the Typology

Agro-marketing / trade

Description of Application
Note whether it is purely information or transaction based

WAMIS-NET is a Network of Market Information Systems from Benin, Burkina Faso, Côte d'Ivoire, Guinea, Niger, Mali, Senegal, Togo, and Nigeria. Together they provide to all stakeholders up to date and accurate information on 400 rural and urban agricultural commodity markets via different media. The network monitors the development of the agricultural Segment through the collection and publication of related statistics and analytical reports.

• Up to date information delivered on markets parameters (prices, quantities, flows, etc.) by publishing weekly prices directories and by monitoring permanently the agricultural markets
• Studies and investigations on agricultural products and food security
• Information on business opportunities
• Bring together traders by exchanging data prices between WAMIS-NET them through the Internet
• Media : Internet, radio, print, email, sms

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS, email	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* Changes to SMS technology could enable additional services.

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* Resimao (Réseau des Systèmes d'Information des Marchés en Afrique de l'Ouest) (financed by the EU and USAID)	Lead role(s) Developed the information system and manages the system's operation

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

RESIMAO/WAMIS-NET is a Network of Market Information Systems from Benin, Together they provide to all stakeholders up to date and accurate information on 400 rural and urban agricultural commodity markets via different media. The network monitors the development of the agricultural Segment through the collection and publication of prices and related statistics and analytical reports. The service is provided free of charge to the citizens of countries served by WAMIS-NET.

Other key players	Roles	Incentives / Business model
1. SMS service provider	Provision of SMS	
2. Market Information Systems from Benin, Burkina Faso, Côte d'Ivoire, Guinea, Niger, Mali, Senegal, Togo, and Nigeria	Provision of market information	

Year of commencement ?	Maturation Cycle Position *Emerging / Expanding / Mature*	Status *E.g., Pilot / Rolling out / Established*

	Mature	Established

Comment on maturation / status of development

Other market information systems in the region not part of WAMIS-NET can apply to the organization to be added to the service. The network currently monitors 400 rural and urban agricultural commodity markets via different media from 62 different local market information systems.

Costs of the application & evidence of cost recovery & profit/sustainability,
E.g., Development of the technical systems & content; maintenance & skills

No information available.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

The objectives of WAMIS-NET are:
- Harmonisation: Harmonize the data collection, processing and diffusion used by the MIS
- Sharing information: Deliver "hot" information to stock holders, for better decision-making in order to contribute to the development and the flow of sub regional exchanges to the benefit of sustainable food security
- Advocacy: Support autonomy, growth and sustainability of national information systems to constitute a plea and special interest group for them toward political, administrative, legislative and juridical decisions makers
- Informed decisions: Help Regional Institutions and National decision making bodies (government) in production, processing and marketing processes of agricultural products
- Poverty reduction: Contribute to the improvement of the incomes of rural people
- Regulations and standards: Contribute to the development of the African trade environment for agricultural and farm-produce products by the harmonizing the national and regional policies and regulations
- Capacity development: Contribute to strengthen the technical and professional abilities for traders organizations in relation with the agricultural markets activities
- Partnership: Collaborate with national, regional and international organizations, which have similar objectives
- Advocacy: Build national concerns around MIS as a focal point in the process of making available useful information

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

No information available.

SWORB *[Maybe summary of other sections]*	**Strengths** Provides localized data, wide range of commodities covered	**Weakness** Not self-sustaining
	Opportunity Regional expansion, developing a sustainable business model	**Risks and barriers** Competing market information systems

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

WAMIS-NET does not charge for use of the service, so it's current business model is not self-sustaining.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

Outside funding is required for WAMIS-NET to grow or be replicated.

Further study / research questions	**Select for case study**

	No
Contact Salifou B. DIARRA, Coordinateur de l'Observatoire du Marché Agricole Bamako, MALI salif@datatech.net.ml	**Comments on contacts made, arrangements, etc.**

Subsector *I.e., Which of Typology Subsectors* Labour, Migration and Human Development	Name of Application and References Project MIND: • http://www.molave.org/SMS.htm • http://event.stockholmchallenge.org/project/2008/Education/Mobile-Technology-Initiatives-Non-Formal-Education • http://www.pandora-asia.org/downloads/07-ICEL_Ramos.pdf • http://www.irrodl.org/index.php/irrodl/article/view/794/1487	Country(s) / Region Mongolia, Philippines

Segment / Activity
i.e., which Segment in the Typology

Education, learning & training

Description of Application
Note whether it is purely information or transaction based

The objectives of this project are to test the feasibility and acceptability of using short message system (SMS) technologies for delivering non-formal distance learning (DL) to different socio-economic, cultural and gender groups; and to determine the motivation of users for distance learning purposes.

The expected outputs include SMS Learning Packs - courseware in SMS format and other ancillary materials (i.e. booklets, cassettes, CD-ROMs, etc.) - on different subjects and topics identified as learning needs of different groups; an SMS server in each partner country (i.e. Philippine and Mongolia) to handle student registration, storage, and deployment of the educational materials, trained personnel on SMS-enabled technologies, a set of standardized assessment tools and forms for use by partner countries, shared online educational materials, research tools/ methodologies for use by project partners, publications, and a set of suggestions for policy guidelines and standards for the use of the SMS platform in DL.

The Philippines is a world leader in the use of mobile and short message systems technology, and Mongolia is a leader in the development of high-compression methods techniques facilitating these technologies in rural areas. This project, a collaboration between specialists in these two countries, will explore the innovative possibilities of mobile SMS technologies in community development contexts, and will provide a bridge between these non-formal uses of the media and those of the formal DL situation. The cross-fertilization of these two fields will represent a valuable contribution to the international literature of DL, in demonstrating that efficient DL evolves from a strong community understanding of the DL media's potential.

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* The application uses SMS, but as prices fall, other technologies such as MMS or WAP (etc) could become more effective technologies.

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* Molave Development Foundation, Inc	Lead role(s) Created the SMS learning courseware and lead the project to test the system

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

The project does not charge for the service and is not intended as a commercial venture. However, the project sponsors believe that the commercial potentials of this system can also be adopted by private or public telecommunications firms, both as a value-added service, as well as a way for them to practice corporate social responsibility, in providing education to the masses, now that mobile phones are accessible to more people than ever before.

The objectives of this project are to test the feasibility and acceptability of using short message system (SMS)

technologies for delivering non-formal distance learning (DL) to different socio-economic, cultural and gender groups; and to determine the motivation of users for distance learning purposes.

The project involved the design of blended learning modules in English, Math and Medicine for various adult learners, physicians and out-of-school youth in the Philippines and Mongolia. The "MIND SMS Learner Management System" was set up and operationalized, which handles the content, database and communications with the students' mobile phones. During the implementation phase, students were given modules, SMS prepaid cards and around 1 week to complete the modules, and to interact with the system through texting.

Other key players	Roles	Incentives / Business model
1. Pan Asia Networking (PAN) Programme Initiative of the International Development Research Centre (IDRC)	Funding	Development
2. Bureau of Alternative Learning Systems of the Department of Education (Philippines)	Gov't department responsible for testing the app among learners	Educational development
3. English for Special Purposes Foundation and Health Sciences University (Mongolia)	Responsible for testing the app in Mongolia	Educational development

Year of commencement	Maturation Cycle Position *Emerging / Expanding / Mature*	Status *E.g., Pilot / Rolling out / Established*
2005	Complete	Complete

Comment on maturation / status of development

Completed project.

Costs of the application & evidence of cost recovery & profit/sustainability
e.g., Development of the technical systems & content; maintenance & skills

No information available.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

A 2007 evaluation found that, "when asked about their overall opinion after using SMS to study Math and English, all of the participants were excited on the prospect of using this technology for learning. If their answers were right or wrong, they were instantly informed by the MIND system's feedback messages, and could immediately check the reasons for their errors. The female participants said that it was helpful for them to learn using SMS because they are usually at home doing household chores. The modules allowed them to learn while doing their household chores." Students also pointed to the added benefit of being able to do their lessons during breaks, meaning that they could still work and gain an income.

A 2008 evaluation found that students who used the SMS modules had better scores than those who did not on standardized tests in the Philippines. The results of the exam seem to indicate that SMS-based learning was particularly beneficial for those students whose grades were situated at the lower end of the spectrum.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

	Difference in scores (+ denotes higher score for SMS group than non-SMS group)	Score range	
		SMS group (N = 142)	Non-SMS group (N = 135)
A&E overall passing rate	+13.78		
A&E mean percent correct (PC) score of passers	+1.06	70-88	70-88
Mean percent correct (PC) in part II - *Communication Skills in English*	+5.00	56-98	30-96
Mean percent correct (PC) in part III - *Problem Solving and Critical Thinking*	+2.32	44-90	36-90

source: http://www.irrodl.org/index.php/irrodl/article/view/794/1487
Note: "A&E" is the Philippine high school Accreditation & Equivalency exam

A 2007 study found that the students spent an average of 40 pesos (less than one USD) for the use of the two modules. Except for two students who spend around the same amount for transportation, using these particular SMS modules for learning was actually more expensive than it would have been to travel to a class. However, they all agreed that learning through SMS still has more value for money for them because of the benefits of being able to learn from their homes or workplace.

SWORB *[Maybe summary of other sections]*	**Strengths** Effective, convenient, affordable		**Weakness** Requires students to have a mobile
	Opportunity Use the project's findings and experiences to improve mobile distance learning techniques		**Risks and barriers** n/a

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

The project is complete. However, the positive results obtained suggest that such an application could be a valuable educational tool.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

This application requires high penetration of mobile phones and familiarity with text messaging – not high hurdles in most countries.

Further study / research questions	**Select for case study** Yes

Contact Molave Development Foundation Inc. washtrc@molave.org	**Comments on contacts made, arrangements, etc.**

Subsector *I.e., Which of Typology Subsectors* Rural Finance, Infrastructure & ICT	Name of Application and References MAP: • http://mapinternational.net/pdfs/MAPUganda CaseStudy.pdf • http://mobileactive.org/mobile-tools/mapswitch • http://bcta-initiative.org/wp-content/uploads/2010/02/1930-UNDP-BCtA-Case_Map_LR3.pdf	Country(s) / Region Uganda, Zambia

Segment / Activity
i.e., which Segment in the Typology

Mobile Money, m-Banking and micro-finance related services

Description of Application
Note whether it is purely information or transaction based

Available Financial Services and Products
• Banking services (withdrawals, deposits, balance enquiries and mini statements)
• Electronic bill payments (e.g. water, electricity, school fees)
• Local money transfer
• Salary/ pension processing
• Mobile airtime top-up

While there have been major advances in mobile banking, MAP offers a step-change in financial access – moving beyond simple cash transfers between mobile phone handsets to real banking services. Once an individual has been through the simple biometric identification process – via one of our Data Capture Stations based in bank branches, or one of our mobile stations available in rural areas – they are issued a smartcard and PIN tied to a bank account. Individuals can access a wide range of services, using this card in conjunction with Point of Sale terminals (deployed to agent networks, petrol stations, grocery stores, Savings and Credit Co-operatives, bank locations and high traffic retail locations), ATMs at bank branches, mobile phones or via the internet. In effect, MAP is helping to create a national identification infrastructure on the basis of which a wide range of other services could also be provided, such as health advice and electoral registration and voting. Meanwhile the electronic infrastructure can also replace cash transactions within corporate supply and distribution chains.

Technology *E.g., voice, video, sms, email, GPS, multi-media* Smartcard/mobile	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* Developed by the company, Kineto Mobile. The application uses Java.

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* MAPSwitch Uganda	Lead role(s) MAP International designed and developed the mobile banking platform. MAP International updates the technology behind the platform in accordance with evolving market needs. MAP International's country office in Uganda then manages the deployment of the banking platform through its partners – financial institutions and mobile phone operators. MAP International Uganda provides the biometric identity card capture technology to partner financial institutions such as Post Bank. To further expand the network of mobile financial infrastructure, MAP International Uganda strategically places ATMs and POS devices around the country to increase access to banking services within target communities.

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

MAP International's mobile banking platform contributes to an enabling environment for widespread adoption of mobile banking and taps into the market potential for banking services. To pave the way for a secure, mobile

banking system, MAP International developed an identity card that doubles as a debit or credit card. The IDs are a crucial step to enabling widespread mobile banking. By incorporating biometric information, these cards make it easier for those in underserved and rural areas to access a host of financial products and services while also cutting back on fraud, corruption and crime. Ugandan government regulators have accepted MAP International's identity cards and have deployed the mobile identity card capture technology in Post Bank Uganda's 25 branch offices across the country. Once connected to the mobile banking network, customers manage their money through access points such as automated teller machines (ATM) and electronic Point of Sale (POS) devices. MAP International is helping to expand this network of mobile financial infrastructure in the cities and towns where Post Bank has a presence. In addition, MAP International is creating other opportunities for expanding the reach of its network by collaborating with a mobile company on the development of a low cost mobile phone with built-in mobile banking software.

Other key players	Roles	Incentives / Business model
1. Financial institutions	Provide banking services to MAP users	Get additional customers through MAP
2. Mobile operators	MAP has distribution agreements with UTL, MTN, WARID, ZAIN and Orange	Enhance service offerings of mobile operators
3. Other partners	Mobile airtime distribution, government salary and pension processing	Enhance the delivery of services

Year of commencement	Maturation Cycle Position *Emerging / Expanding / Mature*	Status *E.g., Pilot / Rolling out / Established*
2008	Expanding	Established

Comment on maturation / status of development

The MAP International mobile platform can be applied to other sectors such as healthcare, agriculture and microfinance. Other potential products or services include:

Health
- A national health registry database that would provide doctors with access to health records with the swipe of a card.
- A mobile phone application that would keep track of medications and give directions to the nearest health clinics or hospitals.
- Mobile applications that would allow users to download vital health information and receive targeted health alerts.

Agriculture
- Applications that link farmers to markets would provide both price as well as supply and demand information.
- A national agriculture database would let the Government better track climate change patterns and provide farmers with relevant agricultural advice.

Microfinancing
- A new application that would connect users with microlenders.

Costs of the application & evidence of cost recovery & profit/sustainability
e.g., Development of the technical systems & content; maintenance & skills

No information on cost of the application.

MAP International's target market is the 20-30% of the population that falls beneath the top socioeconomic groups. Although still in the early stages of expansion, as of January 2010, MAP International has reached approximately 105,000 Ugandans with mobile banking technology. From December 2009 to January 2010, the number of newly enrolled mobile bankers increased by 5%, an increase MAP International expects to grow in the coming year as mobile financial infrastructure is expanded. By the end of 2009, MAP International had introduced 26 ATMs in 25 cities and towns and 200 POS devices in Central and Southern Uganda. The company plans to double the number of POS devices by summer 2010, and to continue the network expansion to reach up to 15,000 merchants and retailers in the long term. Transactions at ATMs and POS devices indicate that there is demand for access to mobile banking. Mobile transactions increased over 80% from November 2009 to December 2009 with an average of each ATM registering 73 transactions per ATM per day. With the current transaction levels and growth projections, MAP International expects to break even in early 2010 and become profitable by

the third quarter of the same year.	

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

MAP International's mobile banking platform connects unbanked and underbanked people to the formal financial sector which helps to meet Millennium Development Goal 1. The system also targets government users. This initiative provides underserved communities with a tool to end poverty and hunger by providing a secure system that allows individuals to better manage their money, pay bills more efficiently, lower money transfer costs, and gain access to finance.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

No information available.

SWORB *[Maybe summary of other sections]*	**Strengths** Transparency, security	**Weakness** Java-based application not compatible with all phones
	Opportunity International expansion, introduction of new services	**Risks and barriers** Other commercial mobile banking applications

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

To date, MAP International has reached 105,000 customers with mobile banking technology, almost half of which are new account holders or formerly unbanked individuals. And since the deployment of mobile financial infrastructure in January 2009, these account holders have made over 250,000 transactions. In December 2009, account holders made an average of 2,263 ATM transactions per day and 1,800 POS transactions per day. POS transactions are expected to continue to rise as additional devices are made available in the northern regions of the country. Although MAP International has extended its network of entry and access points to 25 cities and towns in Uganda, it hopes to extend its reach into rural communities. The company plans to do this by targeting approximately 800 SACCOs – rural Savings and Credit Cooperatives – to bring them and their members into the formal financial sector. There will also be an impact on the over 4,000 local agents, 800 SACCOs and their staff, as well as thousands of merchants (gas stations, supermarkets, retailers) totalling more than 15,000 operators across Uganda who will become more efficient and will be enabled to provide a broader range of products and services. By the end of 2009 over 200,000 government employees will be enrolled onto the system, which will speed the delivery of salaries and access to cash and, help reduce corruption.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

The service can grow in other countries. MAP is working on launching the service in Zambia. Launching in new markets requires that the necessary financial and electronic infrastructure is in place. It is also necessary to form partnerships and have a local presence in any new markets before launching the service.

Further study / research questions	**Select for case study** No

Contact Abri Krige abri@kineto.co.za	**Comments on contacts made, arrangements, etc.**

Subsector *I.e., Which of Typology Subsectors* Agriculture, Fisheries & Forestry	Name of Application and References B2Bpricenow.com: • http://www.b2bpricenow.com/contents/mainpage.asp • http://event.stockholmchallenge.se/project/2008/Economic-Development/E-commerce-Farmers • E-Transformation: Enabling New Development Strategies • http://www.kiwanja.net/database/project/project_B2Bpricenow.pdf • http://www.sustainableicts.org/infodev/B2B.pdf • http://www.e-forall.org/pdf/PHReport_3June2007.pdf • Herbosa, Edgardo B. and Ryk Ramos. *Personal Interviews.* 17 September 2010, Metro Club, Makati City	Country(s) / Region Philippines

Segment / Activity
i.e., which Segment in the Typology Agro-marketing / trade, mobile money

Description of Application
Note whether it is purely information or transaction based B2bpricenow.com provides an integrated e-commerce and m-commerce platform. It has an agriculture e-marketplace that provides up to the minute price updates and other market information on agriculture, consumer and industrial manufacturers, as well as, financial transactions through the integrated solution. B2Bpricenow.com utilizes ICT in the implementation of E-commerce and M-commerce. Both systems are used to send and receive funds anywhere in the country. Its e-commerce platform was designed as a venue for consummating transactions between buyers, and sellers, which in its initial conceptualization were rural cooperatives. B2bpricenow.com's e-commerce solution uses the internet as a billboard for agri-products and as a virtual marketplace for buyers and sellers of agricultural produce. It also offers payment security for online transactions on agricultural produce. Its m-commerce platform, complements this early model, by being able to expand the service to reach individual members who do not necessarily maintain accounts in the bank (Landbank). It uses cashcards and SMS-technology to create seamless transaction flows between merchant famers, and farmers to clients. The integrated E-commerce/ M-commerce solution connects cooperatives to their members; banks and cooperative members and farmer merchants and clients. For instance, through cash cards, they are able to transmit dividends, without physically travelling to the cooperative's offices.

Technology *E.g., voice, video, sms, email, GPS, multi-media* Cashcards, SMS, m-commerce/m-money, internet (website)	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* The B2Bpricenow.com initially started in 2000 as an online billboard for agricultural produce of cooperative members with a Land Bank of the Philippines account. By 2007, the website became an online marketplace (e-commerce) for buyers and sellers of agri-produce. To cater to merchant farmers with no bank account and those with limited internet accessibility, a mobile commerce platform was recently introduced. This includes the use of cashcards (debit cards) and SMS technology that farmers and clients may utilize to take part on online transactions and to transfer funds at their disposal.

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent*	Lead role(s) B2Bpricenow.com provides free electronic bulletin board, online marketplace and money transfer services for cooperatives to their

B2bpricenow.com	members and clients.

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

Farmers in the Philippines, particularly those in rural areas, have long suffered from lack of market price information as well as poor access to buyers. Consequently, they have been unable to get the best value for their produce and have usually relied on traders to serve as intermediaries and providers of market information. But the interests of the traders often conflict with the interest of the farmers - thereby putting into question the reliability of market price information and the fairness of the buying/selling prices negotiated between the farmers and the traders. In the past, this problem was addressed by cooperatives and government agencies who took a sample of prevailing market prices, two or three times a week, and then disseminating them by paper, a day or two later if requested. By such time, however, the prices were out of date and this system was not able to provide comprehensive price information throughout the Philippines' 7,100 islands. Moreover, there has never been a mechanism to allow farmers and cooperatives to market their products and trade directly with distant buyers and sellers, some of whom they have never even met beforehand.

As such, B2Bpricenow.com was created to cater to merchant farmers who have limited accessibility to sell and advertise their agricultural produce. The establishment of B2Bpricenow.com offers an online marketplace for merchant farmers and clients to meet as well as update and inform both farmers and clients the commercial prices of agricultural produce. With the introduction of m-commerce, these services have expanded to merchant farmers without bank accounts and limited internet accessibility.

Presently, B2Bpricenow.com offers an online market place for agricultural produce, billboard and money transfer services for merchant farmers, cooperatives and clients. The security of online transactions is ensured by means of a double-layer security system (V-Token) which makes use of SMS technology to re-check and confirm the transaction made. The income is generated from the following: online transactions, transactions made through SMS, transfer of funds and airtime. In terms of online transactions, a seller shoulders the transaction fee, which is 1% of the value of the commodity sold. Of this 1% amount, 50 percent will be given to Land Bank of the Philippines and the remaining 50 percent to B2Bpricenow.com.

In using SMS, the transaction cost is P2.50/SMS. P2.00 is earned by Telcos (Smart or Globe) and P0.50 is given to B2Bpricenow. Compared to the e-commerce side of its operations, Mr. Herbosa claims that the m-commerce side is even more profitable. They gain from this through not only from the Php0.50/transaction, but also from the top-up loads (which B2b gets at a considerable discount from telco providers) that members can buy through their 'debit cards'.

Other key players	Roles	Incentives / Business model
1. Unisys Philippines	5% ownership and responsible for payment gateway design and maintenance and upgrading of the site	Has a share of the company; Participate in the profits of the business
2. Gerry Geronimo; Ating Alamin	Provides free advertising and radio shows for 5% ownership	Shareholder/Participate in the profits of the business
3. Philippine Rural Reconstruction Movement (PRRM)	Inform, educate, and where available, provide Internet access to cooperatives from their field offices	Development
4. Land Bank of the Philippines	Collecting agent, investor and shoulders the cost of road shows and information dissemination among cooperatives.	Deposit of merchant farmers and cooperatives, and large buyers; half of 1% fees made from online transactions
5. Telcos (Smart and Globe)	SMS services/ mobile commerce	Profits from using SMS services/ mobile commerce

Year of commencement	Maturation Cycle Position	Status
	Emerging / Expanding / Mature	*E.g., Pilot / Rolling out / Established*
2000	Mature	Established

Comment on maturation / status of development

The project started in 2000 and was launched in 2001.

From 2000 to 2007, B2Bpricenow basically operated much like an online bulletin board for its e-commerce facility. A more recent venture has been its m-commerce component, that now allows it to extend new services to the members of the cooperatives.

Costs of the application & evidence of cost recovery & profit/sustainability
e.g., Development of the technical systems & content; maintenance & skills

Project Funding
Founders Initial capital for pre-operating expenses: $40,000

Development Market Place 2003 Grant: $118,000

Unisys covered the site design, technology/ engine and maintenance: $360,000 which was made equivalent to 5% ownership of B2Bpricenow

Ating Alamin (c/o Mr. Gerry Geronimo) covered the advertising and broadcasting of B2B: P10 Million (approx $200,000) and in exchange was given 5% ownership of B2Bpricenow

Landbank shouldered the promotion, road shows and training among cooperatives (technical assistance): $132,000 ((est. Php500T per roadshow)

Total: $690,000

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

The program works with farmers' co-operatives. It hopes to level the playing field among large, medium and small players by giving players access to a common source of reliable market prices. This helps farmers maximize their selling prices. By working with co-operatives, it hopes to increase the bargaining power of co-operatives vs. institutional buyers of produce and fuel intra-co-operative trade.

B2B's e-commerce marketplace provided cooperatives a venue to increase their profit through direct selling to clients/ consumers. This enabled cooperatives to have a marketplace to meet and transact their business without the need for a middleman.

B2B, through its m-commerce, system also offered the convenience of receiving and transferring funds to cooperative members through the use of the internet and SMS. This provided better accessibility to merchant farmers and minimizes seller/buyer fraud such as bouncing checks and robbery.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

B2bprice now initially operated as a bulletin board from 2000 to 2007, partly because its partner argicultral bank, Landbank, was slow in building their back-end support, and also because B2B had to prove that the system was populated and used by members. Table 1 shows the number of sessions that have been consummated online, with the numbers increasing dramatically in 2006, to almost 26,000 session, or transactions.

Table 1: Number of Sessions by Registered Members

Year	Session by Registered Mambers	% change
2000	119	
2001	1014	752%
2002	1,533	51%
2003	1,387	-10%
2004	986	-29%
2005	2,052	108%
2006	25,930	1164%

Source: B2bPrice.com

According to Mr. Herbosa, approximately Php131B worth of goods have been posted online.

SWORB *[Maybe summary of other sections]*	Strengths	Weakness
	• Postings are Free, although 1% fee is charged for transactions • Minimal overhead and maintenance costs • Accessibility to merchant farmers with limited internet connectivity • M-commerce model is 'telco-neutral' which means people subscribed to different telecommunications carriers can still do m-commerce transactions with one another. • A first-mover and is now relatively well established, and the partnerships and networks it has nurtured over time would be difficult to match.	• No means of matching buyers and sellers • Does not provide security in terms of commodity inspection and delivery

Opportunity	Threats	Barriers
• Geographic expansion, interest in the service from other countries • Capacity to connect competing Telcos (Smart and Globe) and banks with cooperatives • Offers online payment security (V-Token) • Venture into other m-commerce services such as top-up loading; peer-to-peer transactions	• There are other m-money services available, including some offered by Telcos • Competitive mobile market information services • Online service is easily replicable	• No feedback mechanism among buyers and sellers • Requires a bank as a partner. • Money transfer service may require some compliance to banking regulations, esp. with regard to system security.

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

The service was able to sustain its operations largely through the grants and other 'in-kind' support it received from partners such as Unisys, Landbank and Ating Alamin. Growth was initially unstable in its initial years, but seems to have picked up since 2005, and exhibited very strong growth in 2006 (see Table 1), though more recent data is not available.

Compared to other e-commerce services in the Philippines, the B2BPriceNow portal is a fairly popular link for search engines, no doubt thanks in part to the favorable international publicity the initiative has received. The installation of 24 centers suggests there is interest on the part of farmers in using the Internet to open up new market channels.

The number of sessions by registered users - 26,000 in all of 2006 - is still limited. There is however no information on how much new business is being generated as a result of these e-commerce sessions. Mr. Herbosa estimates that around Php131B have been posted online. He says a 1% fee is charged for all transactions completed online using their system, and this is shared equally by Landbank and B2b. Note that the 1% is obtained from the seller, and as such, there's no downside for buyers to use the service. For sellers, they are secure and assured that buyers have the necessary credit to pay, since both buyers and sellers have accounts in Landbank.

With only 24 centers installed under its one-time low-fee franchise and still a limited number of registered sessions, the company's revenue sources appear to be low, although this may also depend on how large the transactions are, and if they are consummated using their system.

Partnerships have enhanced outreach while a limited number of staff have kept operating costs low. If plans to expand services materialize company profits and sustainability will rise.

Replicability / hurdles / issues

Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

The B2bpricenow.com model can be replicated in other agriculture-based developing country, especially since the model is relatively simple. The model calls for a tri-partite partnership consisting of B2bpricenow.com Inc (business model for content and connectivity) -. Unisys technology partner) and the apex agriculture bank (training and transaction). However, what may take time is the development of the network of users, which took some years to nurture, before eventually gaining the needed momentum and user volume.

B2bpricenow.com is in the process of replication of its " E-commerce for Farmers Program" to several countries which are Asia Pacific Rural and Agriculture Credit Association (APRACA) member. Seven countries have expressed their interest in replicating the Program in their respective countries. Three agricultural banks have already visited the Philippines to observe the Program. They are Bank Rakyat Indonesia (BRI) ,Agricultural Development Bank of Nepal (ADBN) and National Bank for Agricultural and Rural Development (NBARD) of India. Other APRACA member banks such as the Agriculture Development Bank of China (ADBC), Vietnam Bank for Agricultural Development (VBARD) and Bank of Ceylon (Sri Lanka) are scheduled in the following months. More over, the Asia Pacific Economic Cooperation (APEC) is currently studying the B2Bpricenow.com as the endorsed agriculture e-marketplace to APEC member countries. B2bpricenow.com shall be the provider of the free and sustainable e-marketplace, facilitator of the roadshow and training of cooperatives.

Its m-commerce platform was developed independent of telecommunication providers, which makes it feasible to do in other countries as well. What has to be overcome, however, would be people's familiarity and trust with such transactions, which is relatively common in the Philippines. This is also a service that b2b, as a solutions provider, provides as another revenue source.

Further study / research questions	Select for case study
	Yes

Contact	Comments on contacts made, arrangements, etc.
Herbosa, Edgardo B., Managing Director, B2Bpricenow.com eherbosa@rushremit.com 0917-896-4986	Mr. Herbosa, Edgardo B. and Mr. Ryk Ramos were interviewed *on* 17 September 2010 at Metro Club, Makati City

Subsector *I.e., Which of Typology Subsectors* Agriculture, Fisheries & Forestry	Name of Application and References Nutrient Manager for Rice: • http://beta.irri.org/news/images/stories/ricetoday/9-3/Grain_of_truth.pdf • http://www.scidev.net/en/news/philippine-precision-farming-gets-a-mobile-upgrade.html?utm_source=link&utm_medium=rss&utm_campaign=en_news • http://www1.voanews.com/learningenglish/home/Phoning-Fertilizer-Philippine-Rice-Farmers--100792084.html	Country(s) / Region Philippines, others in future

Segment / Activity
i.e., which Segment in the Typology
Extension services

Description of Application
Note whether it is purely information or transaction based
The Nutrient Manager decision tool for rice has already been released and used with CD and Web-based applications in the Philippines. To reach more farmers, especially those without computers, the Philippines has been selected as the country to develop and provide, through a partnership with the public and private Segment, a mobile phone–based IVR application that sends farmers a text message with a field-specific fertilizer guideline based on information they provide about their rice field. This tool is set to be released in mid-2010.

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS, IVR	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* The Nutrient Manager decision tool for rice has already been released and used with CD and Web-based applications in the Philippines. To reach more farmers, especially those without computers, the Philippines has been selected as the country to develop and provide, through a partnership with the public and private sector, a mobile phone–based IVR application that sends farmers a text message with a field-specific fertilizer guideline based on information they provide about their rice field. This tool is set to be released in mid-2010.

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* International Rice Research Institute (IRRI)	**Lead** role(s) Co-Developed the application and are responsible for developing the responses to farmer queries.

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)
The site-specific nutrient management (SSNM) approach is a relatively knowledge-intensive technology in which optimum fertilizer management is tailored to field-specific conditions for crop yield, crop residue management, historical fertilizer use, use of organic materials, nutrient inputs in irrigation water, and in the case of rice the growth duration of the variety. This knowledge intensity of SSNM has slowed the wide-scale promotion and uptake by farmers of best management practices based on SSNM principles. Uptake by farmers can also be constrained by confusion arising from contrasting recommendations for nutrient management received from different organizations and technical experts. The widespread uptake by farmers of improved nutrient management requires transforming science-based information into locally adapted guidelines that enable extension workers, crop advisors, and farmers to rapidly develop and implement nutrient best management practices for specific fields and growing conditions. IRRI in partnership with organizations across Asia and in Africa developed computer, internet-based and mobile phone-based decision support software capable within 15 minutes of providing farmers with nutrient management guidelines for specific fields with minimized risk and high likelihood of increased profit. The decision software

entitled Nutrient Manager for Rice is tailored to local rice-growing conditions. Distinctive versions of the software are developed, verified, and released by country or regions of a country in the case of some large rice-growing countries. The decision software utilizes results from more than a decade of research on SSNM for rice, and it forms the basis for development of additional locally adapted tools for facilitating dissemination such as videos and quick guides for fertilizing rice.

Other key players	Roles	Incentives / Business model
1. Department of Agriculture	Sponsor/funding	Increase national rice output
2. Globe	Mobile operator	Profit, CSR

Year of commencement	Maturation Cycle Position *Emerging / Expanding / Mature*	Status *E.g., Pilot / Rolling out / Established*
2010	Emerging	Pilot

Comment on maturation / status of development

The mobile application has been used in a pilot project in mid-2010 and will be rolled-out in September 2010. The internet application on which the mobile app is based has been in use since 2009.

Costs of the application & evidence of cost recovery & profit/sustainability
e.g., Development of the technical systems & content; maintenance & skills

No information available.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

The target users are Philippino rice farmers. Insufficient fertiliser can result in low yields, while excess reduces profit and pollutes the environment. Filipino farmers generally fail to optimise fertiliser use, applying it at the wrong times or amounts.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

Fertilizer is the second largest expense in rice farming after labour, and proper application is critical in determining yield. Higher yields could earn farmers an extra $100 to $150 per hectare in each planting season. In a year, if Nutrient Manager can reach five thousand farmers, and their fields can increase yields by half a ton per hectare, profitability for those farmers could increase in the range of half a million dollars.

SWORB *[Maybe summary of other sections]*	Strengths Free, customized to individual farmers, fast	Weakness sustainability
	Opportunity Geographic expansion, expansion to other crops	Risks and barriers sustainability

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

The application could potentially be very valuable. Initial responses from the pilot are positive. The service is provided free of charge to the farmer, so sustainability is an issue using the current model.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

If successful when rolled out in September, the system will also be applied in other countries such as Bangladesh, China, India, Indonesia, Sri Lanka, Vietnam, and even on the African continent. IRRI is also working on similar tools for other cereal crops.

Further study / research questions	**Select for case study**
• Has the system rolled out as planned in September? • Is more information on the business plan available?	No

Contact Roland Buresh International Rice Research Institute r.buresh@cgiar.org	**Comments on contacts made, arrangements, etc.**

Subsector *I.e., Which of Typology Subsectors* Governance / Political	Name of Application and References Ushahidi: • http://www.ushahidi.com • http://www.ushahidi.com/media/Ushahidi_1-Pager.pdf • http://www.omidyar.com/portfolio/ushahidi • http://www.guardian.co.uk/technology/2010/aug/11/ushahidi-crowdmap-crisis-mapping • http://news.bbc.co.uk/2/hi/technology/8543671.stm • http://www.alnap.org/pool/vacancies/ushahidi-haiti-evaluation-tor.pdf • http://www.un.org/ecosocdev/geninfo/afrec/vol24no1/ar-24no1-en.pdf • http://irevolution.wordpress.com/2008/10/23/mapping-kenyas-election-violence/	Country(s) / Region Various

Segment / Activity
i.e., which Segment in the Typology

Election & Opinion Management

Description of Application
Note whether it is purely information or transaction based

Ushahidi is an online mapping tool that can be used to:
• collect and plot reports coming in from officials or citizens via e-mail, SMS or even Twitter;
• aggregate the data at a central point; and
• provide a visualization of the data on a map, that is then made available online to mobile or Internet subscribers.

Its first use, in Kenya where it was created, was to track, display and visualize post-election violence, as well as to help manage peaceful democratization activities such as the recent Kenyan constitutional referendum and bi-elections. In Chile and Haiti it was used to coordinate post-earthquake relief efforts.

A volunteer team behind the original Ushahidi deployment rapidly developed a tool for Kenyans to report and map incidents of post-election violence that they saw via SMS, email or the web. Within a week Ushahidi had gone from idea to live deployment. The Ushahidi software, with a range of associated tools for handling the data is now available as an open source platform and is used in over a thousand live applications around the world.

In August 2010, Ushahidi launched a simplified service. Ushahidi's Crowdmap allows users to begin crowdsourcing reports without downloading the platform and setting up or tailoring their own hub, thus eliminating the need to for technological knowledge to install the service on a server or funds to pay for domain rights.

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* In August 2010, Ushahidi launched a simplified service. Ushahidi's Crowdmap allows users to begin crowdsourcing reports within minutes, eliminating the need to for technological knowledge to install the service on a server or funds to pay for domain rights.

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* Ushahidi	Lead role(s) Developed the application.

Business Model / Rationale

E.g., Market differentiation, clear revenue/profit potential (describe)

Ushahidi now serves as a prototype and a lesson for what can be done by combining crisis or other rapidly emerging spread-out information from citizen-generated reports, media and NGOs with geographical mapping tools. The team behind Ushahidi became an organization that created a free and open source mapping and content management system which can be used by organizations worldwide in similar crisis-related situations. The main goal of the organization is to create a system that facilitates early warning systems and helps in data visualization for response and recovery.

The Ushahidi platform has been used to coordinate post-earthquake response in Haiti and Chile, and to monitor elections in India, Mexico, Lebanon and Afghanistan. It has been deployed in the DR Congo to track unrest; Zambia and elsewhere to monitor medicine stockouts; and the Philippines to track the mobile phone companies' sites. A key component of Ushahidi is the ability to use mobile phones as a primary means of both sending crisis incidents and receiving live updates. The Internet can be difficult to access or completely unavailable in some parts of the world, so the platform was created with the mobile phone as a foundational element.

Other key players	Roles	Incentives / Business model
1. Cisco Foundation, Hivos Foundation, John S. and James L. Knight Foundation, Humanity United, Macarthur Foundation, Omidyar Network, Open Society Institute	Funding	Humanitarian assistance
2. FrontlineSMS	Local SMS integration	Humanitarian assistance

Year of commencement	Maturation Cycle Position	Status
2008	*Emerging / Expanding / Mature* Expanding	*E.g., Pilot / Rolling out / Established* Rolling out

Comment on maturation / status of development

In August 2010, Ushahidi launched an updated service using their Crowdmap technology. The update is intended to simplify the system and make it possible for non-technical people to set up an Ushahidi installation. The organization lists a number of technical challenges they are still working on, including:
- Low-bandwidth interaction
- Server-side map clustering
- Internationalization
- Plugin architecture
- Themes and theme architecture
- Javascript

There are also potentially very significant benefits that could be realized in rural development applications to track natural resources, such as water, soil types and land fertility, agro-marketing, surveying, etc. These have not even begun to date. Ushahidi currently has an application for funding under consideration by Rockefeller Foundation for a first marketing style use of the system, targeted for the social good of farmers.

Costs of the application & evidence of cost recovery & profit/sustainability
e.g., Development of the technical systems & content; maintenance & skills

The application was initially built in early 2008 by an ad hoc team of volunteers. By August 2008 seed funding from Humanity United in the amount of $200,000 allowed the team to get started rebuilding the platform. In 2009, the Omidyar Network provided USD 1.4 million in funding to Ushahidi. The organization has a number of other sponsors (see "Key Players" above).

Since the software is freely accessible, Ushahidi's team of 11 full-time staff are funded partially through the grants received and partially through consulting and development fees from organizations use the platform but need assistance to tailor application solutions.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

The main use of the platform has been in the areas of official and citizen response to political instability, natural disasters and social and health issues. Ushahidi helps in data visualization for response and recovery. As such, the platform's impact in terms of helping to alleviate human suffering and aiding democratization has already been immense (though unmeasurable) and promises expansion on these themes.

According to a study by Harvard University scholars, Ushahidi has been the most comprehensive tool in gathering crisis-related information in Kenya. The platform, the report adds, performed better than mainstream media by reporting more cases of violence and covering a wider geographic area.

There are also potentially very significant benefits that could be realized in rural development applications to track natural resources, such as water, soil types and land fertility, agro-marketing, surveying, etc. These have not even begun to date. Ushahidi currently has an application for funding under consideration by Rockefeller Foundation for a first marketing style use of the system, targeted for the social good of farmers.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

No information available.

SWORB *[Maybe summary of other sections]*	**Strengths** • Free, open source, relatively simple implementation, unique, and beneficial • Powerfully visual tool for response, reporting and strategic applications of many kinds	**Weakness** • Sustainability – appears to be dependent on grants from donor and interested agencies, though the impact of the application has also been its greatest strength to attract funding
	Opportunity • The opportunities for Ushahidi to move into broader applications of a commercial and rural development nature are wide. • Simplifying the implementation for centralized hosting also creates an opportunity for direct involvement and revenue generation to sustain the operation and help to develop its potential further.	**Risks and barriers** • Filtering and Quality-control of user-generated data on individual deployments

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

The application is growing, and valuable, but sustainability is not a certainty. There have been 5,400 downloads of the open-source stand-alone platforms, approximately 1,200 of which are currently using the platform in live applications. Under the terms of the General Public License (GPL), upgrades created by users have to be fed back into the source software for general benefit.. The Crowdmap software, as a cloud based platform, has been used to create over 1,820 Crowdmap sites, with 52,000 associated point location reports.

Ushahidi has been used in the following situations:
• Sudan Vote Monitor is a Sudanese civil society initiative that used SMS to monitor the elections in the Sudan.
• new!Chile Crisis Map is tracking the post-earthquake crisis response and recovery efforts in Chile.
• Open Foreste Italiane is a project for information and knowledge sharing among the public and several institutional and volunteer organizations involved in risk prevention and activities surrounding forest fires.
• Snowmageddon: The Cleanup - the Washington region comes together to dig out of Snowmageddon 2010.
• Haiti Crisis Map is tracking the post-earthquake crisis response and recovery efforts in Haiti.
• Wildlife Trackers is a citizen science project to track wildlife in Kenya.
• Connection GeoMap, managed by Survivors Connect seeks to create a space to share critical information about trafficking and anti-trafficking activity globally, promote transparency in our efforts, engage communities and learn best practices, current challenges and needs in our global effort.
• Atlanta Crime Maps tracks crime in the Atlanta metro area.

- Stop Stockouts is an initiative to track near real-time stockouts of medical supplies at pharmacies (in a medical store or health facility) in Kenya, Uganda, Malawi and Zambia.
- The Computer Professionals' Union in the Philippines created the initiative called TXTpower, an effort to keep an eye on the mobile phone companies by ordinary citizens.
- The Cuidemos el Voto mashup is a platform to help monitor the federal elections of 5 July 2009 in Mexico.
- We set up a site to track the Swine Flu reports coming in from official and unofficial sources at Swineflu.Ushahidi.com. We have also created a way for citizen reports to be submitted.
- Vote Report India is a citizen-driven election monitoring platform for the 2009 Indian general elections.
- Al Jazeera uses Ushahidi in their "War on Gaza" website covering the activity happening in Gaza in Jan/09.
- Peace Heroes: Unsung Peace Heroes is a campaign developed by Butterfly Works and Media Focus on Africa Foundation. The goal is to nominate people who helped do positive things during and after the post-election violence in Kenya.
- Congo (DRC): Deployment to the DRC Congo happened on Nov 7, 2008 - the week after our initial release of the alpha version of the new Ushahidi Platform.
- Kenya: The initial mashup, used to track reports of incidents of violence around Kenya.
- South Africa: Used to map xenophobic attacks perpetrated against non-South Africans.

Replicability / hurdles / issues

Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

Since Ushahidi is a free and open source mapping and content management platform, it can be used by organizations worldwide in similar crisis-related or rapidly emerging strategic or tactical situations when a new use arises. There are no significant hurdles to expanding the use of Ushahidi.

Further study / research questions	Select for case study
	Yes

Contact	Comments on contacts made, arrangements, etc.
Ory Okolloh - Executive Director, Ushahidi kenyanpundit@gmail.com	

Subsector *I.e., Which of Typology Subsectors* Agriculture, Animal husbandry, Fisheries & Forestry	Name of Application and References Dialog Tradenet: • http://www.tradenet.lk/ • http://www.dialog.lk/news/dialog-tradenet-ggs-partnership-set-to-revolutionise-agri-market-access/ • http://ict4d-in-srilanka.blogspot.com/2010/07/dialog-tradenet-is-truly-inclusive.html • http://www.sundaytimes.lk/100103/BusinessTimes/bt25.html • http://www.lbo.lk/fullstory.php?nid=199281877 • http://lirneasia.net/wp-content/uploads/2009/12/19-36.pdf (page 13/18)	Country(s) / Region Sri Lanka

Segment / Activity
i.e., which Segment in the Typology

Agro-marketing / trade

Description of Application
Note whether it is purely information or transaction based

TradeNet is a service launched by Dialog Axiata PLC, the country's leading mobile services provider, in December 2009, to deliver spot and forward agricultural commodity price information via mobile phones. In July of 2010, Tradenet started allowing trades to occur on their platform for all types of services and goods (beyond just agriculture related produce and/or services).

The agriculture component of the service (primarily the wholesale price information) was the result of a partnership between Dialog and Govi Gnana Seva (GGS), a non-profit organization involved in the collection and dissemination of wholesale agricultural produce trade information.

The agricultural price information service was launched in December 2009 and users can currently subscribe to receive up to five price alerts for up to five vegetables and/or fruits from each of the markets covered by GGS. At present GGS covers three markets, which includes the Dambulla Dedicated Economic Centre (DDEC), which is the largest wholesale market for fruits and vegetables in the country and handles nearly 80% of the wholesale trades in the country. The other markets presently covered are the Dedicated Economic Centers in Meegoda and Narahenpita.

The service is only available to Dialog subscribers across the country. Information on the TradeNet platform is disseminated via multiple digital communication technologies such as SMS, Unstructured Supplementary Service Data (USSD) and the web. The SMS service is offered in English, Sinhala and Tamil. Currently use of all these interfaces is free. A dedicated call centre has been set up to register users and provide access to the service. The hotline can be accessed by dialing "977" from any Dialog phone and users have to pay a premium rate of LKR 3 (approximately USD 0.03) per minute to access the call centre.

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS, USSD, web, WAP, IVR	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* Ongoing work involves improving data collection systems and expanding outreach to ensure that farmers receive accurate, timely and actionable price information.

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* Dialog	<u>Lead</u> role(s) Dialog provides the Tradenet platform on which the agricultural market information in disseminated.

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

Whilst the service is currently available for free during these initial stages, plans are underway to start charging subscribers a nominal monthly service charge (approximately LKR 30 or USD 0.3 per month though the rates have not been finalized as yet) by the end of the year. Given the large farmer community in Sri Lanka - agriculture accounts for 32.7% of employment in the country as of 2009 - there is a potentially large subscriber base for this service.

Other key players	Roles	Incentives / Business model
1. Govi Gnana Seva (GGS)	Collecting and disseminating spot prices of agricultural produce	Increase farmer income
2. LIRNEAsia	improving data collection systems and expand the outreach	Increase farmer income
3. USAID	improving data collection systems and expand the outreach	Increase farmer income

Year of commencement	Maturation Cycle Position *Emerging / Expanding / Mature*	Status *E.g., Pilot / Rolling out / Established*
2009	Expanding	Established

Comment on maturation / status of development

In July of 2010, Tradenet started allowing trades to occur on their platform for all types of services and goods (beyond just agriculture related produce and/or services). Ongoing work involves improving data collection systems and expanding outreach to ensure that farmers receive accurate, timely and actionable price information. GGS is in the process of adding more markets and two additional markets should come online by the end of 2010.

Costs of the application & evidence of cost recovery & profit/sustainability
e.g., Development of the technical systems & content; maintenance & skills

The Tradenet system cost approximately LKR 8 million (USD 80,000) to build and this cost was primarily associated with technology development. A further LKR 8 million (USD 80,000) was allocated for project management, marketing and advertising though this fund has not been fully utilised. Operational costs for GGS to conduct the price collection are approximately LKR 1 million (approximately USD 10,000) per year. These operational costs are currently financed via an exclusive content provision agreement with Dialog.

So far nearly 1500 farmers have subscribed for the agricultural market information service and the call center receives nearly 50 calls a day. (The figure only refers to those requesting agricultural price information). Whilst the service is currently available for free during these initial stages, plans are underway to start charging subscribers a nominal monthly service charge (approximately LKR 30 or USD 0.3 per month though the rates have not been finalized as yet) by the end of the year.

Given the large farmer community in Sri Lanka – agriculture accounts for 32.7% of employment in the country as of 2009 - there is a potentially large subscriber base for this service.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

With respect to the agricultural price information part of the Tradenet service, users are getting up to date information on price movements in wholesale agricultural produce. Farmers are utilizing the service to time the exact harvest time as well as the time of entry into the market so as to get a higher price. They are able to do so because most fruits and vegetables in Sri Lanka show high intra-day and inter-day volatility due to a mismatch between supply and demand. Accurate and real-time price information is allowing farmers to forgo the sunk costs associated with entering the market at a non-optimal time (since they are not able to take their produce back if the prices are low in the market due to transportation costs).

Utilization of the trading component of Tradenet is currently low partly because, at the time of this report, the trading aspect of the service had only been operational for less than four months and no successful trades have been conducted. At the moment, farmers have been using it to identify potential buyers for their produce. The benefit from this part of the service is so far unverified.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis

contained in the source material.

Research conducted by LIRNEasia of farmers utilizing this service has found that farmers between 10-15 km from their closest market, are able to get a premium of 23.4% on the price per kg of their produce (when compared to the average daily prices for their produce).

SWORB *[Maybe summary of other sections]*	**Strengths** • Unique service in Sri Lanka that can allow farmers to access real-time price information in a convenient and ultimately cheap manner. • The only service that has leveraged the fact that there is demand for knowledge of the intra-day price movements. • Covers multiple markets • GGS has good linkages with the main wholesale traders especially at DDEC, the main wholesale market in the country. • Has a business plan for longer-term sustainability.	**Weakness** • Relatively weak linkages with cooperatives, farmer organizations and traders, which could limit the use of the trading component of Tradenet. • Technology infrastructure is owned by Dialog, which limits Tradenet's ability to reach non-Dialog mobile phone users.
	Opportunity • Now that the service has been showing benefits, GGS & Dialog should consider partnering with other operators. • Partnering with the 1920 services can provide crop advisory information for farmers and increase the business proposition for the service. • Some potential role for donor funding primarily in helping GGS develop the business plan to make their activities sustainable in the longer term. • GGS could increase their coverage of other smaller wholesale markets in the country relatively quickly with low cost.	**Risks and barriers** • Other similar services (for agricultural price information and trading) are being currently launched which could impact Tradenet's market. • The service is only accessible to Dialog subscribers. There also might be some problems with coverage in the rural farmlands for Dialog which negatively impact the service

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

Given the large farmer community in Sri Lanka – agriculture accounts for 32.7% of employment in the country as of 2009 – there is a potentially large subscriber base for this service.

The main challenge for the service is that it is limited to Dialog subscribers. Also, there are some concerns regarding Dialog's cell phone coverage in some rural areas, which would limit service uptake. Market research conducted by LIRNEasia and GGS has shown farmers to be willing to pay for this service. The research also indicated that farmers using the service have found the price information to be reliable and dependable to the extent that they are deriving real livelihood benefits from it. It remains to be seen, though, how successful the service will be once subscribers are charged.

Another challenge is extending access to the service outside of Dialog subscribers. While the technology is owned by Dialog, it is important that GGS and Dialog enter into partnerships with other operators with some form of revenue share model so that the service can be extended to geographical areas that Dialog does not cover.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

As the service expands, more partnerships and agreements with third-party entities will need to be developed to ensure that localized and context-specific information can be provided. Research has shown that just the provision of price information is creating additional interest in higher value crops, which is increasing demand for crop advisory services. If this too were to be facilitated via the Tradenet system there would be a better business proposition for this new service. Whilst the service is available nationally the price information aspect only covers three markets. There are an additional five regulated markets that are not yet covered, though they are small. Nevertheless, price information from these areas is vital to farmers within their catchment areas. GGS is in the process of adding more markets and two additional markets should come online by the end of 2010. The service is potentially sustainable should subscriber numbers increase and once the service transitions to a paid service.

Further study / research questions	Select for case study
	Yes

Contact	Comments on contacts made, arrangements, etc.
Harsha de Silva harsha.lirne@gmail.com	

Subsector *I.e., Which of Typology Subsectors* Agriculture, Fisheries & Forestry	Name of Application and References KACE & Soko Hewani: • http://www.kacekenya.com/index.php?option=com_content&task=view&id=22&Itemid=53 • http://ictupdate.cta.int/en/Feature-Articles/The-business-of-information • http://www.unctad.info/upload/SUC/LusakaWorkshop/KenyanCommodityExchanges.pdf • http://www.aaae-africa.org/proceedings2/001/Mukhebi.pdf	Country(s) / Region Kenya

Segment / Activity
i.e., which Segment in the Typology

Agro-marketing / trade (e.g., advertising, pricing, strategic link-ups), Innovation (e.g. new supply chain / business models)

Description of Application
Note whether it is purely information or transaction based

The KACE application has developed a market information and linkage system (MILS) which is designed to improve the operation and efficiency of Kenyan agricultural markets, targeting small scale farmers and agribusinesses, through the:
• provision of timely (daily) market information on 20 commodity prices;
• facilitation of offers and bids to match farm outputs with demand from wholesale dealers in the main markets; and
• provision of assistance to facilitate the linkages (e.g., negotiation of contracts and commodity transportation) between the farmers and buyers.

The MILS system consists of several important and integrated ICT enhanced components, which are:
• Rural based Market Resource Centres (MRCs) – franchised liaison offices which are connected to markets and the KACE Nairobi Hub and provide the communications and physical meeting points which support farmers in their geographical area. There are currently eight MRCs around the country.
• Mobile SMS service – using premier access codes with both Safaricom and Zain where farmers are able to secure the daily wholesale prices for 20 commodities in seven main urban market centres, i.e., Nairobi, Mombasa, Nukuru, Eldoret, Machakos, Kitale and Chwele.
• Interactive Voice Response (IVR) service – uses voice mail for delivery of important information by dialing into a premium number and accessing the information though simple menu steps.
• Internet database system – where information is disseminated to users by email from KACE's database and via its website www.kacekenya.co.ke.
• FM radio broadcasts – market information is provided through an interactive weekly broadcast program of the West FM Radio Station , branded as Soko Hewani (Supermarket on Air) providing a virtual trading floor for transactions to take place.

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS, IVR, email, voice, FM radio	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* The extension of web market sites (e.g. Ebay) to local, developing country markets could limit the utility of programs like Soko Hewani.

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* Kenya Agricultural Commodity Exchange (KACE)	<u>Lead</u> role(s) Developed the technology and administers the system.

Business Model / Rationale

E.g., Market differentiation, clear revenue/profit potential (describe)

The KACE system's rationale is to provide an integrated set of applications, in which Mobiles play a critical but not exclusive role. The system is built on the researched understanding that besides the essential ingredient of good information on commodity pricing that is required to empower small farmers in dealings with wholesalers and to eliminate predatory brokers / middlemen, market linkage mechanisms are also needed to enable farmers to actually sell their produce and get it to market. Assistance is also needed to be able to find out about and purchase the most suitable inputs – seeds, fertilizer and chemical in a timely manner and at competitive prices. Thus KACE has incorporated all of these components in their system.

In addition to the SMS based pricing information, KACE's franchised MRCs help establish the linkages for farmers, at a modest fee recognizing the value added. The MRC staff personnel are also the ones who gather the daily market pricing information and supply it to the KACE Hub for uploading to the KACE database, thus supporting the SMS service. The daily pricing information is displayed on local trading boards at their own premises to assist farmers and SMEs who attend the location physically.

As a further integrating mechanism, the Soko Hewani radio service provides the trading platform to facilitate some of the MRC's activities, though to date this is only via one radio station in one particular region. This, as well as the other services can be expanded to bring about the same level of integration on a broader scale and larger geographic area.

Each application within the KACE system has its own business model. Currently, KACE covers only 60% of its operating costs through revenue generation. The balance is made up through donor contributions.
- Currently, KACE covers only 5% of its operating costs from SMS revenue. The SMS based market information messages are paid for by the "callers" to the telecom operators. The revenue share between the main telecom operator Safaricom and KACE is on a sliding scale, in which KACE receives a higher proportion as the number of messages per month increases. Current expectations, based on around 37,000 messages per month are around 47,000 KShs per month (i.e., approx. 1.3 KShs per message.)
- Income from MRC operations and trade linkages covers 40% of KACE's operating costs. KACE's financial objective for the MRCs is for them to be self-sustaining after two years of operation, through the provision of standardized, needed, appropriate and affordable services to local smallholder farmers and SMEs in the area. The MRCs charge a placement fee of USD 1.50 – 15.00 (depending on the volume concerned) to farmers and buyers for submitting a bid or offer onto the Soko Hewani radio programme. They also charge a commission of between 0.5% to 5% on successful deals to manage the negotiation, contract and transportation. Total volume of business transacted through Soko Hewani is KShs 8 million per week.
- KACE income from consulting fees and other commercial sources is 15%.

Other key players	Roles	Incentives / Business model
1. West Media Limited	Proprietors of the West FM Radio Station that broadcasts Soko Hewani	Increase listeners, advertising revenues
2. Market Resource Centres (MRCs)	Trade on the Soko Hewani program through their own accounts or on behalf of farmers	Income derived through trading

Year of commencement	Maturation Cycle Position *Emerging / Expanding / Mature*	Status *E.g., Pilot / Rolling out / Established*
2006	Mature	Established

Comment on maturation / status of development

The application is mature. KACE is seeking to automate the market information collection, processing, management and dissemination process. Scaling up to service 1 million messages per month (from the current average of 37,000) and the addition of an SMS based trading platform, plus the migration of Soko Hewani to a radio station with full national coverage would require an investment of USD 1.75 million over three years.

Costs of the application & evidence of cost recovery & profit/sustainability
e.g., Development of the technical systems & content; maintenance & skills

Each application within the KACE system has its own business model. Currently, KACE covers only 60% of its

operating costs through revenue generation. The balance is made up through donor contributions.

- Currently, KACE covers only 5% of its operating costs from SMS revenue. The SMS based market information messages are paid for by the "callers" to the telecom operators. The revenue share between the main telecom operator Safaricom and KACE is on a sliding scale, in which KACE receives a higher proportion as the number of messages per month increases. Current expectations, based on around 37,000 messages per month are around 47,000 KShs per month (i.e., approx. 1.3 KShs per message.)
- Income from MRC operations and trade linkages covers 40% of KACE's operating costs. KACE's financial objective for the MRCs is for them to be self-sustaining after two years of operation, through the provision of standardized, needed, appropriate and affordable services to local smallholder farmers and SMEs in the area. The MRCs charge a placement fee of USD 1.50 – 15.00 (depending on the volume concerned) to farmers and buyers for submitting a bid or offer onto the Soko Hewani radio programme. They also charge a commission of between 0.5% to 5% on successful deals to manage the negotiation, contract and transportation. Total volume of business transacted through Soko Hewani is KShs 8 million per week.
- KACE income from consulting fees and other commercial sources is 15%.

KACE clearly needs to get out of the Donor supported "rut". Although the breadth of its integrated family of applications is impressive, which makes it a leader in Kenya, the scale of its reach is still very small compared to the 4 million smallholder farmers who exist in the country. KACE needs to scale up both its SMS service by several orders of magnitude and also to multiply the reach of its broadcasting based virtual trading floor in order to become self-reliant and commercially viable.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

In addition to the provision of timely, market pricing, which is universally recognized only as a foundation for farmers to participate in the market system, KACE is developing a set of services through the MRCs which are also essential components to enable farmers to overcome their economic hurdles. These are:
- Collection and weighing
- Transport
- Warehousing
- Quality Control, such as moisture testing for grain
- Advice and stocking of farm inputs (quality seeds, fertilizer and agro-chemicals)
- Facilitation of cashless payment (e.g., M-PESA and Zap).

The services which KACE's MRCs are developing are in response to previous studies in which farmers already benefiting from the market information expressed a demand and willingness to pay for these value-added services.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

According to a 2007 report, the proportion of farmers and traders that say their incomes have increased and their bargaining positions have improved was 75% for farmers and 60% for traders. Evidence from one season in Bungoma district in Kenya, showed that farmers who used the KACE system received 22% higher maize prices that those who used the usual middlemen. The newly franchised MRCs also performed well, raising almost twice as much money as the un-franchised market information points during the same period.

| SWORB
[Maybe summary of other sections] | **Strengths**

• Proven and strategic combination of information and market linkage facilitation covering 20 products and market linkages throughout the country | **Weakness**

• Limited reach as a percentage of the total number of smallholder farmers in Kenya.
• Weak links with cooperatives, farmers organisations which could be leverages to publicize KACE's services to a much wider population of farmers |
| | **Opportunity**

• Scaling up and increasing the integration of its components to reach a much broader population of farmers in several | **Risks and barriers**

• Other competitive market information and/or linkage solutions being developed, often copied from KACE, will eat into KACE's |

sectors • KACE currently has a lead and therefore it has a window of opportunity to develop a much wider reach before the market becomes too fragmented. • Replicating the KACE model to four other countries in the East African Community region (Tanzania, Uganda, Rwanda & Burundi)	market • Any move by government towards central price control could reduce the need for market information, though the trend seems to be in the reverse direction. • Significant first year finance is required for the upscaling activities

Market potential assessment

E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

KACE has determined that scaling up to service 1 million messages per month (from the current average of 37,000) and the addition of an SMS based trading platform, plus the migration of Soko Hewani to a radio station with full national coverage would require an investment of USD 1.75 million over three years. Development and operating costs for Year 1 are estimated at USD 743,000.

KACE clearly needs to get out of the Donor supported "rut". Although the breadth of its integrated family of applications is impressive, which makes it a leader in Kenya, the scale of its reach is still very small compared to the 4 million smallholder farmers who exist in the country. KACE needs to scale up both its SMS service by several orders of magnitude and also to multiply the reach of its broadcasting based virtual trading floor in order to become self-reliant and commercially viable.

Replicability / hurdles / issues

Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

The program can grow where farmers do not currently have access to current commodity prices. Soko Hewani has faced market-unfriendly government policy, which it identifies as a hurdle. One advantage of KACE's structure is that the MRCs are established on a franchise model. It is therefore planned that they can be scaled up and replicated to a greater number of places, to some extent without burdening KACE's operating budget. KACE arranged start-up credit though a micro-finance institution and also equipped the MRCs during their start-up phase by providing training and skills mentoring to enable them to provide the required assistance to farmers and SMEs.

Further study / research questions	**Select for case study** No

Contact Adrian Mukhebi kace@kacekenya.com	**Comments on contacts made, arrangements, etc.**

Subsector *I.e., Which of Typology Subsectors* Labour, Migration and Human Development	Name of Application and References Mobile for Good (M4G): • http://uk.oneworld.net/section/mobile • http://gkp.stockholmchallenge.se/project/2007/Economic-Development/MOBILE-FOR-GOOD • http://www.kiwanja.net/database/project/project_mobile4good.pdf • "The Mobile for Good (M4G) Social Franchise Model – An investment opportunity"	Country(s) / Region Kenya, Cameroon, Tanzania, Uganda, Nigeria, Nepal

Segment / Activity
i.e., which Segment in the Typology

Employment

Description of Application
Note whether it is purely information or transaction based

Mobile for Good (M4G) is a social franchise project designed to use mobile phone technology to help alleviate poverty and improve the lives of people in the developing world. It delivers vital health, employment and community content via SMS on mobile phones in order to inform and empower disadvantaged individuals and help bridge the digital divide, the widening technology gulf which exists between rich and poor countries.

The Mobile for Good project has already been implemented in Kenya, where it has been instrumental in helping more than a hundred people to find jobs every week. The success of this pilot has driven plans to replicate the franchise in further countries across Africa and the rest of the developing world including Cameroon, Tanzania, Uganda, Nigeria and Nepal. The team are currently looking for potential franchisees and investors.

The Mobile for Good technology platform is designed to enable franchisees to deploy it in different parts of the world and to operate along with the service providers in their respective countries. It is a carrier grade platform; the same as the one used by Airtel-India's largest operator. It uses the short message service (SMS) as the primary channel for communication and content exchange. Whilst providing SMS services is the key, the platform is capable of supporting other related content technologies such as multimedia messaging and content can also be exchanged in binary format.

Convergence of email and SMS technologies forms an integral part of the solution. In this effect users are able to have two-way communication with the system. Message transmission can originate at mobile phones and terminate at a software application and it can, similarly, originate at an application and terminate at mobile phone.

The pilot project in Kenya, initially known as OKN Mobile, has proved to be a great success since it began in September 2003. The service was originally funded by the Vodafone Group Foundation.

The success of M4G-Kenya has been staggering. The business has already broken even and has had over 70,000 people use its services. Over 60,000 have found employment through the jobs service, Kazi560. In addition, some employers have said that this is the only form of recruitment they are now using.

Technology *E.g., voice, video, sms, email, GPS, multi-media* Email, SMS	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* It is unclear what would have a major impact on this app, short of the replacement of SMS with a new technology.

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* OneWorld	**Lead** role(s) Developed the app.

Business Model / Rationale

E.g., Market differentiation, clear revenue/profit potential (describe)

Mobile for Good (M4G) is a social franchise project designed to use mobile technology to improve the lives of people in the developing world. It aims to send essential health, employment and community content via SMS on mobile phones in order to inform and empower disadvantaged individuals and help bridge the 'digital divide' – the widening technology gulf which exists between rich and poor countries.

The content services are targeted at Bottom-of-the-Pyramid (BOP) consumers – generally defined as the low income segment of the population that lives on less then two USD a day; although the business concept also includes premium services aimed at higher income groups, which allows services offered to the BOP to be subsidised.

Other key players	Roles	Incentives / Business model
1. Safaricom	Mobile service provider in Kenya	Profits from additional use of its network
2. Africa Online	Internet service provider in Kenya	Profits from additional use of its network
3. Ministry of Labour (Kenya)	?	Increase employment in Kenya

Year of commencement	Maturation Cycle Position	Status
	Emerging / Expanding / Mature	*E.g., Pilot / Rolling out / Established*
2003 established		
2004 launched	Mature	Established

Comment on maturation / status of development

The app was developed in 2003-2004. There is no information on further developments.

Costs of the application & evidence of cost recovery & profit/sustainability
e.g., Development of the technical systems & content; maintenance & skills

No information on the cost of originally developing the app. Old data from the OneWorld site shows that M4G-Kenya has annualized revenues of over US$100,000 and has broken even in under two years.

The following are the projected costs, revenue and net profits for starting up and running a franchise for the first 3 years[1] in US dollars in smaller, developing markets like Nepal, Caribbean and similar markets.

	Year 1	Year 2	Year 3
TOTAL REVENUE SUMMARY			
Jobs	55,000	85,000	127,500
Health Tips-HIV/AIDS	2,808	3,509	4,387
Morning Prayer & Motivational Tips	4,250	6,375	9,563
TOTAL REVENUE	**62,058**	**94,884**	**141,449**
TOTAL COST SUMMARY			
Total Salaries & Wages	21,616	32,724	37,381
Total Office Overheads	5,882	7,329	9,725
Total Content	6,000	7,500	9,000
Total Product Marketing	15,000	18,153	21,379
Cost of Business	21,632	6,000	6,000
TOTAL COSTS	**70,130**	**71,706**	**83,485**
Net Profit USD	- 8,073	23,178	57,964

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

The Mobile for Good platform can be used for a wide range of uses. The best-documented use of Mobile for Good is Kazi560, the Kenyan mobile job search service. A large number of people have found employment through Kazi560. Feedback received shows that many employers are benefiting as well as job-seekers, with some companies stating that Mobile for Good is the only recruitment service they are using.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

Over 60,000 have found employment through the jobs service, Kazi560. In a week, Kazi560 is able to fill over 200 positions countrywide in Kenya.

SWORB *[Maybe summary of other sections]*	**Strengths** Wide range of potential uses, proven profitability	**Weakness** Mobile for Good is a platform on which apps can be launched, so without the app, it is not useful
	Opportunity International expansion, new apps	**Risks and barriers**

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

The case of Kazi560 shows that the platform is valuable. By the end of 2006, there were over 80,000 users of the service. In the investment opportunity document, OneWorld says that investors in a Mobile for Good franchise can expect a 32% ROI.

Replicability / hurdles / issues

Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

The Mobile for Good technology platform is designed to enable franchisees to deploy it in different parts of the world and to operate along with the service providers in their respective countries. It is a carrier grade platform; the same as the one used by Airtel-India's largest operator.

As the application is able to be deployed in multiple locations and the provision of technologies varies between the mobile telecom service providers, the platform enables integration with their systems using standard protocols. This minimises dependencies on service providers and proprietary software applications.

Taking into account the technology deployments in the developing countries, the application is modular with a core application to support key functionalities. Additional modules can be plugged in according to the user requirements.

Each deployment of the application is independent from the others and it will be administered separately.

Further study / research questions	Select for case study
	Yes

Contact	Comments on contacts made, arrangements, etc.
Gopal Gobiratnam, Software Architect gopal.gobiratnam @oneworld.net	

Subsector *I.e., Which of Typology Subsectors* Agriculture, Fisheries & Forestry	**Name of Application and References** Manobi: • http://www.manobi.sn/sites/za • http://www.manobi.net/foundation/?M=2&SM=6 • http://www.africaneconomicoutlook.org/en/in-depth/innovation-and-ict-in-africa-2009/pro-development-innovative-applications/box-24-manobi-african-innovation-for-smallholder-farming/	**Country(s) / Region** Senegal, South Africa

Segment / Activity
i.e., which Segment in the Typology

Agro-marketing / trade

Description of Application
Note whether it is purely information or transaction based

Manobi is a mobile data services operator. They provide added value corporate services to clients to help them to generate more revenue, save costs and improve business performance.

With "Xam Marsé", the latest market information system on SMS and the Internet developed by Manobi, Senegalese farmers, traders, hoteliers or housewives can now receive a free, daily SMS containing information on the product of their choice on any selected market.

In conjunction with Sonatel, Manobi has successfully introduced in Africa the use of the mobile phone by producers as an information and interaction tool for their production and marketing industry. The Senegalese producers, fishermen, traders, local authorities, and also companies have found out how to break out of their isolation and remedy their lack of information and low competitiveness thanks to the mobile phone and services tailored to suit their local needs.

Manobi's information system on fruits and vegetables (SIM) accessible by GSM-Data has enabled the farmers of the Niayes - a market gardening area in the West of Senegal- to increase their sale prices negotiated from their fields or on the markets by over 50% per year. Overall, the use of the SIM on the mobile brings an annual income of CFA F 10 billion from the 7,000 ha cultivated in the Niayes area, which can immediately be used by the beneficiaries to take care of their own social and economic development.

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS	**Technical development path** *Note any past or expected changes and what impact technological change could have on the application and its viability* Applications should remain viable as long as SMS is common.
Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* Manobi	**Lead role(s)** Developed the applications.

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

Manobi uses mobile phone technology to help small scale farmers play a more active role in the product value chain. An innovative business model developed by Manobi supports the delivery of the services while creating a sustainable ecosystem for the farmers and all the value chain operators.

Other key players 1. Sonatel	**Roles** Mobile service provider in Senegal	**Incentives / Business model** CSR

2. Senegalese Ministry of Commerce	?		Social development
Year of commencement 2003	**Maturation Cycle Position** *Emerging / Expanding / Mature* Mature	**Status** *E.g., Pilot / Rolling out / Established* Established	

Comment on maturation / status of development

The Xam Marse application is mature. Manobi continues to develop more mobile applications for agricultural uses.

Costs of the application & evidence of cost recovery & profit/sustainability
e.g., Development of the technical systems & content; maintenance & skills

No information available for Xam Marse. For the original app targeting Senegalese fishermen, launched in 2003, the following investments were made:

MANOBI: US$139,920
Sonatel: US$105,580
Alcatel: US$ 88,420
IDRC: US$ 31,800
infoDev: US$249,206
Total project budget: US$615,000

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

Manobi's applications target producers, fishermen, traders, local authorities, and also companies. Market information on prices, consignments, and demand of fresh products must be given to all producers and to the rural population in order to immediately build their capacities in (i) seizing the market opportunities, (ii) increasing their income (ii) choosing their path of development and (v) naturally take care of the more sophisticated services which they think necessary to speed up their economic and social development.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

In Senegal thousands of small vegetable growers from the Niayes region have increased their net revenues by over $2,200 per hectare/year.

In Senegal dozens of very small-scale farmers bundle their produce to supply the large clients directly and have been able to triple their average revenue as a result. Today, they carry out individual transactions that guarantee a turnover of over $3,000 per week.

In South Africa, hundreds of farmers from the Limpopo province who were traditionally handicapped no longer have to travel to Pretoria or Johannesburg to sell their perishables at low prices, bearing heavy losses in terms of time and transport fees. Instead, via their mobile phones, they are directly linked to purchasers from restaurants and lodges in the Kruger Park, situated within a radius of 20km.

In just a few months the revenue of some of these farmers has jumped from $700 per month on average to $4,000 per month.

In the fishing sector, Manobi users have increased their sales by 30%.

Limpopo farmers are directly linked to restaurants and lodges of the Kruger National Park, located within a radius of 20 km. In a matter of months, the revenue of some of these farmers has jumped from $700 per month on average to $4,000 per month.

SWORB *[Maybe* *summary of*	**Strengths** Proven to increase revenues	**Weakness**
	Opportunity International expansion, new	**Risks and barriers** Competing mobile market information systems

other sections]	markets/commodities	

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

Manobi's model is going to be extended in West and Central Africa in partnership with international organisations and private foundations which have joined Manobi aiming to reach 650 000 farmers by 2011. Mobile operators and suppliers also support the project which makes rural communities much more attractive by transforming the mobile phone into a business tool.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

Manobi has already worked with numerous communities in Senegal and South Africa, so replicability is feasible.

Further study / research questions	**Select for case study**
	No

Contact	**Comments on contacts made, arrangements, etc.**
Daniel Annerose CEO MANOBI	

Subsector *I.e., Which of Typology Subsectors* Agriculture, Fisheries & Forestry	Name of Application and References GL-CRSP Livestock Information Network and Knowledge System (LINKS): • http://lmistz.net/Pages/Public/Home.aspx • http://www.kari.org/fileadmin/publications/10thproceedings/Poster/Application_InfoComTech.pdf • http://www.fara-africa.org/media/uploads/File/NSF2/RAILS/Innovative_Farmer_Advisory_Systems.pdf	Country(s) / Region Ethiopia, Kenya, Tanzania

Segment / Activity
i.e., which Segment in the Typology

Agro-marketing / trade

Description of Application
Note whether it is purely information or transaction based

Livestock market information is an integral part of early warning systems. It is helping track changes in terms of trade particularly with regard to comparing trends in grain marketing in order to identify potentially critical food shortage trends. LINKS is a Livestock Information Network and Knowledge System which provides regular livestock prices and volume information on most of the major livestock markets in Ethiopia, Kenya and Tanzania along with information on forage conditions, disease outbreak, conflict and water supply to support decision making at multiple scales.

LINKS livestock market monitoring system is a mechanism through which collection, analysis and dissemination of information needed to help producers, middle men and traders are organized and systematized. This system provides near real time market information which is available on request via SMS text message system, email, WorldSpace radio systems and on the internet. LINKS is a sub-project within the Global Livestock Collaborative Research Support Program (GL-CRSP) being implemented by Texas A&M University and funded by USAID.

USAID-Mali is also developing a similar system in Mali called the Livestock Market Information System (http://www.malibetail.net/Pages/Public/Home.aspx).

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS, email	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* Project funding discontinued in 2009

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* Global Livestock Collaborative Research Support Program University of California, Davis	Lead role(s) Developed the application

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

A coding system has been developed and accepted to report market conditions. The system provides codes for markets, animal species, breeds, age and sex categories. Trained monitors collect livestock prices and volumes through interviews during the peak of a market day. They have to interview 5 cases of each of the dominant breeds, classes and grade combination of animals on that market day in order to generate data then calculate the average prices for each animal category along with the total volumes of livestock supplied to the market by animal species. The data is then coded and is sent into the database system using short message service (SMS), e-mail or posted directly on the web into the database system. The coded market information is sent to automated country servers which, in turn, are linked to a global server allowing viewing of market data across country borders through the

Internet. The system provides timely information to enhance transparency and efficiency in livestock marketing and support decision-making that provides alternatives to source and dispose livestock through markets offering better returns for producers and traders. In addition to information technology development, considerable efforts have been made to build stakeholder consensus on how to report market dynamics and agree to a livestock grading system.

Other key players	Roles	Incentives / Business model
1. Government ministries in Kenya, Tanzania, Uganda	Integrated LINKS into national livestock marketing information systems	Agricultural development
2. USAID	Funding	Development
3. Texas A&M University	Implementing Global Livestock Collaborative Research Support Program (GL-CRSP)	Development

Year of commencement	Maturation Cycle Position *Emerging / Expanding / Mature*	Status *E.g., Pilot / Rolling out / Established*
2003	Mature	Established

Comment on maturation / status of development

Project funding was discontinued on June 2009. In Kenya, LINKS has been integrated into a national livestock marketing information system (NLMIS) that facilitates dissemination of information so as to reach end users in the remote livestock producing areas.

Costs of the application & evidence of cost recovery & profit/sustainability
e.g., Development of the technical systems & content; maintenance & skills

Information not available.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

The system provides pricing and other market information in pastoral areas. This will have a positive effect on market transactions in terms of improving sales and identifying markets offering better prices. The livelihood of a vast majority of people in East Africa is highly dependent on income from livestock and livestock products. Therefore, the development of reliable and timely livestock market information is vital for the development of the countries in the region and provides a basis for livestock producers and traders to make informed marketing decisions.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

Pastoral areas in the 3 countries carry about 30% of the total population estimated at 160 million people which amounts to 48 million people. It is estimated that out of the 48 million, about 5% (2.4 million) have access to the information through the network of major project partners with an estimated 3% (720,000) using personal mobile phones.

SWORB *[Maybe summary of other sections]*	Strengths Reliable, timely, regional (East Africa)		Weakness Funding
	Opportunity n/a		Risks and barriers n/a

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

Funding stopped in 2009, however, development of a system building on lessons from LINKS is taking place in Mali.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

Funding for this project was terminated in June 2009, and data collection has stopped. The sponsors (USAID, Texas

AgriLife Research/Texas A&M, University under the Global Livestock Collaborative, Research and Support Program (GL-CRSP), in partnership with Observatoire du Marche Agricole, (OMA) and the Direction Nationale des Productions et des Industries Animales (DNPIA)) are using the lessons learned from LINKS to build a Livestock Market Information System in Mali. (http://glcrsp.ucdavis.edu/publications/mali/10-03-MALI.pdf)	
Further study / research questions	**Select for case study** No
Contact Robert Kaitho Associate Research Scientist rkaitho@cnrit.tamu.edu	**Comments on contacts made, arrangements, etc.**

Subsector	Name of Application and References	Country(s) / Region
I.e., Which of Typology Subsectors Agriculture, Animal husbandry, Fisheries & Forestry	LIRNEasia / HJS Traceability App: • http://www.lirneasia.net/wp-content/uploads/2008/03/soysa_traceability-and-icts.pdf • http://www.lirneasia.net/wp-content/uploads/2008/03/de-silva_traceability-in-sri-lanka.pdf	Sri Lanka

Segment / Activity
i.e., which Segment in the Typology

Agro-support

Description of Application
Note whether it is purely information or transaction based

Gherkin farmers in Sri Lanka were given mobile phones with a Sinhala, menu-based application that allows farmers to send and receive information about:

- seed variety and quantity
- fertilizer variety and quantity
- pesticide variety and quantity
- revenue
- rejected quantity
- defects
- dispatch information
- crate details

Technology	Technical development path
E.g., voice, video, sms, email, GPS, multi-media SMS	*Note any past or expected changes and what impact technological change could have on the application and its viability* Increased familiarity with mobiles / SMS among farmers should increase the apps' viability

Leading Ecosystem Player	Lead role(s)
E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent LIRNEasia	Developed the application

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

It is easy to reduce some defects in gherkins through changes the farmers can make. The mobile application was introduced to increase traceability and help to fix addressable defects in gherkins to increase farmer income and reduce expenses by allowing communication via SMS rather than travel for face-to-face meeting.

Other key players	Roles	Incentives / Business model
1. HJS Condiments	The buyer of gherkins, providing feedback to farmers	Improved product quality/quantity

Year of commencement	Maturation Cycle Position *Emerging / Expanding / Mature*	Status *E.g., Pilot / Rolling out / Established*
2007	Emerging	Pilot

Comment on maturation / status of development

The project was reported on in February 2008. There is no newer information on this application.

Costs of the application & evidence of cost recovery & profit/sustainability
e.g., Development of the technical systems & content; maintenance & skills

No information available.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

- Information from the SMS was important to the farmers;
- Quick information was also useful to the centre managers;
- Legitimacy of relationships were enhanced by sms;
- Younger farmers were:
    o More enthusiastic about using phones;
    o Older farmers more technologically illiterate;
    o Preferred to collect SMS on the phone to see the monthly revenue; and
    o Created SMS networks to communicate with other farmers and field officer concerning gherkin issues.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

Quick feedback can reduce defects by up to 40%.

SWORB [Maybe summary of other sections]	**Strengths** Easy to use, quick feedback, enabled improvements	**Weakness** Technology issues, farmer familiarity with technology need improvement
	Opportunity Better training, more information provided via SMS	**Risks and barriers** Competing mobile farmer information systems

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

The farmers' benefitted from this application. There should be significant demand for such an application among farmers growing anything for which a short-term change in farming technique can have an impact on quality/quantity.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

This type of application requires that farmers and buyers/traders cooperate to share information.

In this pilot project, the technology and farmer's capacity needs to be improved. The reason for defects was not included in SMS to Thalawa. SMS from HJS did not reach farmers in Koswatte. SMS were sometimes not sent promptly because technology failed.

Further study / research questions	**Select for case study**
	No

Contact	**Comments on contacts made, arrangements, etc.**
Shamistra Soysa LIRNEasia	

Subsector *I.e., Which of Typology Subsectors* Governance / Political	Name of Application and References Disaster and Emergency Warning Network (DEWN): • http://202.69.200.131/en/responsibility/dewn/dewn.html • http://www.dialog.lk/about/responsibility/outreach-cr/dewn/ • http://www.ent.mrt.ac.lk/dialog/dewn.shtml • http://www.mimobimedia.com/Mobile_Dewn.htm • http://www.ent.mrt.ac.lk/dialog/dewn.shtml • http://lirneasia.net/2009/01/sri-lanka-dialog-assists-disaster-management/ • http://www.prweb.com/releases/2009/06/prweb2444844.htm	Country(s) / Region Sri Lanka

Segment / Activity
i.e., which Segment in the Typology

Other m-government services

Description of Application
Note whether it is purely information or transaction based

The DEWN is an innovation based on widely available mobile communications technologies such as short messages (SMS) and cell broadcast (CB), aimed at rendering a cost effective and reliable mass alert system. The network connects mobile subscribers, police stations, identified religious/social community centres and even the general public to a national emergency alarming centre.

A responsible authority would generate an alarm message from the alarming centre, which would be received by mobile phones as well as specialized alarm devices. The message could be selectively sent based on area, to identified individual/group of receivers, or to the general public as decided by the authority generating the message.

Messages can be received by either a mobile phone or a special-purpose wireless alerting device. Cell phones may receive the message in any of the three languages. The wireless alerting device shown responds to warning messages by either emitting an audible alarm and a flashing light or by turning on a radio. The device may be installed at central locations such as police stations and community centres and even domestically. Emergency alarms would be relayed in seconds to these end-devices through the DEWN. Dialog-UoM Mobile Communications Research Laboratory developed the special-purpose wireless alarm (DEWN alarm device) for this project.

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS, cell broadcast	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* Increased mobile penetration would make the application more viable.

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* Dialog	**Lead role(s)** Mobile operator that lead the development of the application and distributes the SMS warning messages.

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

The application is Sri Lanka's first mass alert early warning system and is a non-commercial undertaking.

Other key players	Roles	Incentives / Business model
1. Disaster	Receives and verifies information and sends out alerts	Improved disaster warnings

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Management Centre			
2. Dialog-University of Moratuwa Mobile Communications Research Laboratory	Co-developed the system		Improved disaster warnings
3. Microimage	Co-developed the system		Improved disaster warnings, exposure/marketing

Year of commencement 2009	Maturation Cycle Position *Emerging / Expanding / Mature* Mature	Status *E.g., Pilot / Rolling out / Established* Established

Comment on maturation / status of development

The application is operational. There is no information suggesting further development or expansion is in the works.

Costs of the application & evidence of cost recovery & profit/sustainability
e.g., Development of the technical systems & content; maintenance & skills

No information available.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

The system is designed to benefit all people at risk from any natural disaster by providing a timely warning of impending danger.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

No information available.

SWORB *[Maybe summary of other sections]*	**Strengths** Timely warning, widely available, doesn't require mobile phone to benefit	**Weakness**
	Opportunity International expansion	**Risks and barriers**

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

The application appears to be valuable and should grow in other countries, especially those prone to disaster. It is a non-commercial application, so requires the contribution of application developers and a mobile operator in order for it to be sustainable.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

This application can grow elsewhere, but requires the contribution of an application developer and a mobile operator.

Further study / research questions	**Select for case study** No
Contact	**Comments on contacts made, arrangements, etc.**

Subsector *I.e., Which of Typology Subsectors* Governance / political	Name of Application and References	Country(s) / Region
	1919 / GovSMS: - http://www.icta.lk/ta/component/content/article/610-1919-one-window-for-government-services-information.html - http://www.gic.gov.lk/gic/index.php?option=com_content&view=article&id=3%3Agovsms&catid=7%3Agov-sms&Itemid=22&lang=en - http://www.aptld.org/colombo2010/docs/102%20-%20ICTA%20-%20update%20for%20APTLD%20-%2027%20June%202010%20ver1.2.pdf - http://www.egovonline.net/articles-list/47/8174-sri-lankan-e-government-goes-open-source.html - http://www.icta.lk/en/programmes/technology/142-e-government-projects/874-govsms.html - http://srilankatoday.com/index.php?option=com_content&task=view&id=4401&Itemid=52 - http://www.gic.gov.lk/gic/index.php?option=com_content&view=article&id=2&Itemid=24&lang=en - Discussions with Mr. Wasantha Deshapriya, Director, Re-Engineering Government Program, ICTA	Sri Lanka

Segment / Activity
i.e., which Segment in the Typology

E-Government and m-Government services

Description of Application
Note whether it is purely information or transaction based

1919 is a hotline, launched in 2006, which provides access to information on government services in Sri Lanka. It is accessible on any telephone network and is offered in all three local languages, Sinhala, Tamil and English.

The service was initiated by The Information and Communication Technology (ICTA), the apex body for IT in Sri Lanka, which also coordinates and owns the Government Information Center (GIC) website. More than 20 governmental institutions and 2500 services are now a part of this initiative.

GovSMS is a related channel launched in 2009, which can be used to obtain government information via SMS. The GovSMS platform uses a SMS short code 1919, which is unified across all GSM and CDMA operators. A nominal fee for the service is charged equivalent the cost of sending the SMS. Currently, information on train schedules and crop prices are available via GovSMS.

The service aims to resolve all queries immediately. If the user's query cannot be answered immediately, they are advised to call after 24 hours with the reference number that is issued at the time of the first call. The unanswered question is then referred to and followed up with the relevant Ministry/ Government department by the Team Lead at the centre. 94% of queries are resolved within the first call. An average call lasts for about 1 minute and 6 seconds and the average queue time for an incoming call is about 0.12 seconds. There are approximately 16 operators manning the call centre, which can accommodate up to a maximum of 20 operators. The users of this service are primarily citizens of the country who are recipients of some form of government services. The 1919 service can also be accessed via the web at www.gic.gov.lk.

An additional program called GovSMS (as part of 1919) was launched in late 2009 and currently only provides train schedules and daily average commodity prices from the main wholesale market in the country. This part of the service has so far not been publicized and there are only very few users of this system at the moment. The implementers plan to launch an advertising campaign early next year once more services are added to the GovSMS interface.

Technology *E.g., voice, video, sms,*	**Technical development path** *Note any past or expected changes and what impact technological change could*

email, GPS, multi-media Voice, SMS	*have on the application and its viability* Ministry of Finance of Sri Lanka restricted the use of credit card payments only for the eRevenue License project until June 2010. Hence ICTA was incapable of releasing any more eServices requiring payment until this restriction was removed.

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* Sri Lanka's Information and Communication Technology Agency (ICTA)	**Lead role(s)** Conceived and coordinated the project.

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

The project depends on continuous government funding to function. There is no business plan to recuperate costs directly for the service. The quality of the service has so far not been measured and it is troubling that a large number of the calls coming to the hotline everyday are for contact information for various ministries. Even if project implementers considered charging for use of the service, it is not known if there is sufficient value from the service that users would be willing to pay. The intention seems to be to continue this as a free service for the foreseeable future.

Other key players	**Roles**	**Incentives / Business model**
1. Presidential Secretariat	Took over ownership of the Call Center project in April 2009	Provision of government services and information

Year of commencement 2006 (call centre) 2009 (GovSMS)	**Maturation Cycle Position** *Emerging / Expanding / Mature* Expanding	**Status** *E.g., Pilot / Rolling out / Established* Established

Comment on maturation / status of development

More than 20 governmental institutions and 2,500 services are now a part of this initiative. Currently 1919 covers 134 government organizations (99 percent). GovSMS is a related channel launched in 2009, which can be used to obtain government information via SMS. The GovSMS platform uses a SMS short code 1919, which is unified across all GSM and CDMA operators. A nominal fee for the service is charged equivalent the cost of sending the SMS. Currently, information on train schedules and crop prices are available via GovSMS.

Costs of the application & evidence of cost recovery & profit/sustainability
e.g., Development of the technical systems & content; maintenance & skills

The service was established in 2006 with LKR 7 million (approximately USD 70,000) of World Bank funding through Sri Lanka's Information and Communication Technology Agency (ICTA). ICTA was in charge of setting up the technology for running this service as well as building capacity in government ministries to provided and regularly update the databases needed by the operators manning the call centre. Since 2008, ICTA's role has been solely to do the project management for this service on a continuous basis as well as ensure that ministries regularly update their information. Whilst the initial operating cost per year was around LKR 7 million (approximately USD 70,000) a year, it is now estimated to be around LKR 15 million (approximately USD 150,000) a year. The Presidential Secretariat currently funds the operating costs.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

The service provides users with up-to-date information on government services, and is available in all three local languages. Citizens should find accessing government services to be less time consuming and less expensive by using the 1919 service. Given the current changes in portfolios for most government ministries following the last general elections, 1919 often serves as the first point of contact for the public needing specific government

services. So far the most frequently requested information are related to obtaining passports, a copy of a birth certificate, marriage and death certificates and new national identity cards.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

94% of queries are resolved within the first call. An average call lasts for about 1 minute and 6 seconds and the average queue time for an incoming call is about 0.12 seconds.

SWORB *[Maybe summary of other sections]*	**Strengths** • Unique service that is currently not being provided by anyone else. • Centralized team that serves a public function as well as facilitating the up-gradation of knowledge management and public access of all government ministries and departments	**Weakness** • For the most part the service serves only as a "library" of information and provides only limited functionality for users to query on their specific personal cases/ applications with a specific government agency.
	Opportunity • Centralized system can be leveraged to integrate services across multiple ministries (in the case where users need to approach multiple department/ ministries for a specific case)	**Risks and barriers** • Dependant on continuous government funding

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

Currently 1919 covers 134 government organizations (99 percent). Approximately 3,500-4,000 calls are made to the number every day, which operates from 8am to 8pm (12 hours), 365 days of the year. Call volumes have doubled in the last two years.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

The project has won awards and some work has been done to inform other Asian governments about the application. However, the project depends on continuous government funding to function. There is no business plan to recuperate costs directly for the service. The quality of the service has so far not been measured and it is troubling that a large number of the calls coming to the hotline everyday are for contact information for various ministries. Even if project implementers considered charging for use of the service, it is not known if there is sufficient value from the service that users would be willing to pay. The intention seems to be to continue this as a free service for the foreseeable future.

A service such as 1919 requires government leadership and investment to be replicated. Whilst ICTA serves as the project managers, the service itself sits directly under the Presidential Secretariat, which has been essential in ensuring that ministries comply with their duties in updating the databases used by the service. There is also significant overhead on the part of the project managers to ensure that government ministries update their information on a regular basis. This is an issue that has been a priority since the inception of this service in 2006.

Further study / research questions	Select for case study
	Yes

Contact	Comments on contacts made, arrangements, etc.
Wasantha Deshapriya, Director, Re-engineering Government Programme, ICTA	

| **Subsector**
I.e., Which of Typology Subsectors

Agriculture, Fisheries & Forestry | **Name of Application and References**

NAFIS:
• http://www.nafis.go.ke/
• http://mobileactive.org/mobile-tools/nafis-national-farmers-information-service
• ftp://lenst.det.unifi.it/pub/LenLar/proceedings/2009/istafrica09/ICT%20for%20eInclusion%20and%20eAccessibility/Application/ISTAfrica2009_Paper_ref_132.pdf
• http://www.slideshare.net/iaald/1-nenkari-nafis-iaald | **Country(s) / Region**

Kenya |

Segment / Activity
i.e., which Segment in the Typology

Extension services

Description of Application
Note whether it is purely information or transaction based

NAFIS (the National Farmers Information Service) is a voice service that offers agricultural extension information which farmers can access through mobile phones. NAFIS is updated through the web, and the IVR is created automatically through a Text-to-Speech engine in both Kiswahili and Kenyan English.

The system is interconnected to all the telephone service providers, thus allowing cheap calling rates by farmers as they do not pay interconnection charges. It is updated through the Web so as to enable updates by field extension officers, with the updated information being accessed through the phone, while being available on the website. The information obtained through the phone is deliberately summarised to save on the time the farmer has to spend on the call. Furthermore, this very crucial feature of NAFIS allows farmers to access regionally based information which is relevant to their agro-ecological zones. NAFIS generates audio speech automatically in both Kenyan English and Kiswahili, by subjecting the keyed in text to the Text-to-Speech engine and the audio so generated is configured into an IVR seamlessly to enable the extension officers to test the system as they continue updating it. The heart of the NAFIS innovation is the Text to Speech systems which take up the keyed–in text and converts to speech.

| **Technology**
E.g., voice, video, sms, email, GPS, multi-media

IVR | **Technical development path**
Note any past or expected changes and what impact technological change could have on the application and its viability

Complete development of NAFIS is expected to take a long time as different enterprises are built into the system one by one, and the feedback received incorporated into the system. The extension of mobile technology should increase the value and viability of the service over time. |

| **Leading Ecosystem Player**
E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent

National Agriculture & Livestock Extension Programme (NALEP) | **Lead role(s)**

Project direction and content |

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

The voice service was developed with the aim of assisting in improving agricultural output by enhancing technical support to small scale farmers who undertake most farming activities in Kenya. In Kenya, information dissemination is carried out by extension workers to the 75% of the population who are involved in farming in some way. The farming is done by small scale farmers spread out throughout the whole country. It is estimated that there are 4.5 million full time small-scale-farmers and only 40% are reached through the direct extension services offered by the government. It is for this reason that the need to explore innovative methods to enhance this reach was realised and as a result, the idea to develop a voice service (an automated IVR) for providing agricultural extension information through telephony was conceived.

Other key players	Roles	Incentives / Business model
1. Teknobyte	Lead consultants, project management	Consulting fees
2. Speechnet	Web/voice design, system integration	Consulting fees
3. Popote Wireless	System hosting and trials	Fees
4. University of Nairobi	Translation resources, studio recording, research materials	Agricultural development

Year of commencement	Maturation Cycle Position *Emerging / Expanding / Mature*	Status *E.g., Pilot / Rolling out / Established*
2008	Expanding	Established

Comment on maturation / status of development
Complete development of NAFIS is expected to take a long time as different enterprises are built into the system one by one, and the feedback received incorporated into the system.

Costs of the application & evidence of cost recovery & profit/sustainability
e.g., Development of the technical systems & content; maintenance & skills
No information available.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.
The service: • enhances farmers and producers access to markets and information on farming techniques and practices; and • improves dissemination of and access to scientific and technical information. The system is interconnected to all the telephone service providers, thus allowing cheap calling rates by farmers as they do not pay interconnection charges. It is updated through the Web so as to enable updates by field extension officers, with the updated information being accessed through the phone, while being available on the website. The information obtained through the phone is deliberately summarised to save on the time the farmer has to spend on the call. Furthermore, this very crucial feature of NAFIS allows farmers to access regionally based information which is relevant to their agro-ecological zones.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.
No information available.

SWORB *[Maybe summary of other sections]*	Strengths Voice service in English and Kiswahili	Weakness Requires constant updating of information by field officers
	Opportunity Expanding the number of services	Risks and barriers Competing mobile agricultural information services

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service
NAFIS does not substitute the extension officer or other existing sources of information, but rather enhances them. NAFIS fills in a gap in the existing information chain. NAFIS is currently offering the following benefits: • Offers critical regionally based information to farmers at the appropriate time • Creates demand for extension services by informing farmers where to get to their extension officer. • Creates a ready-made communications channel between the providers of extension services and the farmers • Enables the government to get feedback on services needed most by farmers

Replicability / hurdles / issues *Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high* This service is designed for Kenya's farmers. The lessons learned could be applied to other farmer information services, but any other country would need to adapt the system for their farmers and provide the automated voice responses in their own language or dialect.	

Further study / research questions	**Select for case study** No

Contact	**Comments on contacts made, arrangements, etc.**

Subsector *I.e., Which of Typology Subsectors* Agriculture, Fisheries & Forestry	Name of Application and References Kenya Farmer's Helpline (KenCall): • http://www.kencall.com/index.php/site/kenya_farmers_helpline/ • http://www.eastafricancsrawards.com/downloads/shortlisted/SC_%20Kencall%20Farmers%20Call%20Centre.pdf	Country(s) / Region Kenya

Segment / Activity
i.e., which Segment in the Typology

Extension services

Description of Application
Note whether it is purely information or transaction based

The service, which primarily targets individual farmers, will also be accessible to agriculture extension facilities, so as to complement existing efforts to support and engage the SHFs with detailed and varied agricultural information on how to improve production (growing, harvesting and rearing), planning (agricultural inputs and planting), negotiating and selling. KenCall expects that with the right information, farmers will be in a position to improve their yields through better farming practices or an increase in the price that can be obtained for their produce through better understanding of product demand.

The service will create a two way channel between farmers and agricultural experts by enabling farmers to obtain real-time answers in English or Swahili depending on their preference. To access it, farmers will call to register whenever they have queries, and with their details already captured, the in-house agricultural experts will provide the right solutions or call them back with feedback within 24hours.

In the event that the agricultural expert is unable to respond in real-time, the helpline agent will get in touch with the second-line agriculture expert consultants and armed with the right answer, revert to the farmer.

Technology *E.g., voice, video, sms, email, GPS, multi-media* Voice	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* Kencall has had several significant challenges in designing a customer database that can be modified as the project grows and which can track data captured through all of the modifications of the database.

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* Kencall	Lead role(s) Developed and operate the service

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

The service aims to provide agricultural and horticultural information, advice and support over the phone to small holder farmers who are living on or around the subsistence level. The service which primarily targets individual farmers will also be accessible to agriculture extension facilities, so as to complement existing efforts to support and engage the SHFs with detailed and varied agricultural information on how to improve production (growing, harvesting and rearing), planning (agricultural inputs and planting), negotiating and selling. KenCall expects that with the right information, farmers will be in a position to improve their yields through better farming practices or an increase in the price that can be obtained for their produce through better understanding of product demand.

Other key players	Roles	Incentives / Business model
1. GSM Association	Funding	Development, mobile application development
2. Rockefeller Foundation	Funding	Development

Year of commencement	Maturation Cycle Position	Status

2009	*Emerging / Expanding / Mature* Emerging	*E.g., Pilot / Rolling out / Established* Pilot

Comment on maturation / status of development

The Kenya Farmers' helpline service has been split geographically by regions and will commence with a test period in:

Central Province – Research findings shows that farmers in the central valley are early adopters to new farming techniques have an entrepreneurial mindset and have the highest ownership and use of mobile phones in the country. The main towns to be covered are Kinangop, Mai Mahiu and Kijabe.

Eastern Province – Research findings show that the Eastern district has climatic conditions closely related to other regions – North Eastern, Coastal and Rift Valley. The main areas to be covered are Athi River District and Kinanie Mathatani Division, Eastern Province.

The above areas were chosen to be in the test phase due to their proximity to the call centre and they are the areas with the most Small Holder Farmers.

The test period will involve understanding farmers' needs and identifying the queries they are most likely to ask in order to develop a FAQ. During this period, agricultural experts will go out to the field to meet and speak with the farmers, create awareness about the helpline and collect information through questionnaires for data input in the Customer Relationship Management (CRM) tool. Registered farmers will then call the helpline and get assistance from the internal agriculture experts. The test period's objective is to officially launch the helpline, roll-out and scale up across Kenya.

Costs of the application & evidence of cost recovery & profit/sustainability
e.g., Development of the technical systems & content; maintenance & skills

The overall project has a budget of $1.8 million investment over 18 months.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

The Kenya Farmer Helpline impacts small holder farmers positively by providing high quality, reliable, timely and affordable information about the best agricultural practices via mobile phone. The Kenya Farmer Helpline has already witnessed a very significant impact on smallholder farmers who have used their mobile phones to ask agricultural questions and receive answers from the call center. Farmers are already seeing the immediate benefits from the answers they receive and we are confident they will see even greater benefits as we make available detailed weather, soil type and geographic information through advanced tools form Google and other satellite mapping and imagery software providers.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

To date, KenCall has spoken with and helped well over 5,000 farmers in a relatively small geography covering Athi River, Lari, Mai Mahiu, Kinangop, Nyeri, Meru, Embu, Machakos and Kiambu.

SWORB *[Maybe summary of other sections]*	**Strengths** Easy for farmers to use, provides customized info to small farmers, multiple languages	**Weakness** Expensive to set-up system
	Opportunity Expansion throughout Kenya	**Risks and barriers** Competing farmer information services

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

Kencall fully intends to continue to roll out the project nationally. After 12 months, KenCall is expected to begin to commercialize the project investigating what revenue generation activities are viable. The clear expectation is that

this initiative will be financially self-supporting after 18 months. The application could potentially be valuable, if it is developed properly. The issue yet to be determined is sustainability. Kencall does not appear to be certain of how to ensure sustainability after the GSMA's 18 month funding commitment expires.

Replicability / hurdles / issues

Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

Developing this service appears to be complex. The call centre purchased a customer relationship management tool for the project. Kencall also formed numerous partnerships to acquire the required agricultural expertise. Overall, the investment and complexity of the service are quite high and might not be easily replicable.

Further study / research questions	Select for case study
- Has there been progress on the investigations of revenue generation potential? - Will the service be sustainable after the GSMA funding commitment expires?	Yes

Contact	Comments on contacts made, arrangements, etc.
Eric Nesbitt, Chief Operations Officer, Kencall info@kencall.com	

Subsector *I.e., Which of Typology Subsectors* Labour, Migration and Human Development	Name of Application and References Txteagle: • http://txteagle.com/about.html • http://assets.en.oreilly.com/1/event/20/txteagle_%20Crowd-Sourcing%20on%20Mobile%20Phones%20in%20the%20Developing%20World%20Presentation.pdf • http://reality.media.mit.edu/pdfs/hcii_txteagle.pdf	Country(s) / Region Kenya, Rwanda, Dominican Republic

Segment / Activity
i.e., which Segment in the Typology

Employment

Description of Application
Note whether it is purely information or transaction based

txteagle is a service that enables mobile phone subscribers to earn money and accumulate savings by completing simple micro-tasks for large corporate clients. Originally conceived as a mechanism to compensate rural Kenyan nurses, txteagle is now on track to becoming one of Africa's largest employers. txteagle serves the outsourcing industry by taking tasks traditionally completed in off-shore call center-like settings and distributing them directly to untapped knowledge labor markets. We utilize advanced statistical methods to match tasks to workers and monitor quality. Lower overhead results in greater cost savings. A wide variety of tasks are accomplishable on the txteagle platform. txteagle can either substitute for traditional outsourcing solutions or augment or partially replace existing solutions.

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS, USSD, WAP	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* Txteagle began as an SMS service, but subsequently added USSD and WAP capability. Increases in mobile usage should make the system more successful.

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* txteagle	<u>Lead</u> role(s) Developed and manage the application.

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

txteagle enables corporations to employ populations previously unable to participate in the global knowledge-based labor market. Rather than trying to move labor to the problem, txteagle delivers the task to a decentralized workforce, wherever it may be located. They use sophisticated statistical algorithms to evaluate work quality and then compensate workers in proportion to how useful their input was to creating a final solution for clients. This strategy both encourages workers to deliver the highest quality work they can, as well as reduces cost in the form of reducing the overhead associated with traditional approaches.

Other key players	Roles	Incentives / Business model
1. Mobile Planet	SMS short-code provider in Kenya	Paid to provide SMS short codes
2. Safaricom	Co-developed USSD service	Generate more network traffic through txteagle
3. MTN Rwanda	Co-developed USSD service	Generate more network traffic through txteagle
4. M-banking operators	M-Pesa and Zap can be used to "cash out" of the system	Additional network use

Year of commencement	Maturation Cycle Position *Emerging / Expanding / Mature*	Status *E.g., Pilot / Rolling out / Established*
2009	Expanding	Rolling out

Comment on maturation / status of development

The txteagle platform has been fully developed. New applications can be added. Additional development will involve more international expansion, from the initial countries of Kenya, then Rwanda then the Dominican Republic.

Available txteagle services include:

Outsourcing Services
Image Transcription, Translation, Software Localization, Audio Transcription, Internet Search, Internet Activities, Software Beta Testing

Local Information
Health Surveys/Government populace surveys, Market Research Surveys, Focus Groups

Human-in-the-Loop
Image Tagging, Video Tagging, Speech Corpus, Text Sentiment Analysis

Costs of the application & evidence of cost recovery & profit/sustainability
e.g., Development of the technical systems & content; maintenance & skills

No information available.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

txteagle is a service that enables mobile phone subscribers to earn money and accumulate savings by completing simple micro-tasks for large corporate clients. In countries such as Kenya, where mobile payment platforms are available, payment is made directly to a worker's phone after their work has been evaluated. Money can be withdrawn at mobile phone operator-run kiosks present in virtually every major village in the country.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

No information available.

SWORB *[Maybe summary of other sections]*	Strengths Versatile, system can measure quality of work	Weakness Can workers make enough for txteagle to be sole source of income
	Opportunity International expansion	Risks and barriers Competing mobile services, Mechanical Turk

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

It appears that the application is growing, though it is still early in its development. There is doubtless ample demand from mobile users in developing countries to do get paid work through their mobile phone. The question about the service's sustainability is more relevant to the employer side of the equation. Though a wide range of work can be done via txteagle, it is unclear if it will be enough for the service to succeed.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

The service is based on a platform that can be used anywhere with mobile networks. If the service can prove to potential employers that it can provide a more cost-effective way to complete work, then txteagle should grow

naturally.		
Further study / research questions		**Select for case study**
		No
Contact Nathan Eagle CEO, txteagle info@txteagle.com	**Comments on contacts made, arrangements, etc.**	

Subsector *I.e., Which of Typology Subsectors* Agriculture, Fisheries & Forestry	Name of Application and References DrumNet: • http://www.drumnet.org • http://www.prideafrica.com/assets/docs/DrumNet%20Sunflower%20Experience.pdf • http://www.ifpri.org/sites/default/files/publications/focus18_14.pdf • http://www.acorn-redecom.org/papers/acornredecom2010okello.pdf • http://www.idrc.ca/strategic_framework/ev-118204-201_103745-1-IDRC_ADM_INFO.html • http://www.idrc.ca/uploads/user-S/12759445811eAgriculture_and_eGovernment.pdf • http://www.tegemeo.org/documents/workshop/Workshop-Proceedings-Market-participation-among-women-and-the-poor-in-rural-kenya.pdf	Country(s) / Region Kenya

Segment / Activity
i.e., which Segment in the Typology Agro-marketing / Trade

Description of Application
Note whether it is purely information or transaction based DrumNet is an ICT platform with heavy use of mobile SMS, specifically tailored to creating processes that address the needs of actors in the agricultural sector. The application has a holistic view, bringing together and enabling the key actors in the value-chain to create the strong and reliable links necessary for reaping optimal benefit, and especially for agricultural producers. PRIDE AFRICA operated (piloted) the DrumNet Project from 2003 to 2009 in two different segments of Kenya's agricultural sector – the horticultural sector and the oilseed sector. It was first launched in Central Province from 2003 to 2006. There, DrumNet collaborated with Kenya Horticultural Exporters (KHE) and approximately 1,500 smallholder farmers cultivating baby corn, French beans, passion fruit, as well as other horticultural products. DrumNet worked with Bidco Oil Refineries (Bidco) and 2,000+ smallholder farmers growing sunflower oilseed from 2007 to 2009. Activities took place in Eastern, Nyanza, Rift Valley and Western Provinces during that time. In each case, Equity Bank and several farm input retailers were also involved with the project.

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* Drumnet is developing a performance management system, a crop insurance add-on, a soil analysis service and way to integrate mobile banking services such as M-Pesa and ZAP.

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* PRIDE Africa	Lead role(s) Developed and operates the application

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe) The project's main objective was the creation and piloting of a replicable, easy-to-scale model that facilitated cooperation between all the agricultural supply-chain partners – including producers, buyers and processing plant, transportation, banks, and input retailers. DrumNet utilized an integrated finance, production, delivery and payment process to drive its model, as well as an innovative ICT platform. The process promoted a set of procedures and standards that helped partners to form unique, value-adding relationships. The ICT platform provided the interactive tools to support the process, plus it tracked and reported on ongoing activities. DrumNet generated revenue from

services offered through its model.

Oilseed farmers' who were members of DrumNet were able to gain full benefit from the eco-system and they saw up to 32% increase of income, based on receiving a higher percentage of the processing plant entry gate price, due to the replacement of middlemen with the DrumNet model.

Other key players	Roles	Incentives / Business model
1. Banks (Equity Bank)	Underwrites in put loans	Interest from loan, does not have to deal with each farmer
2. Input suppliers	Linked to farmers via cash-less credit scheme	Get paid by bank
3. Buyers	Buy from farmers	Access predictable supplies

Year of commencement	Maturation Cycle Position *Emerging / Expanding / Mature*	Status *E.g., Pilot / Rolling out / Established*
2005	Mature	Established

Comment on maturation / status of development

DrumNet reported that operating DrumNet as a donor-funded entity left it prone to inconsistent cash flow and conditionality that pushed and pulled its operations in a manner incompatible with commercial development. Furthermore, DrumNet's headquarters costs remained too high throughout the pilots due to the primitive nature of its platform. For example, too much time and resources were wasted on personnel hauling paper forms from the field and then manually entering data into the DrumNet database. Costs were also high due to regular platform breakdown.

To remedy both issues, DrumNet approached several IT firms in Nairobi to discuss its commercialization through the formation of a new company. Software Technologies Ltd. (STL) was initially selected as the firm of choice. The company embarked on software development, however several hurdles were encountered and progress was halted. Reasons for the lack of success appear to have been related to the company not committing sufficient resources relative to other more lucrative opportunities it had.

DrumNet eventually formed a new corporate entity called Team Gaia Limited (TGL), which was to be a joint venture between PRIDE AFRICA and STL, and prepared a detailed Business Plan which has sought to present its opportunity going forward, to attract commercial investment. The DrumNet sponsor (PRIDE AFRICA) wishes to attract equity investment which would allow them to retain a significant share in the business going forward.

Costs of the application & evidence of cost recovery & profit/sustainability
e.g., Development of the technical systems & content; maintenance & skills

The IDRC supplied $350,000 in funding to Drumnet from 2006-2009. DrumNet reported that operating DrumNet as a donor-funded entity left it prone to inconsistent cash flow and conditionality that pushed and pulled its operations in a manner incompatible with commercial development.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

The DrumNet platform establishes a bridge between producers, buyers, farm input retailers and banks that facilitates and incentivises co-operation thus creating efficiency. The key actors in the supply chain are able to enjoy the various benefits, these are;

Producers (Smallhoder Farmers)
They are afforded reliable and profitable link to markets instead of selling produce adhoc at farm gate or local market. Farmers with the platform grow under structured agreements (contract farming) with buyers. An example of such contract financing is the oilseed (sunflower farmers') partnership with Bidco. This partnership has seen farmers' increase their income by 32%. Where farmers used brokers, they were only able to get 65% of the Bidco entry gate price, with the broker's intermediary charge, including transportation costs, amounting to approximately 35%. Farmers' in the DrumNet based eco-system received up to 86% of the entry gate price, with Bidco organizing the transportation for just 9% and a commission of 5% charged by DrumNet.

Suppliers/Farm Input Retailers
Farm input suppliers through the SMS alert on producers' input requirement can stock with an assured market through the season thus enjoying economies of scale. This increases demand for products without an added credit burden

which can result in loss of working capital and high default risk.

Financial Services Institutions
The Agriculture sector is referred to as a high-risk sector for financing especially for smallholder farmers. Financing smallholder farmers is riddled with high transaction costs making the market undesirable and underserved for financial products. With the DrumNet platform, Financial Institutions and Insurance companies are able to reduce the transactions costs due to a channelled payment system. They are also shielded from the complexity of managing large numbers of farm input loans. Also, the structured and strong links to the value-chain enabled by the DrumNet platform reduces repayment risks with connection to produce agreements/payments. This can provide for affordable loans for smallholder farmers.

Buyers
Buyers face numerous challenges in a value-chain that is not structured and introduces cumbersome scouting for farm produce and even more complex financial administration. Partnership with a partner such as DrumNet allows the buyer (e.g., leading vegetable oil company Bidco) to concentrate on their core business thus reducing costs that are not related their core business. A weakly linked value-chain is costly and has heavy reliance to brokers/trader networks that are not always able to deliver predictable quantities or qualities of produce in a traceable manner. Unreliable quantities lead to chronic supply shortfalls that increase costs of production which can inadvertently lead costly finished goods which can make them uncompetitive regionally.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

Farmers with the platform grow under structured agreements (contract farming) with buyers. An example of such contract financing is the oilseed (sunflower farmers') partnership with Bidco. This partnership has seen farmers' increase their income by 32%. Where farmers used brokers, they were only able to get 65% of the Bidco entry gate price, with the broker's intermediary charge, including transportation costs, amounting to approximately 35%. Farmers' in the DrumNet based eco-system received up to 86% of the entry gate price, with Bidco organizing the transportation for just 9% and a commission of 5% charged by DrumNet.

SWORB [Maybe summary of other sections]	**Strengths** • Experience - Well-versed in Kenya's agricultural sector and nuanced in agri supply-chain integration • Existing Relationships - Has gained confidence in the market as a good partner in agri supply-chain. Has existing relationships with large key actors(Banks, Buyers)	**Weakness** • Donor Reliance - Due to lack of donor funds, DrumNet may not be able to continue with the program.
	Opportunity • Supply-chain gap - The customer needs analysis above indicates a dire need for an integrated agri supply-chain • Government – With the new constitution, the decentralisation of central administrative roles provides a good environment for localising partnerships for localised products(crops that can only be grown in specific regions) • All-Inclusive platform - DrumNet is the only mobile application provider engaging supply-chain players from end-to-end. • Mobile Payment systems and banking – Rapid developments that have taken place in Kenya's financial infrastructure (i.e. mobile banking and agency banking, including mobile/banking partnership services such as – M-Kesho, etc.,) are making the distribution of smallholder loans and smallholder payments increasingly cheap and efficient. This creates opportunity for m-applications in agriculture such as DrumNet to be even more effective and transformative.	**Risks and barriers** • Risk – Numerous mobile applications coming into the market which is likely to dilute projected revenue. • Barriers – Long process of engaging partners. Due to the numerous players in the supply-chain, negotiations are likely to take long periods before they are finalised.

Market potential assessment

E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

PRIDE AFRICA operated (piloted) the DrumNet Project from 2003 to 2009 in two different segments of Kenya's agricultural sector – the horticultural sector and the oilseed sector. It was first launched in Central Province from 2003 to 2006. There, DrumNet collaborated with Kenya Horticultural Exporters (KHE) and approximately 1,500 smallholder farmers cultivating baby corn, French beans, passion fruit, as well as other horticultural products. DrumNet worked with Bidco Oil Refineries (Bidco) and 2,000+ smallholder farmers growing sunflower oilseed from 2007 to 2009.

Oilseed farmers' who were members of DrumNet were able to gain full benefit from the eco-system and they saw up to 32% increase of income, based on receiving a higher percentage of the processing plant entry gate price, due to the replacement of middlemen with the DrumNet model.

Replicability / hurdles / issues

Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

According to DrumNet, through the pilots, several issues became evident about the model. First, agricultural actors at the higher links of the supply-chain (e.g. buyers, agro-dealers etc) are keen to participate and actors at the lower links (e.g. farmers) can be quickly mobilized to form a large and exponentially growing producer base. Second, field costs can be kept relatively low after initial marketing and training exercises are complete. And third, although supply-chains will differ between different crops, they share general processes (e.g. input collection, produce collection, etc) that can be made more efficient through increased predictability and ICT-driven processes.

DrumNet also reported that it became clear, however, that operating DrumNet as a donor-funded entity left it prone to inconsistent cash flow and conditionality that pushed and pulled its operations in a manner incompatible with commercial development. Furthermore, DrumNet's headquarters costs remained too high throughout the pilots due to the primitive nature of its platform. For example, too much time and resources were wasted on personnel hauling paper forms from the field and then manually entering data into the DrumNet database. Costs were also high due to regular platform breakdown.

To remedy both issues, DrumNet approached several IT firms in Nairobi to discuss its commercialization through the formation of a new company. Software Technologies Ltd. (STL) was initially selected as the firm of choice. The company embarked on software development, however several hurdles were encountered and progress was halted. Reasons for the lack of success appear to have been related to the company not committing sufficient resources relative to other more lucrative opportunities it had.

DrumNet eventually formed a new corporate entity called Team Gaia Limited (TGL), which was to be a joint venture between PRIDE AFRICA and STL, and prepared a detailed Business Plan which has sought to present its opportunity going forward, to attract commercial investment. The DrumNet sponsor (PRIDE AFRICA) wishes to attract equity investment which would allow them to retain a significant share in the business going forward.

Further study / research questions	Select for case study
	Yes

Contact	Comments on contacts made, arrangements, etc.
Jonathan Campaigne Pride Africa Drumnet 39320-00623	

Subsector *I.e., Which of Typology Subsectors* Agriculture, Animal husbandry, Fisheries & Forestry	Name of Application and References 1920 (Govi Sahana Sarana): • http://www.agridept.gov.lk/other_pages.php?heading=Toll%20Free%20Agri%20Advisory%20Service • http://www.sundayobserver.lk/2007/11/18/imp01.asp • http://www.telecentre.org/profiles/blogs/research-on-mobile-phones-for • http://www.gic.gov.lk/gic/index.php?option=com_info&id=1341&task=info&lang=en • Phone conversations with Dr. Rohan Wijekoon	Country(s) / Region Sri Lanka

Segment / Activity
i.e., which Segment in the Typology

Agro-support, Extension services

Description of Application
Note whether it is purely information or transaction based

Started on February 23, 2006, 1920 (also known as "Govi Sahana Sarana") offers crop advisory and technology advice to farmers via a toll-free call to the number 1920 across all mobile and fixed operators. The service functions during office hours and is available in Sinhala or Tamil. The service was initiated by the Sri Lanka's Ministry of Agriculture as part of its Cyber Agricultural Extension Project (CAEP).

Callers from anywhere in the country can access the service by dialling "1920" from any phone. The toll free service allows farmers to avail of crop advisory information. Call centre agents that man this service respond to queries from callers using their own knowledge or by querying a database of relevant knowledge (which also stores answers to past queries). Callers are given immediate feedback over the phone whenever possible. Where problems are more complicated, call center operators refer to agriculture experts and/or relevant literature before responding to callers (usually within 72 hours). A digital database containing the list of queries received to date is also maintained for internal purposes. The service is available during office hours from 9am- 5pm, in Sinhala and Tamil.

Technology *E.g., voice, video, sms, email, GPS, multi-media* voice	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* No information available

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* Ministry of Agriculture	Lead role(s) Developed and operate the service

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

Agricultural extension services in the country have progressively weakened in the last few decades, leading to problems in technology transfer. The aim of the service is to address this issue, by helping farmers solve problems related to technical, inputs and marketing matters.

Other key players	Roles		Incentives / Business model
Year of commencement 2006	Maturation Cycle Position *Emerging / Expanding / Mature* Mature		Status *E.g., Pilot / Rolling out / Established* Established

Comment on maturation / status of development

The application is developed, but the sponsors are considering ways to increase service penetration to the North and East. Recently, video conferencing facilities were also introduced in several agrarian centers. Preparations are also being made to extend the service beyond voice, to that of email as well.

Costs of the application & evidence of cost recovery & profit/sustainability,
E.g., Development of the technical systems & content; maintenance & skills

The initial investment cost was approximately Rs. 1 million (approximately USD 10,000), while yearly operational costs are approximately Rs. 500,000 a year (equivalent to about USD 5,000 a year). The latter consists mainly of telephone bills and staff salaries. Recently, video conferencing facilities were also introduced in several agrarian centers. Preparations are also being made to extend the service beyond voice, to that of email as well. The estimated initial investment cost would be LKR 10 million (approximately USD 100,000), and the operational cost per year would be LKR 5 million (approximately USD 50,000).

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

Users benefit from regular access to free expert advice, available on both mobile and fixed telephone networks. A study by LIRNEasia has indicated that some farmers have even begun cultivation of new crops through information obtained from the 1920 hotline. There is very little demand side research to gauge how farmers are utilizing the service. A small study done around Dambulla (the location of the main wholesale agricultural market in Sri Lanka) suggests that only a third of the farmers in that district knew of the service. Increased use of mobile phones in the country as well as demand for immediate feedback on queries can be seen as two success factors that have led to its implementation in Sri Lanka.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

No information available.

SWORB [Maybe summary of other sections]	Strengths	Weakness
	• Unique service in the country that provides crop advisory services on an individual basis.	• Limited funding limits the operating hours as well as the number of requests that they can handle.
	Opportunity	**Risks and barriers**
	• There is evidence to suggest that farmers are willing to pay for these kinds of services. If a sustainable business model were introduced the service could be scaled up much more quickly. • Exploring partnerships with Tradenet would give the services access to additional delivery channels (WAP, SMS and USSD). • Opportunity for donor funding to scale up this operation and assist in business development	• Dependent on government funding. No clear indication of government's commitment to scaling up the service.

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

Over a period of 15 months, till May 2007, the service had received approximately 40,000 calls. Currently the service receives about 200 calls a day and the trend has been increasing year on year (exact figures were not available) with an average call time of about 5 to 10 minutes. There is evidence to suggest that the actual demand for the services is much higher since a lot of callers report getting an engaged tone when trying to reach the service. The service is only

available on weekdays from 9am to 5pm, which is seen as inadequate by farmers who would prefer to have the option to access this service in the evenings after they return home from their farmlands.

Replicability / hurdles / issues

Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

The Department of Agriculture is, at the time of writing of this report, awaiting feedback on a proposal submitted to the Government of India to increase service penetration to the North and East. At present, Tamil-speaking call center operators aren't familiar with crops grown in these areas, and hence the proposal, if successful, can help address this problem.

Recently, video conferencing facilities were also introduced in several agrarian centers. Preparations are also being made to extend the service beyond voice, to that of email as well. The estimated initial investment cost would be LKR 10 million (approximately USD 100,000), and the operational cost per year would be LKR 5 million (approximately USD 50,000).

Further study / research questions	Select for case study
- Have there been any studies of quantifiable benefits to citizens and/or the government? - Does the service generate any revenue for the government? - Are there plans to expand the services available or upgrade the technology?	Yes

Contact	Comments on contacts made, arrangements, etc.
K.N. Mankotte Director, Extension and Training, Agriculture Extention and Training	

Subsector *I.e., Which of Typology Subsectors* Rural Finance, Infrastructure & ICT	Name of Application and References Zero (ZMF): • http://www.alittleworld.com/htmls/zero/platform.html • http://www.inclusion.in/index.php?option=com_content&view=article&id=368&Itemid=97 • http://in.biz.yahoo.com/100802/50/baw1v7.html • http://www.thehindubusinessline.com/ew/2010/06/07/stories/2010060750040100.htm • http://www.cseindia.org/content/bank-your-doorstep • http://www.financialexpress.com/news/mass-banking-through-the-mobile/564150/0	Country(s) / Region India

Segment / Activity
i.e., which Segment in the Typology

Mobile money, mobile banking

Description of Application
Note whether it is purely information or transaction based

The ZERO platform converts new generation low cost NFC (Near Field Communication) mobile phones with large storage capacities as a secure, self-sufficient bank branch, with biometrics based customer ID, for customer enrollments for no-frills accounts and all types of transactions in the village with the local Customer Service Point operator acting as a Teller. Existing Mobile communications networks are used for all transaction uploads, downloads and application updates. The ZERO platform is used by many leading banks to implement financial inclusion initiative. ZERO collaborates with leading banks and banking regulators, and the government to identify opportunities and bring about consensus on standards and processes for financial inclusion. mZERO (mobile version of ZERO) is available as a self-service payment option for customers on the mobile phone SIM to enable both over-the-counter and remote payments. The Zero Mass Foundation (ZMF) creates the last mile operations network in villages, under pre-defined service agreements with Banks and front-ends the delivery of full-featured transactional services on behalf of Banks for Financial Inclusion on the ground.

Examples of how the Zero platform is being used today:

1. Andhra Pradesh
The Foundation, in partnership with six banks and a technology company called A Little World, has started a service that enables the Government to implement its flagship National Old Age Pension Scheme and the National Rural Employment Guarantee Scheme (NREGS) across 10 districts in Andhra Pradesh. In each district, several Customer Service Points (CSPs) have been created by selecting women from the local self-help groups who are given a kit consisting of a special mobile phone and accessories. These kits can process banking transactions such as deposits and withdrawals electronically, through real-time exchange of information with the bank's database at the backend. A biometric scanner to read fingerprints makes the transaction secure. A printer is connected to the phone. The system has become so successful that ZMF has now appointed nearly 6,000 CSPs serving a total of 1.5 million NREGS payees, 0.7 million pensioners and nearly 0.7 million rural citizens who have opened accounts under the financial inclusion programme.

2. Orissa
Zero Mass Foundation is the business correspondent for Orissa's pilot project which started in November 2009. The foundation hires representatives in villages, whom they call customer service providers. Each beneficiary also has an identity card called the SBI tiny card. This carries details of the beneficiary, along with the zero security number, a unique id, which acts as the first level of identity proof. Usually, the junior engineer at the work site concerned sends weekly bills to the panchayats, along with the work schedule. The schedule lists the quantum of work and the due wages. The sarpanch and the customer service provider issue a cheque to the nearest SBI branch, along with a copy of the work schedule and the wages due. The branch credits the amount mentioned into the beneficiary's account, which automatically gets transferred to the Zero Mass Foundation's account. The foundation then transfers the money to the customer service provider who withdraws it and makes the payment.

Technology *E.g., voice, video, sms, email, GPS, multi-media*	Technical development path *Note any past or expected changes and what impact*

SMS, NFC, biometrics	*technological change could have on the application and its viability* Further development of SMS, NFC and biometrics could enhance the services' viability

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* Zero Mass Foundation	**Lead role(s)** Creates the last mile operations network in villages, under pre-defined service agreements with Banks and front-ends the delivery of full-featured transactional services on behalf of Banks for Financial Inclusion on the ground.

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

The ZERO platform converts new generation low cost NFC (Near Field Communication) mobile phones with large storage capacities as a secure, self-sufficient bank branch, with biometrics based customer ID, for customer enrollments for no-frills accounts and all types of transactions in the village with the local Customer Service Point operator acting as a Teller. The platform is intended to serve people in rural areas who are not well-served by conventional financial service providers.

Other key players 1. Financial institutions	**Roles** Provide financial services offered through Zero	**Incentives / Business model** Increase customer base

Year of commencement ?	**Maturation Cycle Position** *Emerging / Expanding / Mature* Emerging	**Status** *E.g., Pilot / Rolling out / Established* Pilot

Comment on maturation / status of development

Pilot projects have been carried out in Andhra Pradesh, Karnataka, Tamil Nadu, Maharastra, Jharkhand, Orissa, Bihar, New Delhi, Rajasthan, Mizoram, Meghalaya, Assam, Uttarakhand, West Bengal, Punjab and Gujarat in partnership with State Bank of India, State Bank of Hyderabad, Punjab National Bank, Canara Bank, Bank of Baroda, Development Credit Bank, Andhra Bank, Andhra Pradesh Grameen Vikas Bank, Nainital Bank, Union Bank of India and Axis Bank.

Costs of the application & evidence of cost recovery & profit/sustainability,
E.g., Development of the technical systems & content; maintenance & skills

No information available.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

About 250,000 customers have enrolled with the State Bank of India and about 100,000 with the other banks.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

No information available.

SWORB *[Maybe summary of other sections]*	**Strengths** Secure, extends financial services	**Weakness** Cost of the system
	Opportunity Geographic expansion, expanded partnerships with financial institutions	**Risks and barriers** Cost

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

ZMF operates in 127 districts across 26 states in India. It has appointed nearly 6,000 Customer Service Points, serving 15 lakh MGREGS payees and 70 lakh pensioners and nearly 70 lakh rural citizens who have opened bank accounts under the financial inclusion programme. The bulk of the accounts are in ten districts of Andhra Pradesh, but there is significant pilot- level activity in Meghalaya, Uttarakhand and West Bengal.

According to the Reserve Bank of India in mid-2010, A Little World (ALW) and its non-profit partner Zero Mass Foundation have opened about 4 million accounts as business correspondents for 20 banks.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

The project is based on a hosted application service provider (ASP) model, which is scalable to a large segment of the population. The ZERO platform absorbs the dependencies of interfacing with multiple banking and mobile systems, hence provides a plug-and-play access to banks to roll out their services using the platform. The project has been replicated by various leading banks in a short period of time.

The developer has been keeping pace with the project by creating new products like mZERO (using the SIM card of the customer as a payment card in partnership with SmartTrust, Sweden), virtual card (using the NFC phone to securely create and store payment card of multiple customers, hence reducing the cost acquisition of customers), finger print registration and verification using mobile phones, etc.

Based on the Orissa pilot, cost though is a deterrent and the reason the pilot project was restricted to 986 panchayats in Ganjam, Gajapati and Mayurbhanj districts, and one panchayat each in Bhadrak and Jajpur districts. The pilot was planned in 1,000 gram panchayats in 10 districts. Bank officials conceded that because of these problems, except in Ganjam, things had not moved beyond the enrolment stage. SBI pays Rs 2,000 per customer service provider to the foundation. About 700 of them are active. The foundation keeps Rs 500 towards its cost and gives the rest to the service provider. Then there is the customized device, which costs Rs 25,000. The service provider makes a down payment of Rs 5,000 for the device to the foundation; the rest is deducted in 36 easy instalments from the service provider's salary.

Further study / research questions	**Select for case study**
	No

Contact	**Comments on contacts made, arrangements, etc.**

Subsector *I.e., Which of Typology Subsectors* Agriculture, Animal husbandry, Fisheries & Forestry	Name of Application and References Mandi Bhav: • http://www.mobilebehavior.com/2009/07/08/indias-agricultural-revolution-goes-mobile-with-mandi-bhav • http://lirneasia.net/wp-content/uploads/2008/05/Mobile-2.0_AgInfo.pdf • http://www.trai.gov.in/NFCNPrts/session5/1-nEERAJM.pdf (p.10) • http://www.impetus.com/mandi_bhav • http://voicendata.ciol.com/content/news/109102701.asp	Country(s) / Region India

Segment / Activity
i.e., which Segment in the Typology

Agro-marketing / trade

Description of Application
Note whether it is purely information or transaction based

Tata Teleservices (TTSL) partnered with Impetus Technologies to launch a Mandi Bhav as a VAS targeting rural farmers. Via this service, subscribers on the Tata Indicom network can get real-time spot market prices on 500 commodities from over 3,000 mandis across India. The service is targeted towards farmers and agricultural commodity traders who need updated information on current prices of various commodities across the country. Launched in early 2009, the service was initially available in Hindi, Marathi and English in the state of Punjab. Since then it has expanded into Haryana, Himachal Pradesh, Uttar Pradesh and Maharashtra and is to be available in up to 9 languages. The service costs INR 30/month. The product is available in 3 flavors: EasySMS, MandiBhav WAP and MandiBhav native application (downloadable application).

With the support of India's largest carriers and the execution of a rural marketing strategy to reach a potential market of 120 million farmers and 8 million purchasing agents, 'Mandi Bhav' can be a game-changer for India's agricultural sector and can help instigate a real mobile revolution.

Technology *E.g., voice, video, sms, email, GPS, multi-media* WAP, SMS, software application	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* Further penetration of WAP and increased mobile penetration could improve viability

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* Tata Teleservices	Lead role(s) Supports the service through it's network.

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

The service is targeted towards farmers and agricultural commodity traders who need updated information on current prices of various commodities across the country.

Other key players	Roles	Incentives / Business model
1. Impetus Technologies	Developed the app	Selling applications
2. Organizations that collect pricing information	Information gathering	Paid for information

Year of commencement 2009	Maturation Cycle Position *Emerging / Expanding / Mature* Expanding	Status *E.g., Pilot / Rolling out / Established* Rolling out

Comment on maturation / status of development
The application was release in January 2009.

Costs of the application & evidence of cost recovery & profit/sustainability, *E.g., Development of the technical systems & content; maintenance & skills*
No information available.

Description of benefit & impact for beneficiaries *Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.*
Benefits: • Mandi bhav provides the latest & updated information on commodity prices so that farmers are able to sell their produce at the right price • Avoid being cheated by middle men • Information sourced from reliable sources – UP Mandi Parishad Mandi Bhav could be a retention tool/new subscriber acquisition tool rather than a revenue generating tool.

Quantifiable benefits *Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.*
No information available.

SWORB *[Maybe summary of other sections]*	**Strengths** Updated, local market pricing	**Weakness** Complexity of data gathering
	Opportunity Geographic/market expansion	**Risks and barriers** Competitive services

Market potential assessment *E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service*
With the support of India's largest carriers and the execution of a rural marketing strategy to reach a potential market of 120 million farmers and 8 million purchasing agents, 'Mandi Bhav' can be a game-changer for India's agricultural sector and can help instigate a real mobile revolution.

Replicability / hurdles / issues *Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high*
Between Mandi and farmers around half a dozen middlemen come into picture. So the Mandi bhav would be relevant to the handful of middlemen who sell directly in the Mandi. How real time and precise the service would be is again a question?

Further study / research questions	**Select for case study** No

Contact	**Comments on contacts made, arrangements, etc.**
Pankaj Mittal Sr.Vice President & CTO Impetus Technologies	

Subsector *I.e., Which of Typology Subsectors* Agriculture, Animal husbandry, Fisheries & Forestry	Name of Application and References KRIBHCO Reliance Kisan Limited: • http://kribhco.net • http://www.rcom.co.in/rcom/StoreLocator/press_release_detail.jsp?id=335 • http://lirneasia.net/wp-content/uploads/2008/05/Mobile-2.0_AgInfo.pdf	Country(s) / Region India

Segment / Activity
i.e., which Segment in the Typology

Agro-marketing / trade

Description of Application
Note whether it is purely information or transaction based

Reliance Telecommunications and Krishak Bharati Cooperative Limited (KRIBHCO), a fertilizer producing cooperative, formed a joint venture in June 2009, called KRIBHCO Reliance Kisan Ltd. This JV was again primarily a rural distribution model for telecom and non-telecom products. In structure this is similar to the IFFCO Kisan Sanchar Ltd's service. However desk research has revealed limited information on the nature of the value added services targeting market price dissemination via this system. Reliance did in late 2009 announce a full suite of upcoming VAS targeting mGov services in Maharashtra and Kerala which would include market price information as well.

Technology *E.g., voice, video, sms, email, GPS, multi-media* No information available.	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* No information available.

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* KRIBHCO Reliance Kisan	Lead role(s) No information available.

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

No information available.

Other key players	Roles	Incentives / Business model

Year of commencement 2009	Maturation Cycle Position *Emerging / Expanding / Mature* Emerging	Status *E.g., Pilot / Rolling out / Established* Pre-Pilot

Comment on maturation / status of development

No information available.

Costs of the application & evidence of cost recovery & profit/sustainability,
E.g., Development of the technical systems & content; maintenance & skills

No information available.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

No information available.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

No information available.

| **SWORB** *[Maybe summary of other sections]* | **Strengths** | **Weakness** |
| | **Opportunity** | **Risks and barriers** |

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

No information available.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

No information available.

| **Further study / research questions** | **Select for case study** |
| | No |

| **Contact** | **Comments on contacts made, arrangements, etc.** |

Subsector	Name of Application & Ref. links	Country(s) / Region
Governance	Mamayan Muna- Text CSC: • http://www.csc.gov.ph/cscweb/MMOUweb.html • http://www.facebook.com/pages/Mamayan-Muna-Citizens-First-Hindi-Mamaya-Na-Not-Later/126661917359437 • *Lallana, E. (2004) TXT CSC: SMS Service for the Philippines Civil Service Commission (accessed Sept 1)* • http://www.egov4dev.org/mgovernment/resources/case/txtcsc.shtml • Colobong, MR., Galenzoga, GM, Quintans, AR, Sbalburo, SM (2009, unpublished). Mobile Governance in the Philippines: An Assessment of Its role in enhancing participation and Responsiveness. PhilICT Grant Report.	Philippines

Segment / Activity
i.e., which segment in the Typology
E-Government and administration relevant to rural development

Description of Application
E.g., Sale of crop insurance to farmers with seed purchase via m-Pesa. Note whether it is purely information or transaction based
The Text CSC is a support mechanism of the Mamamayan Muna flagship program of the Civil Service Commission (CSC) under the Public Assistance and Information Office (PAIO). It seeks to provide improvement on government frontline services, act on requests, recommendations, complaints and other concerns of the citizen in an upfront, courteous, and efficient manner.

Technology *E.g., voice, video, sms, email, GPS, multi-media*	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability*
SMS, Facebook, Telephone, radio, drop-box	Feedback used to be received through drop boxes, and then a telephone line was also opened to get feedback. Currently, the application uses SMS, but increasingly some government agencies are also using Facebook and Twitter to get citizen feedback, including the Civil Service.

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* Government- Civil Service Commission	Lead role(s) TXT CSC is run in-house on a limited budget, with an equivalent of one full-time staff member using one PC with a database. This is hosted in its Public Assistance and Information Office. Its responses to text messages are personalised/customised to the complaint or query. As a matter of policy the CSC must respond to queries and complaints within the day. The Commission is generally able to respond quickly to queries and complaints about other agencies because of pre-existing relationships with these various agencies. It also helps that CSC has supervisory power over all government employees. Nonetheless, CSC is not always able to meet the one-day deadline because of the complexities of interacting with other agencies, and its response time could be better if it had online access to other public agencies (Lallana 2004).

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

Other key players	Roles	Incentives / Business model
1. Radio stations	Advertising/plugs/Marketing	Access to Content/Guesting of Public Officials
2. Other Government agencies	Addressing citizen complaints/concerns that the Text CSC forwards to them through formal letters.	Improving services; addressing problems; service improvement

Year of commencement	Maturation Cycle Position	Status
2001	Mature	Established and still operational; pursuing a call center model in the near future.

Comment on maturation / status of development

The CSC was recently granted funding through the e-Government fund to develop their model into a call center operation. They are working with the Department of Science and Technology's Applied Science and Technology Institute for this. Funding for the project is Php54M, which will cover infrastructure and equipment expenses. According to Director Agamata, this would help them analyze the data and requests more systematically.

At present, the current system has 'upgraded' to a more 'advanced' phone, that allows for easier texting/replies. Aside from this, all it requires is a personal computer, one cellphone lines, and one dedicated staff assigned to answer the requests and prepare letters to the agencies that are being reported.

Costs of the application & evidence of cost recovery & profit/sustainability,
E.g., Development of the technical systems & content; maintenance & skills

The number of text CSC is (0917-TEXTCSC or 0917-8398272). The service charges Php1.00 per text message sent by the citizen to the system, although with unlimited texting packages, this could now be lower.

The CSC maintains its own database and stores and handles all messages in their computers for the program. This database, however, is not directly linked to cellphone, and is manually re-typed by the staff assigned.

The text service uses a mobile phone attached to the computer to receive and store messages. When the staff is not in the office, they can also reply directly to requests through the mobile handset itself.

The mobile phone service provider is Globe Telecom which waived the Php1,200.00 monthly post paid subscription fee and provided the mobile phone unit. The CSC originally spent about Php400.00 monthly (Colobong et.al 2009) as maintenance for texting outside the Globe Telecom network, and have since upgraded this plan to around Php700/month (Agamata 2010). They also pay the amount they use in excess of their subscription plan. Since it is part of the Mamamayan Muna Program, the money used in maintaining the system comes from regular funds appropriated to the PAIO. No new personnel was hired for the Text CSC since one existing personnel from PAIO was given the responsibility over responding to Text CSC concerns. (Colobong et al 2009).

Part of the reason is that CSC is not using a fee-sharing arrangement with an application service provider or cellular service provider, as its sister public agency is. CSC resisted suggestions from the cellular service provider to adopt a fee-sharing arrangement as they did not believe the TXT CSC service would generate enough traffic to make fee-sharing work. They also wanted the lowest possible price for the service. The Commission also found the menu-driven system being proposed by the service provider to be too complicated. They believed that texters would want the quickest way to send their message to CSC and would not want to spend time navigating through menus. (Lallana 2004)

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

The target users are all citizens who deal with the government. The system specifically provides information and address concerns on: 1. Civil Service Exam related matters, 2. CSC Policies, 3. Complaints regarding dishonesty, use of government vehicle, office and systems procedures, irregularities in personnel actions 4. Request for assistance in the follow-up of documents, complaints, and assistance, 5. Commendation of government employees 6. Suggestions.

No text format is required, and the CSC does not send automated replies to the users. Instead all messages are responded to by the action officer in charge of the Text CSC. Response time usually varies. For cases where the query is easy and does not require research or coordination with other offices, they respond immediately, usually under 8 minutes (according to the Citizen's Charter of the CSC). Messages requiring research and coordination are usually responded to as soon as possible. Needless to say all messages sent to the CSC are responded to by the end of the day. The action officer can only receive thirty (30) text messages at a time since the mobile phone unit they use can only accommodate that much. The messages upon receipt are however transferred and stored

in the computer.

The Text CSC is an Immediate Response mechanism of the CSC that involves prompt action from the agency as well as other concerned government office. The user sends a message to the system. The action officer upon receipt of the message responds and coordinates, if necessary, with concerned agencies to address the concern of the individual.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

When it was launched, and in spite of minimal public announcements and promotions, Lallana (2004) reported that TXT CSC was receiving an average of 1,000 to 1,500 messages per month: which was among the highest of the government's various SMS-based information/complaint services. A follow up m-governance study by Colobong et.al. (2009) showed that this monthly average was maintained, as the program received a total of 12,054 messages in 2008 (Colobong, et.al 2009) (See Figure 1).

Figure 1 No. of Messages Received (2008)
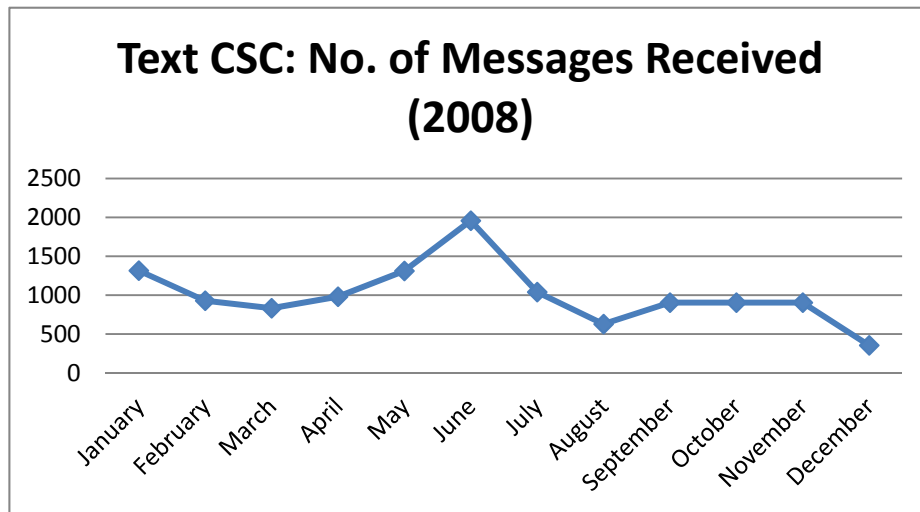
In terms of the nature of messages the service received in 2008, 49% were Requests for assistance in transactions with other government agencies while 39% result from further interaction through SMS with the action officer (See Figure 2).

Figure 2 Distribution of Messages Received According to Nature

Text CSC: Distribution of Messages Received According to Nature

- Complaints 2%
- Other Details of Text Messages 39%
- Request for Assistance 49%
- Query 6%
- For Information 1%
- Commendation /Apprciation 3%
- Suggestions 0%
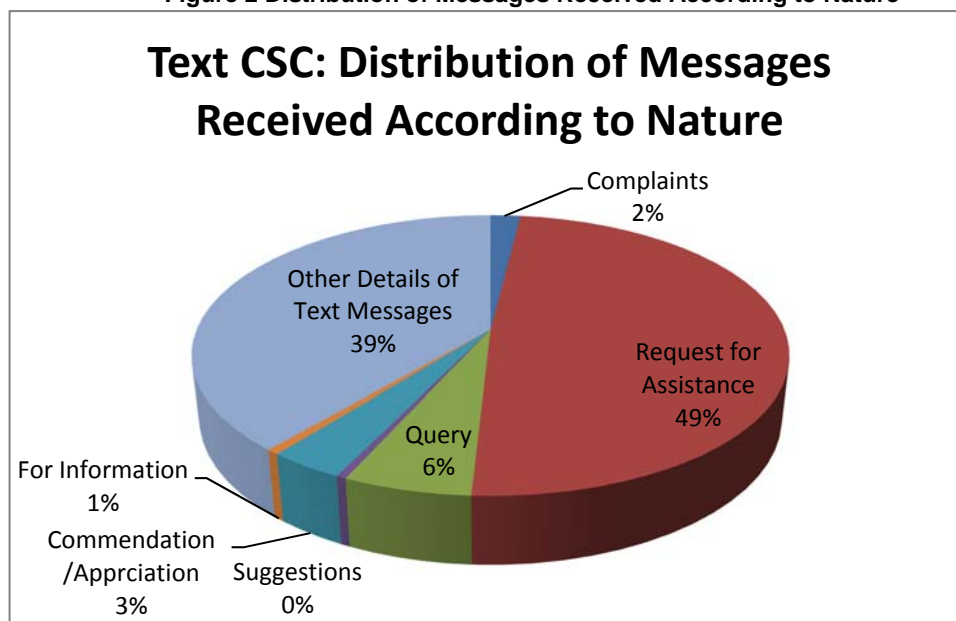
Since the service is housed in CSC itself, the staff is able to access needed manuals and people in order to answer the text messages it receives. Since the messages received are in free-form, there is no automatic answers to queries, although immediate replies acknowledging receipt is sent back. Tracking of these requests/complaints are done manually, even though they are stored in a computer database. Queries include questions about CSC testing schedules and results, complaints could include graft and corruption, government systems and procedures and unofficial use of government vehicles.

In terms of complaints and requests that were coursed through Mamayan MUna (of which Text CSC is part of) that were acted upon within 3 working days, the agency reports that all 4,236 requests were addressed in 2009, and at present 5125 of the 5446 complaints for 2010 has been addressed.

To get an idea of the amount of traffic the text center receives in proportion to other modes of feedback (walk-in, phone-in, written, email), text messages comprised 62.5% of the sources of reports (total 323 of 516) received from January – June 2010. Majority of these complaints pertained to office systems and procedures (272 of 516).

According to Director Agamata, one advantage working for CSC is that it is a highly trusted institution in government, and as such letters from it is acted upon with urgency by government departments and units.

SWORB [Maybe summary of other sections]	**Strengths** • Cheap for both citizens and government provider; cell phones are accessible to almost everyone, everywhere. • Anonymity/non-use of voice encourages reporting. • High trust enjoyed by the implementing agency (CSC) among citizens and government units. It can compel other government agencies to answer its requests.		**Weakness** • Not well marketed, or marketing is not sustained; Number not easy to recall • System is not fully automated. Hence reporting and analysis of data is still manually done. • Also, their system is not integrated with systems in other government agencies. Hence reporting and follow-up with other agencies is still paper based.
	Opportunity Integrating the system with other agencies with own complaints/queries	**Risks** • New technologies such as Twitter and Facebook are trendier and may get more support from other agencies as a medium. • Anonymity can lead to harassment through false/made-up/unsubstantiated complaints.	**Barriers** Support from other agencies

Market potential assessment *E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service* Given its cost, its relatively easy to maintain. If volume increases further, it may entail more people to involve since the service is not automated and requires some coordination.	

Replicability / hurdles / issues *Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high* Replicability is relatively easy. SMS/texting is increasingly becoming common in many places in the world, although perhaps it may be a barrier to places where literary and alphanumeric symbols are not used. Accessibility to the service is also dependent on the roll-out of mobile services. While interconnection can simplify things, another option is having alternative numbers depending on the provider.	

Further study / research questions	**Select for case study**
• Which agencies have received the most complaints? • Are there records of actions taken regarding these complaints?	Yes

Contact	**Comments on contacts made, arrangements, etc.**
Dir. Maria Luisa Salonga-Agamata Public Assistance and Information Office Civil Service Commission, Batasan Hills, Diliman, Quezon City Fax: 932-0179	Director Agamata was interviewed on September 22, 2010 at her office in the Civil Service Commission.

Subsector	Name of Application & Ref. links	Country(s) / Region
Agriculture	Farmers' Text Center (FTC) : • http://www.philstar.com/Article.aspx?articleId=600634&publicationSubCategoryId=77 • Saliendres, M. (2009) K-Agrinet: Utilizing ICT for Philippine Agriculture. ICT4D.ph, Department of Science and Techology. • Alampay, E. & Cruz, R. (2010-unpublished) ICT and Participation in the Philippines- research report prepared for IT for Change and UNDP • Pascua, S., Zagado R., Asis, Olive, Domingo, Oliver, Maloles, J. "Enhancing Knowledge Networking through Short Messaging Service: The Farmers' Text Center Experience." Philippine Rice Research Institute, 2010	Philippines

Segment / Activity

Extension Service/ agro-support

Description of Application

E.g., Sale of crop insurance to farmers with seed purchase via m-Pesa. Note whether it is purely information or transaction based

The Farmer's Text Center (FTC) is an-SMS based service for answering agriculture related queries.

In general, the FTC provides technical assistance and promotes rice and rice-based technologies to farmers, extension workers and relevant stakeholders. Specifically, the FTC answers queries on rice and rice-based farm production through SMS. This includes providing technological updates on rice and rice-based productions to farmers and clients, information on demand service for rice varietal characteristics and; creating a network/ market for farmers and clients to meet.

Technology	Technical development path
E.g., voice, video, sms, email, GPS, multi-media SMS, computer, internet, GSM modem and sim-based software	The system has had a number of 'evolutions'. Originally it used only a crude version with a cell phone. Then it used it in combination with a computer database, allowing operators to answer through computers. Payment and hosting systems has also evolved to make operations more affordable to clients and more sustainable for the host agency. (see details below)

Leading	**Lead** role(s)

Ecosystem Player PhilRice (Government)	Hosts the texting service operations then farms out queries to agricultural experts depending on the difficulty of queries. Frequently asked queries can be addressed more rapidly by operators. PhilRice co-owns and provides the funding support for the FTC.

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

The rationale behind FTC was to provide rice production technology to farmers. The platform was designed to provide an information resource and market system for farmers to inquire on rice-related queries and rice varietal characteristics, communicate with rice-clients and receive rice-based technological updates. By means of SMS technology, the FTC is expected to improve rice productivity among farmers.

The FTC is owned by PhilRice and partner-agencies and SUCs. It was iinitially funded by PhilRice through the K-Agrinet Program. Further funding support for the seed stock inventory service was generated from PAN Asia. With the conclusion of the K-Agrinet program, FTC, at present, primarily receives financial support from PhilRice.

Some features of the FTC can be considered as a transactional model, even as some services are provided for free. For the transactional model, every SMS of farmers sent to the FTC will cost them P1.00 unless they are enrolled to Smart's unlimited text scheme. Non-transactional services (typhoon warnings, rice technology tips) are provided for free (no fees) for the farmers. To receive these tips, farmers' have to register their names and cellphone numbers. Other than this, every SMS a farmer sends to the FTC is charged at P1.00.

Currently, Philrice is not earning a profit from the FTC. They tried to negotiate with a Teclo (Smart) regarding this. In December 2005, they tried their helpdesk service (700RICE Text Center). According to the telco, when they have attained a certain number of SMS received, they will be earning profits. Yet, the 700RICE was not that successful since it costs P2.50/SMS for farmers. Hence, this did not generate enough SMS traffic for the project to earn a profit. As such, the pricing has to be balanced with the primary service objectives of the program. As such, there was no payback period considered in the design of the fees for the project.

Other key players	Roles	Incentives / Business model
1. State Universities and Agricultural schools	Knowledge/resource base/Marketing	Resource/knowledge base
2. Department of Agriculture	Network of extension workers can serve as marketing mechanism	Platform/service for extension workers
3. Telcos, GiveMeUnlimited, Inc (SMS platform)	Infrastructure/software provider	SMS charges, One-time fee for system installation
4. *Commission on ICTs and PAN-Asia (IDRC)*	Initial funding support	Support for ICT pilots
5. Smart Telecommunications (telecom provider)	Infrastructure/ SMS service provider	SMS charges (Php0.50/message sent out), aside from SMS charges for SMS to the number by SMART users

Year of commencement	Maturation Cycle Position	Status
September 2004	Mature	Established

Comment on maturation / status of development

The texting service was tested on Sept 2, and response was within 5 mins. This signifies the project is still operational. Inquiry regarding possible overlaps with Nutrient Manager program was answered promptly (within 3 minutes). Philrice is actually helping IRRI promote the software to farmers and agricultural technicians. The two are complementary, the software was developed by IRRI, and they allow Philrice to use it, and Philrice also helps promote it.

Costs of the application & evidence of cost recovery & profit/sustainability,
E.g., Development of the technical systems & content; maintenance & skills

PhilRice initiated the service with funding coming from the Commission on Information and Communications

Technology (CICT) under the K-Agrinet program. Also, the first program director was able to get funding from PAN Asia for the seed stock inventory service of the FTC. Since the K-Agrinet program has ended, the service is being funded now by PhilRice.

The FTC is owned by PhilRice with its partner-agencies and state universities and colleges (SUCs).

The 'texting service' officially started in 2004. It started using a *NOKIA 3210* in receiving text messages from the farmers. The first clients of the project were the participants of a basic ICT training course that Philrice was running on the use of computer and the Internet from 5 pilot sites.

Its initial clients were comprised of approximately 150 people spread out in 5 communities nationwide. Most of them were extension workers who worked under their respective local government units. Initially, most of the text messages received then were about hybrid rice, nutrient management and rice production The original set-up as a crude and manual system. But even then, the queries were usually responded to within the day (or one to two days at most).

By August 2005, OPAPA started using a GSM platform that was developed by the Department of Science and Technology (DOST) - ASTI. OPAPA staff was actively involved in the process of programming the software. The system was web-based: whenever farmers send a text message it is received through a server, which then goes to a computer. Text agents then accessed the web to read messages. They then replied and answered on the computer. The advantage of this method was the ease in replying. Prior to this, documentation was 'manually' done--- text agent would receive the message on the cell phone and then re-encode them on the word processor in the computer. Their responses were also done using the cell phone. Under the new system, everything, including the replies, was done using the computer. However, in the initial stages, the system was not yet that stable, as errors and bugs were often encountered.

During this phase, they were using a fixed plan (post-paid) with SMART as cell phone service provider. Under this set-up, every message they sent cost the project 50 centavos. On the other hand, for farmers, every message sent cost P1.00 on their part. Messages received did not have any charges for either party. At present, the same cost structure applies.

In December 2005, the project hooked up with SMART Telecoms and developed the 700RICE SMS-based system. The infrastructure, however, was located with SMART communications and this was implemented while the other GSM system was being run simultaneously. Hence, aside from the old cell phone number, OPAPA was also using the 700RICE number.

The advantage of the 700RICE system was that the system architecture was already complete unlike the GSM platform developed by ASTI that was still a work in progress. In this arrangement SMART provided the platform and infrastructure, while Philrice provided the message and content.

In this system, the client, who sends a text message, had to follow a proper syntax. They had to type: PALAY_ before writing the question and then sending the message to 700RICE (or 7007423). In this arrangement, there was no cost for Philrice to send messages, however, the cost for the farmer was higher at P2.50 per message. Another drawback was the lack of flexibility under that system, in particular with replying to messages being sent by farmers. With 700RICE, the system could only send one message per user, after which the system will report that the query had been answered already.

In the older GSM platform replies could be customized and additional information could be sent. It was also a problem for non-SMART users. As such, for a short period the two systems were being used together, until Philrice found a better GSM platform.

The 700RICE was used until April 2006[1]. However, when GSM of ASTI no longer worked Philrice purchased an SMS platform in January 2006 called Give me Unlimited SMS platform. The system along with the hardware cost them a one-time payment of Php 100,000. It was similar to the program ASTI was trying to develop, but in this case coding was already complete with the features to send SMS, Inbox folders and documentation. The system allowed 'unlimited messages', which meant the system can handle unlimited messages to receive and send.[2] Also, in this new system, when farmers texted, they were charged only P1.00, while for Philrice the cost to send was 50c. Hence, for a time, OPAPA contemplated converting contacts in Give me Unlimited to 700RICE because of this cost consideration where

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[1] It was active for a longer period that year.

[2] Some older text system literally went to a cell phone where there is limited memory space. This was a problem before in the early development of TextGMA, a texting service for the office of the President of the Philippines.

all the costs were the burden of the client. Eventually, OPAPA decided to use the Give me Unlimited because they received feedback that some farmers was confused with the 700RICE number, found the syntax that was required more difficult, aside from the service being more expensive for the farmer.

Under the present set-up, there is a free form in the SMS queries they receive. The current system allows them to write in any format they like and simply send the message to the following number: 09209111398. The free form of texting, allows them greater flexibility in answering all queries. What it requires, however, are very knowledgeable and well-trained texting center operators who would serve as the first line of knowledge experts who can either: 1) answer common questions; 2) route specialized questions to designated categories with assigned experts; 3) route special questions to other experts within the consortia.

Operational costs
This February 2010, the project transferred the sim and web hosting in Manila which costs P65,000 annually. In theory, however the project can be hosted at PhilRice (in Nueva Ecija) if the internet connection gets better. The prject currently has 7 text agents though they are not full-time agents. About P116,000 per month is the total salary for 7 agents though they are also involved in other projects and activities.

For the telecommunications bill, Philrice spends between P8,000-P13,000 for this quarter, although they once paid more than P20,000 for one month in 2010. This, monthly cost would be dependent on the number of texts messages sent out. SMART telecom charges P0.50 per message sent. FTC also pays for the call diverts from the modem of the infotext to another number. The modem of the system is connected in the computer located inside a server room.

There is no price for the users, except for the text charged by the telecommunication provider. Otherwise, this is a completely free service for the users (farmers, extension workers, etc.).

To summarize, the operations of FTC are financially sustained by PhilRice. The operational cost of FTC include: P100,000 (est.) for the InfoTXT SMS platform, an annual fee of P65,000 for the sim and web hosting (there are plans to host FTC under PhilRice once the internet connection has improved), P116,000 monthly salary of the 7 text agents and P0.50/SMS fee charged by Smart.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

The application was initially used by agricultural extension workers but is now also targeted for farmers. Farmers, using their own or borrowed cellular phones, can text their queries or requests for information on rice production problem to the PhilRice's "Farmers' Text Center" located in Munoz, Nueva Ecija. Frequently asked questions [FAQs], of which there are ready answers, can be replied to instantly. The answers are condensed to fit one SMS message of 160 characters. For highly technical questions, messages are forwarded to scientists or experts of the agency.

Since the questions are limited to the maximum capacity for one text message, the replies would be limited to the same number. As such, queries and responses are usually in texting format (meaning spelled as it sounds, omitting the vowels if possible and often not following spelling conventions).

There is no price for the users of FTC. It is a free service. At present, FTC is considering tapping emails and e-forum to expand the options of users to avail the services.

Quantifiable benefits

Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

The volume of demand for the application determines the usefulness of the platform. Since FTC primarily operates through an SMS platform, the number of SMS generated indicates the demand for it.

1.1.1 Text Volume Usage

In an ex-ante evaluation by Flor (2006) he reported a monthly text received of 163 messages per month. A year and a half thereafter, the project was averaging more than a fourfold increase. It only received 3000 messages in 2006, more than 13000 in 2007, and more than 25,000 in 2008. In 2009, it received more than 2000 messages a month (see Table 1), which represents around 1000 active text users. A 2010 report already has them averaging 3000 messages a month (Philstar 2010), which indicates the project is gaining further traction.

Figure 1: SMS received from 2006 to 2009 for rice related queries
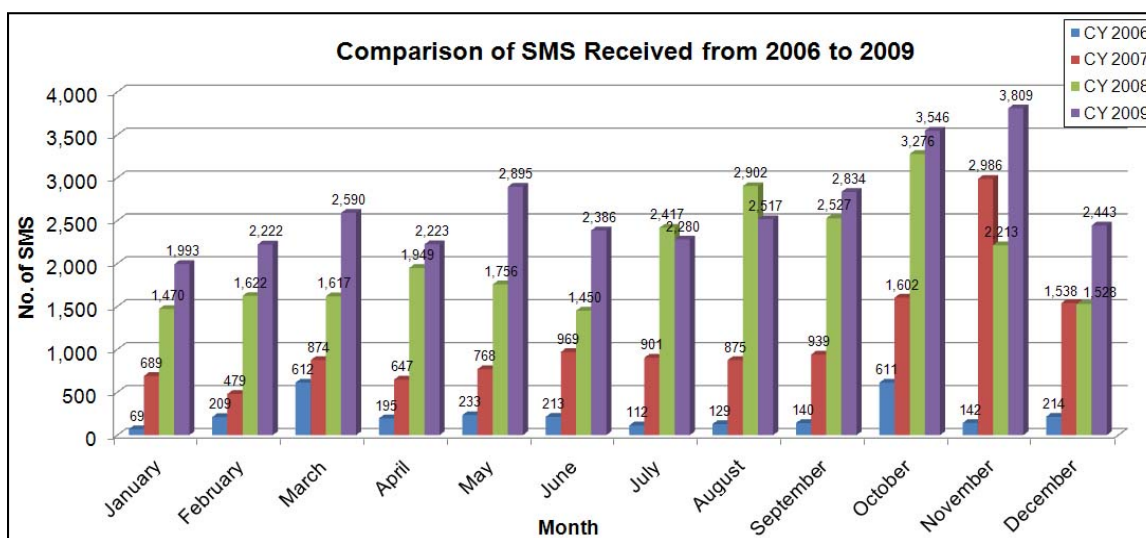
Source: Pascua, Zagado, Asia, Domingo and Maloles, 2010

Furthermore, according to Philrice, of all its messages received from January 2006 to March 2007, 48.8% were known to be queries from farmers (n=4760). This would suggest that it is reaching the marginalized group it was intended for, although this number still represents a very small fraction of the entire farmer population. Interestingly, of the number of SMS reported in 2007, 1,071 messages came from Central Luzon farmers, 824 from the Ilocos and 299 from Calabarzon (Cavite, Laguna, Batangas, Rizal and Quezon), according to the records. Farmers in Northern Mindanao sent the lowest number of messages (25), according to the records (Roque 2007) (See Figure 1).

Apart from the SMS volume, FTC also conducts interviews among users to identify their satisfaction level in using the service.

SWORB [Maybe summary of other sections]	**Strengths**	**Weakness**

	• Ability to leverage existing networks of extension workers, farmers, researchers and universities along with ICTs
	• For the critical success factors
	  • Back-end support (technical experts)
	  • Well-developed back-bone infrastructure (communication)
	  • Well-trained and knowledgeable frontline agents (text agents)
	  • Continuous source of budget (since
		• Marketing is still limited by geographic/social networks
		• While 3000 messages per month is relatively a lot compared to other SMS programs, this is still small if contextualized versus the number of farmers in the country.
		• FTC operates from Monday to Friday, 8am to 5pm only (this would assume queries are not emergency in nature).

the FTC has no revenue) • Capacity to enhance services to attract more users • Accessibility to users • Cost-effective for farmers • Easy replication		

Opportunity	**Risks**	**Barriers**
• Expansion; Automation of FAQs; • Knowledge can be expanded to online/internet and be used elsewhere. Hence, there's the possibility to gain more users through expansion of FTC to include emails and e-forum	• Funding support to maintain operations has to be sustained • Huge expansion in users/demand may not be supported by current workforce • Possibility of wrong diagnosis and response because interaction is primarily based on farmer's SMS	• Language of knowledge used versus language of other users • Need to use syntax • Technological constraints (i.e. SMS traffic, data/memory storage capacity) • Limitation on the users' side. They may not be able to describe what they see, or the problem accurately in a short SMS message. • Back-end support (requires technical experts) • Requires well-developed back-bone infrastructure (communication) and frontliners (text agents) • Continuous funding support to maintain operations • SMS limitations (i.e. number of characters allowed for SMS)

Market potential assessment

E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

Field reports show that average monthly text messages from year to year has been increasing. This suggests demand for services is being sustained. Cost of service remains the same, and service provider (telco or smart) has no added cost and charges Php 0.50/SMS from Philrice.

FTC activated info on demand service for varietal characteristics of rice such that clients can obtain the immediate characteristics of PSB/NSIC approved rice varieties. Syntax is required to use this service (i.e. type Rc and the number). Each variety equates to one SMS.

FTC also has plans of promoting the program to gain more users. The capability to receive MMS has also been tapped to enhance service delivery.

Replicability / hurdles / issues

Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

Replication is highly viable but the possibility for expansion is determined by the capacity to acquire and sustain the technical, financial and hardware requirements of a more sophisticated text center. While current operations can manage 100 messages a day, how much further expansion can it support given the millions of farmers nation-wide?

Further study / research questions	**Select for case study**
• How does this program inter-phase/overlap with the Nutrient Manager program? How does it complement each other? • Does each message have a downstream multiplier effect on farming communities? • Is there evidence that users follow through with knowledge gained from the messages?	Yes

Contact	Comments on contacts made, arrangements, etc.
Mr. Stoix Pascua snspascua@philrice.gov.ph Mr, Ronan Zagado rgzagado@philrice.gov.ph or rgzagado@philrice.gov.ph	The lead researcher had previously conducted face-to-face interviews with Mr. Stoix Pascua and Mr. Ronana Zagado of Philrice. For this research, follow-up queries were conducted through e-mail correspondences. Ronan Zagado is currently on study leave in Australia

| Subsector
I.e., Which of Typology Subsectors

Labour, Migration and Human Development | Name of Application and References

Open Data Kit:
http://www.open-mobile.org/technologies/open-data-kit-tools-data-collection-aggregation-and-visualization http://code.google.com/p/opendatakit/ http://code.google.com/p/opendatakit/wiki/FeaturedDeployments http://modi.mech.columbia.edu/wp-content/uploads/2010/04/Open-Data-Kit-Review-Article.pdf http://globalwater.jhu.edu/magazine/article/androids_come_to_ghana/ http://www.mobileactive.org/mobile-tools/open-data-kit http://www.tatrc.org/include/conferences/ata_2010/ppt/3_Borriello_ATA2010_May.pdf | Country(s) / Region

Sub-Saharan Africa |

Segment / Activity
i.e., which Segment in the Typology

Various

Description of Application
Note whether it is purely information or transaction based

Open Data Kit (ODK) is an open source mobile data collection system designed so that components can reconfigured as needed. The system harnesses rapidly evolving functionality on mobiles and on the internet into an easy to use package. The mobile client, ODK Collect, is built on the Android platform and can collect a variety of data types: text, location, photos, video, audio, and barcodes. ODK Aggregate is a web server built on Google's App Engine infrastructure. It provides a free and scalable repository where collected data can be stored, exported into a number of formats or visualized on a Google Map. Instead of closed solutions with limited lifetimes, ODK builds on open technologies and open standards that guarantee interoperability and enable future capabilities. By using the XForms standard, ODK can share complex forms and data with systems such as OpenMRS, EpiSurveyor, and the OMC's JavaRosa. Among ODK's users is USAID-AMPATH, the largest HIV treatment program in sub-Saharan Africa and Kenya's most comprehensive initiative to combat the disease. Over the next two years, ODK Collect will be used to conduct a home-based testing and counseling program reaching 2 million people.

List of organizations using ODK tools in developing/emerging nations for non-health applications:

Google (Tanzania, Cambodia, Brazil)
Google.org and Google Earth Outreach have partnered with organizations around the world to pilot the use of ODK for field data collection. Partners include the Jane Goodall Institute in Tanzania, the Clinton Climate Initiative and Forestry Administration in Cambodia, and the Surui Tribe and Forestry Service in Brazil. For more info, watch this video.

Grameen Foundation Application Laboratory (Uganda)
ODK Collect has been used by AppLab since November 2008 by shared phone operators (SPO) in rural Uganda. The SPOs survey their customers about available phone-based services and the results are used to guide the development of services like Google's Clinic Finder and Farmer's Friend. One user noted that unlike their old paper surveys, "The survey process is real time as opposed to the paper forms where we had to wait for a month to be picked up...". Grameen's Community Knowledge Worker program also uses ODK.

Episurveyor at DataDyne (Kenya)
DataDyne is active in over 20 countries in sub-Saharan Africa, where EpiSurveyor is being used on mobile phones to track crucial data—from the availability of medical supplies to the coverage rates of immunization campaigns. DataDyne is using ODK Collect as the foundation of EpiSurveyor on Android. ODK Collect can already use forms built for EpiSurveyor and soon will be able to submit to the EpiSurveyor server.

Human Rights Center at UC Berkeley (Central African Republic)
The Human Rights Center investigates war crimes and other serious violations of human rights and international humanitarian law. Their empirical studies recommend policy measures to hold perpetrators accountable, protect vulnerable populations, and help rebuild war-torn societies. Traditionally, these studies have been done on paper, but a proof of concept study in Uganda in 2007 showed that mobile data collection was feasible, fast, and generated much higher quality data than traditional paper based surveys. The survey HRC uses has more than 300 questions, the database more than 550 fields. In a month, they have completed 1853 surveys all over the country using 20

enumerators conducting interviews that each take an hour. HRC has also built the KoBo Post Processor, an ODK compliant tool that bridges the gap between collecting data and databasing it when connectivity is not an option.

Information School and Haas School at UC Berkeley (Ethiopia, Uganda, India, Mexico)
Teams from University of California, Berkeley Information School and Haas School are exploring applications of ODK Collect to facilitate agricultural knowledge access in sub-Saharan Africa and South Asia. Initial investigations will be conducted with field partners in Ethiopia, Uganda, India and Mexico.

Vetaid (Zanzibar)
Vetaid supports animal health projects in Africa by training a large number of Community Animal Health Workers or "barefoot vets". A recent development within the project has been the adoption of mobile telephony as a way of linking the community workers with the central veterinary team. ODK Collect has been piloted for collecting information from 50 farms and 400 animals. Read about the deployment.

Frogtek (Colombia)
Frogtek is a social venture dedicated to creating business tools for micro-entrepreneurs in emerging markets. Using mobile phones as a computing platform, it will develop applications for small retail shops, restaurants and other small businesses. Frogtek is interested in using ODK Aggregate to store forms and building a new UI for ODK Collect.

Johns Hopkins University Global Water Program (Ghana)
The JHU GWP focuses on solving the global water challenge of providing safe, sufficient water through innovation, education, and collaboration. Since 2008, the JHU Global Water Program (GWP) and Center for Water and Health (CWH) have managed a longitudinal study to understand the health impacts, changes in hygiene practices, and determinants of use related to water treatment and vending kiosks in four rural communities in Ghana. Each year, surveyors collect data from over 500 households in four languages. These in-depth surveys can take over an hour, and the logic involved has been quite complex—forcing surveyors to flip back and forth between pages, parse and interpret survey directions while simultaneously maintaining the flow of the interview. In order to improve data quality and streamline the survey process, the team at the Center for Water and Health decided to pilot the use of mobile devices/cell phones for data collection.

CyberTracker (South Africa)
CyberTracker was first developed in 1997 as a way to allow non-literate animal trackers to communicate their environmental observations. It has since evolved to become a powerful general purpose data capture and visualization system with an incredible 40000 downloads. CyberTracker's unique design allows users to display icons, text or both, which makes data collection faster. There is ongoing work to port CyberTracker to the ODK platform.

Person Finder Mobile (Haiti)
Built on Open Data Kit, Person Finder Mobile provides an XForm/PFIF tool to collect data on missing people from on-the-ground in Haiti. It will push data into the official repository at http://haiticrisis.appspot.com

Foundation for Democratic Process (Zambia)
FODEP monitors elections so they are free and fair. They are trying to use ODK to gain real time results from every polling station in Zambia.

Lumana (Ghana)
Lumana sees microcredit as an organizing tool for development. They provide small loans in order to create a baseline of financial security and cooperative organization in the communities where they operate. Using ODK, Lumana seeks to build off their current data collection software to refine how they survey and understand the communities they currently serve and the villages they seek to help.

Mortenson Center in Engineering for Developing Communities at University of Colorado at Boulder (Nepal)
A team of engineering graduate students from Colorado University in Boulder, twenty four NGOs from the Swayambhu Community in Nepal, and Nepal Community Development Foundation are working on a community assessment tool for Swayambhu, Nepal. They are investigating ODK as a possible tool.

Columbia University (Mali)
Columbia University researchers used ODK in an agroforestry adoption study in Mali. From New York, researchers could remotely monitor survey completion progress and begin preliminary data analysis. In their tech review, they report that "ODK can be manipulated for practical use with ample room for versatility. ODK successfully made use of modern technology and communications infrastructure to enable highly efficient data gathering and information compilation, resulting in a useful tool for global development applications."

| Technology
E.g., voice, video, sms, email, GPS, multi-media

Forms / data | Technical development path
Note any past or expected changes and what impact technological change could have on the application and its viability

Based on open source software that runs on the Android mobile operating system, this tool has limited penetration while Android smartphones are not commonly used in rural areas of developing/emerging nations. However, increased penetration could make this application/platform more popular. |
|---|---|

| Leading Ecosystem Player
E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent

University of Washington / Open Mobile Consortium | Lead role(s)

Developed the platform |
|---|---|

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

The goals of ODK are to make open-source and standards-based tools which are easy to try, easy to use, easy to modify, and easy to scale.

In the developing world, the lack of reliable infrastructure, ubiquitous connectivity, and adequate expertise makes data collection difficult. Currently, most organizations collect data on paper forms despite inefficiencies such as the physical collection of completed forms, data transcription errors, and long delays before the data is available.

The exponential growth of cell phone usage and infrastructure in developing regions has aroused great excitement for using mobile devices to address current gaps in data gathering. In addition to the variety of data -- text, photos, location, audio, video, barcode scans -- that can be gathered, mobile devices have proven to be dramatically faster at both collecting the data and making it available to decision makers. Moreover, deploying mobile devices can be less expensive and less error prone than using pen and paper.

| Other key players
1. Application developers | Roles
Develop applications that run on the ODK platform | Incentives / Business model
Simplified application development |
|---|---|---|

| Year of commencement

2009 | Maturation Cycle Position
Emerging / Expanding / Mature

Emerging | Status
E.g., Pilot / Rolling out / Established

Rolling out |
|---|---|---|

Comment on maturation / status of development

The platform was released in November 2009 and is in version 1.1. Forthcoming ODK tools include,

Non-cloud storage options
• ODK Store – Local, private, in-country server storage

Management and supervision
• ODK Manage – Remote mgmt of forms and applications
• ODK Tasks – Task assignment and workflow mgmt
• ODK Voice – Voice-based forms for automated follow-up

Connection to EMR systems
• ODK OpenMRS – Enter patient data directly into OpenMRS
• ODK DB – Local caching of secure patient records on phone
• ODK Clinic – On phone patient portal for clinicians

Amplifying human resources
• ODK Protocol – Navigate triage/advice/diagnostic protocols
• ODK Tutor – Video-based materials in the field

Costs of the application & evidence of cost recovery & profit/sustainability
E.g., Development of the technical systems & content; maintenance & skills

No information available.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

ODK makes open-source and standards-based tools which are easy to try, easy to use, easy to modify, and easy to scale. In the developing world, the lack of reliable infrastructure, ubiquitous connectivity, and adequate expertise makes data collection difficult. Currently, most organizations collect data on paper forms despite inefficiencies such as the physical collection of completed forms, data transcription errors, and long delays before the data is available. ODK allows for more efficient, accurate and timely collection of data.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

No information available.

SWORB *[Maybe summary of other sections]*	**Strengths** Easy to use once system is set up, immediately digitizes data for analysis, allows for remote monitoring of the collection progress, facilitates the gathering of data	**Weakness** Battery life of smartphones in rural areas, signal strength must be good to transmit data, requires use of expensive phones
	Opportunity Simplify the implementation process	**Risks and barriers** Cost of Android handsets, possibility that Android will not gain widespread acceptance in rural areas of developing/emerging nations

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

There are currently fewer than 100 end-users of the system, and an estimated 10,000 – 100,000 beneficiaries. Given that ODK is a platform on which a range of data gathering applications can be implemented, the market potential appears to be significant. Projects using the application require funding as ODK does not include any way to generate revenue.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

The application is in use around the world already. The biggest hurdle appears to be the requirement for technicians with the necessary knowledge / expertise to set up the system for a new implementation.

Also, the use of Android smartphones limits the use of the application for projects in low income areas with minimal funding.

Further study / research questions	**Select for case study** No

Contact Yaw Anokwa yanokwa@gmail.com	**Comments on contacts made, arrangements, etc.**

Subsector *I.e., Which of Typology Subsectors* Labour, Migration and Human Development	Name of Application and References RapidSMS: • http://unicefinnovation.org/mobile-and-sms.php • http://www.dimagi.com/rapidsms/ • http://www.rapidsms.org/ • http://www.alertnet.org/thenews/newsdesk/IRIN/8dbff9d756544e0617a01bb0073864a3.htm • http://www.netsquared.org/projects/child-malnutrition-surveillance-and-famine-response • http://mobileactive.org/howtos/rapidsms-review	Country(s) / Region UNICEF

Segment / Activity
i.e., which Segment in the Typology

Various

Description of Application
Note whether it is purely information or transaction based

RapidSMS is a platform created from the same underlying pieces of computer code. Each one was crafted to solve a specific problem of a field office. The underlying code-base is open-source, so anyone can use it and build upon the platform. RapidSMS is designed to be customized for the varied needs and constraints of UNICEF and the developing world. Each RapidSMS product is an SMS-based tool that enables mobile data collection and messaging. Users can collect both quantitative and qualitative data through customizable SMS forms. Quantitative data from the forms can be edited through a RapidSMS web interface, exported to Excel, and displayed with a built-in graphing tool. Qualitative data can be collected in open-ended questions known as 'general queries.' General queries can be used to poll a base of users or community on a certain question or topic, and all responses are stored in an SMS inbox for easy review. With the RapidSMS web interface, multiple users from around the world can simultaneously access the system to view incoming data as it arrives, export new data-sets, and send text messages to users. RapidSMS is free to download, use, and modify -- and runs well even on low-powered and older computers, needing only a GSM modem and SIM card to get started. RapidSMS leverages popular programming languages, and thus is easily integrated into existing ICT systems. A RapidSMS implementation has optional audio capabilities so users can leave voice messages or browse information through an IVR interface that can recite text or play audio clips over the phone. This currently requires a computer with PBX hardware installed and a land line or voice-over-IP line; however UNICEF Innovations is currently working to develop a solution that uses a standard cellphone (connected to the computer) to receive phone calls and record messages into the system.

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS, voice	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* UNICEF Innovations is currently working to develop a solution that uses a standard cellphone (connected to the computer) to receive phone calls and record messages into the system.

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* UNICEF Innovations	Lead role(s) Developed the application for use by UNICEF in different contexts

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

RapidSMS is an SMS-based tool that allows for mobile data collection and bulk sms messaging. User can collect both quantitative and qualitative data through SMS forms. RapidSMS also features bulk SMS messaging functionality similar to what you would find in desktop SMS tools like Frontline SMS. RapidSMS offers many advantages over a desktop system. First, since it is web-based, multiple users are able to access the system remotely at the same time. RapidSMS is also an "open" platform based on a popular programming framework which should appeal to organizations with technical staff who want to customize or integrate the tool into their current web systems. RapidSMS is designed for "mass-scale" monitoring and data collection (both qualitative and quantitative).

Other key players	Roles	Incentives / Business model
1. Dimagi	Assisted with application development	Human development
2. Open Mobile Consortium	Assisted with application development	Human development

Year of commencement 2008	Maturation Cycle Position *Emerging / Expanding / Mature* Expanding	Status *E.g., Pilot / Rolling out / Established* Rolling out

Comment on maturation / status of development

The application was developed during 2008, with the first pilot projects starting in the second half of the year.

Costs of the application & evidence of cost recovery & profit/sustainability
E.g., Development of the technical systems & content; maintenance & skills

No information available.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

The impact a RapidSMS implementation has on UNICEF's work practices is dramatic. In October 2008, Ethiopia experienced crippling droughts. Faced with the possibility of famine, UNICEF Ethiopia launched a massive food distribution program to supply the high-protein food Plumpy'nut to under-nourished children at more than 1,800 feeding centres in the country. Previously, UNICEF monitored the distribution of food by sending a small set of individuals who traveled to each feeding center. The monitor wrote down the amount of food that was received, was distributed, and if more food was needed. There had been a two week to two month delay between the collection of that data and analysis, prolonging action. In a famine situation each day can mean the difference between recovery, starvation, or even death.

The Ethiopian implementation of RapidSMS completely eliminated the delay. After a short training session the monitors would enter information directly into their mobile phones as SMS messages. This data would instantaneously appear on the server and immediately be visualized into graphs showing potential distribution problem and displayed on a map clearly showing where the problems were. The data could be seen, not only by the field office, but by the regional office, supply division and even headquarters, greatly improving response coordination. The process of entering the data into phones was also easier and more cost effective for the monitors themselves leading to quick adoption of the technology.

Without accurate and timely data, it is very difficult to make decisions, see where there are problems, respond quickly, and allocate resources effectively. RapidSMS is a powerful suite of tools that directly address this problem improving coordination and impact.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

In the Malawi nutritional surveilance program, transmission times that previously took from two to three months were reduced to an average of two minutes. This is essentially 64,800 times faster than the paper-based system. Poor data quality: there were 15 data entry errors, representing an error rate of 2.8 percent. These errors consisted of wrong measurements entered, wrong association of child ID number with measurements, or entry of data strings with one or more missing values. This was a significant improvement over the 14.2 percent error rate under the previous system in 2007.

SWORB *[Maybe summary of other sections]*	Strengths Customizeable for a wide range of uses, enable faster data entry, increase data accuracy, open source	Weakness Relatively difficult to implement
	Opportunity Make the system easier to implement to encourage increased usage	Risks and barriers Competition from other data entry systems such as FrontlineSMS

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

RapidSMS is already in use around the world, and can be expected to grow if groups other than UNICEF embrace the system:

Senegal- The Jokko Initiative: Literacy and Community Empowerment (05/2010)
The Jokko Initiative is a collaboration between UNICEF and Tostan that makes it possible to communicate with a network of people by simply sending a text message. Through Jokko's RapidSMS Community Forum, a user can send an SMS text message to a "magic number" that then forwards the message to all phone numbers belonging to the network. The module also introduces mobile phones as pedagogical tools to teach and reinforce literacy as well as the organization and management skills taught in Tostan's Community Empowerment Program.

Somalia – Emergency Response Monitoring (10/2009)
In Somalia, a RapidSMS project for emergency response monitoring is currently in the testing phase, leading to deployment in southern Somalia. Prior to the involvement of RapidSMS, data from the Emergency Response Monitoring Checklist was submitted sporadically via paper and email by various aid organizations, with important data missing or inaccurate.

Kenya – Empowering Community Health Workers (06/2009)
A recent Millennium Villages Project, with support from UNICEF, is customizing RapidSMS to address under five mortality rates at a community level. This initiative brings diagnoses, referrals and treatment out of the clinics and into the communities.

Nigeria – Monitoring Supplies in a Campaign Setting (04/2009)
In Nigeria, RapidSMS was piloted in the first phase of a 70 million 'long lasting insecticide-treated nets' distribution campaign. As a pilot activity, RapidSMS was used in Kano state to capture data of commodities from state stores to the Local Government Area and distribution points.

Malawi – Nutritional Surveillance (01/2009)
UNICEF Malawi deployed RapidSMS to address serious constraints within the national Integrated Nutrition and Food Security Surveillance System, which was facing slow data transmission and incomplete and poor quality data sets. Automated basic diagnostic tests, are now identifying more children with moderate malnutrition who were previously falling through the cracks.

Ethiopia – Supply Chain Management (10/2008)
In October 2008, Ethiopia experienced crippling droughts. Faced with the possibility of famine, UNICEF Ethiopia launched a massive food distribution program to supply the high-protein food Plumpy'nut to under-nourished children at more than 1,800 feeding centres in the country.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

Rapid SMS is replicable. The main hurdle is the technical expertise required to set-up an implementation of the system, but as it uses open source software, this hurdle should not be insurmountable.

Further study / research questions	**Select for case study**
	No

Contact	**Comments on contacts made, arrangements, etc.**
Dr. Sharad Sapra, UNICEF's Director of the Division of Communication	

Subsector *I.e., Which of Typology Subsectors* Agriculture, Animal husbandry, Fisheries & Forestry	Name of Application and References Compañía Argentina de Granos (CAGSA): • http://www.cagsa.com.ar/index2.html • http://ve.blackberry.com/newsroom/success/cagsa.jsp • http://na.blackberry.com/newsroom/success/cagsa_TCS.pdf • http://na.blackberry.com/newsroom/success/cagsa_BCS.pdf	Country(s) / Region Argentina

Segment / Activity
i.e., which Segment in the Typology

Agro-marketing / trade

Description of Application
Note whether it is purely information or transaction based

Compañia Argentina de Granos (CAGSA) is a major food broker in Argentina; they simplify the logistics of transporting harvested grain and corn to their distribution centers, deliver supplies, such as fertilizer, and provide various agri-business services to their members.

Many agri-producers work all day in the crop fields, up to 125 miles (200 km) from their homes and telephones. CAGSA wanted to give their customers BlackBerry smartphones so they could request pick ups or service from wherever they were – even in the middle of a grain field. That information would be sent to CAGSA's ERP system to prompt the appropriate service, bypass phone calls and reduce human errors.

Enter Syncrologix Mobile Solutions' SmartTasks application, an application for the BlackBerry Enterprise Solution. It offered a way to build specific reporting and data capturing forms for the BlackBerry smartphones that would process requests for various CAGSA services. Logistical support was the biggest change to the agri-producer's life. They now have the ability to place an order for a truck to come pick up their harvested crops. The request is automatically sent from their BlackBerry smartphone to CAGSA's ERP system.

Truck drivers, who also use BlackBerry smartphones, are dispatched by the same SmartTasks application. That means when the agri-producer indicates the exact amount of a shipment, the application checks the available drivers in the area and dispatches the right size of truck and the closest driver. As a result, CAGSA does not have trucks sitting idle or using up unnecessary gasoline and the agri-producer gets the best time-to-market for their harvest.

Agri-producers request agricultural supplies through SmartTasks on the BlackBerry smartphones, which is remotely connected to the CAGSA ERP Database for request processing. CAGSA also uses this solution for direct marketing that increases sales volumes: they notify agri-producers of special offers on their BlackBerry smartphones, such as discounts on fertilizers or other farming supplies. And, a special 911 Help Desk has been installed to help agri-producers with any technical issues related to their wireless device.

CAGSA´s agri-producer community can also check weather conditions through the BlackBerry smartphone's browser and can make on-the-spot decisions about cultivating their crops. And instead of having to place calls about market prices, they pull up the facts themselves and plan the best time for harvest. All of this is done from the middle of the farmland – giving the agri-producers unprecedented convenience and control over their business.

Technology *E.g., voice, video, sms, email, GPS, multi-media* Java-based application linked to ERP system	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* The Syncrologix Mobile Solutions SmarTasks applications is designed for the Blackberry Enterprise Solution and thus its success depends on the expansion of the Blackberry system.
Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent*	**Lead role(s)** CAGSA's ERP system links to agri-producers' Blackberry phones to provide information and services

CAGSA	

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

Compañia Argentina de Granos (CAGSA) wanted to help their agri-producer customers improve the time-to-market for their grain, communicate easier with CAGSA and access farming information faster and more simply.

User-friendliness was one of the primary reasons the BlackBerry Enterprise Solution was attractive to CAGSA. Less than 40% of CAGSA's agri-producer members have computers in their homes; of that number, only half have ever used the Internet. The BlackBerry Enterprise Solution was also valuable because it's designed to mobilize critical business information and applications. CAGSA realized agri-producers needed a convenient way to communicate and do business with them and wireless transactions could be the solution.

The SmartTasks application offered a way to build specific reporting and data capturing forms for the BlackBerry smartphones that would process requests for various CAGSA services.

Other key players	Roles	Incentives / Business model
1. Syncrologix	Developed the SmartTasks application	Sale of application systems
2. Research in Motion	Makers of the Blackberry phone/operating system	Sale of equipment and software

Year of commencement	Maturation Cycle Position *Emerging / Expanding / Mature*	Status *E.g., Pilot / Rolling out / Established*
2006?	Mature	Established

Comment on maturation / status of development

The available case studies on the system were written in 2007 and describe a system that has been fully implemented.

Costs of the application & evidence of cost recovery & profit/sustainability
E.g., Development of the technical systems & content; maintenance & skills

No information available.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

Efficiency of Supply Chain: With logistical requests going straight to CAGSA's ERP system through the SmartTasks application running on the BlackBerry smartphones, trucks are booked and dispatched more efficiently to meet agri-producers schedules and maximize efficiency for CAGSA's trucks.

Reliability for Agri-producers: Agri-producers can time their crop pick ups or deliveries to take advantage of the best time to market without having to make phone calls. Because the SmartTasks application running on BlackBerry smartphones automatically forwards details about the driver and truck, agri-producers have peace of mind about their shipments and there are fewer mistakes.

New Customer Services: Agri-producers can now place supply orders, check weather conditions, compare market rates for their crops and request agricultural information – all from the convenience of their BlackBerry smartphones, wherever they are.

Competitive Advantage: CAGSA is the only broker to have this vision for their members, proving they are working hard for agri-producers and keeping their customers' loyalty.

Revolutionizes Communication in Agricultural Community: Moving from land lines to BlackBerry smartphones appeals not just to agri-producers, but also to their families and communities who have gained a new way to communicate. CAGSA plans to deliver even more services to their members in the future to make this technology indispensable in rural communities.

Builds on Current ERP System: With some manageable changes, CAGSA was able to use their existing ERP database to offer customers new ways to process their service requests and to offer improved service levels and options to the agri-producers community.

Automates Services for Agri-producers: Using SmartTasks by Syncrologix on the BlackBerry Enterprise Solution, agri-producers can arrange crop pick up and delivery of fertilizer and other supplies, and enjoy the best time-to-market for their crops.

Easier Development Cycle: Because the SmartTasks application allows the user to build their own dynamic forms, CAGSA did not have to invest in extensive IT expertise to take advantage of this Java-based application and quickly adapt their services to their customer needs.

Simple Way to Offer Information: Using BlackBerry Mobile Data Services, CAGSA was able to provide agri-producers with a convenient way to look up market rates, weather conditions and other relevant information such as special offers, accounts payable and accounts receivable statements, through their BlackBerry smartphones.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

No information available.

SWORB *[Maybe summary of other sections]*	**Strengths** Efficiency, reliability, new services available to agri-producers	**Weakness** Requires relatively expensive Blackberry smartphones
	Opportunity Expand application to other agricultural organizations and other mobile platforms	**Risks and barriers** Cost and availability of Blackberry

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Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

The application appears to be valuable where there is a large organization with an enterprise resource planning system that could provide agri-producers with valuable services and information if they were able to access via a mobile device. The market potential could be significant, though probably somewhat limited in developing regions.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

This application can grow in other areas but requires a large agricultural organization with an ERP system.

Further study / research questions	**Select for case study** No

Contact Gastón Kauer, COO, Compañía Argentina de Granos	**Comments on contacts made, arrangements, etc.**

Subsector *I.e., Which of Typology Subsectors* Labour, Migration and Human Development	Name of Application and References Freedom Fone: • http://www.freedomfone.org • http://www.mobileactive.org/case-studies/freedom-fone-field • http://ictupdate.cta.int/en/Feature-Articles/The-freedom-of-information	Country(s) / Region Zimbabwe

Segment / Activity
i.e., which Segment in the Typology

Employment – the possibilities cover just about any type information

Description of Application
Note whether it is purely information or transaction based

Freedom Fone is an information and communication tool, which marries the mobile phone with Interactive Voice Response (IVR), for citizen benefit. It provides information activists, service organisations and NGO's with widely usable telephony applications, to deliver vital information to communities who need it most. Freedom Fone makes it easy to build voice menus, run SMS polls, receive SMS messages and manage voice messages. Callers navigate through the IVR menu to listen to audio clips. IVR menus are a series of prompts in which an automated voice instructs the caller to, for example, 'Press 1 for sales, 2 for the help desk, 3 for customer care' and so on. Callers can phone from a landline, mobile or other system, such as Skype, and contribute questions, content and feedback by leaving voice messages. The audio files are stored on a content management system (CMS), which can be easily and regularly updated. Freedom Fone launched in June 2009 and, so far, content consists of a mix of news, event details, jobs and other opportunities that members have come to value from more established outlets – the website, community blog, email and SMS service. But Freedom Fone will target those Zimbabweans who cannot access information in these formats.

Inzwa is a weekly audio magazine in Zimbabwe that was the pilot project for the Freedom Fone platform. It is a project of Kubatana.net.

Recently, Freedom Fone was adapted by two farm radio stations through the African Radio Research Initiative, a 42-month project implemented by Farm Radio International. The aim of the AFRRI project was to assess the effectiveness and impact of farm radio in many parts of Africa.

Technology *E.g., voice, video, sms, email, GPS, multi-media* IVR	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* Increased mobile penetration generally will have a beneficial impact on Freedom Fone's prospects.

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* The Kubatana Trust	Lead role(s) Developed the application and uses is for their work in Zimbabwe.

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

Freedom Fone is an information and communication tool, which marries the mobile phone with Interactive Voice Response (IVR), for citizen benefit. It provides information activists, service organisations and NGO's with widely usable telephony applications, to deliver vital information to communities who need it most. Freedom Fone makes it easy to build voice menus, run SMS polls, receive SMS messages and manage voice messages.

Other key players	Roles	Incentives / Business model
1. mobile operators	Provide airtime and SIM cards	Increase sales and network usage

Year of commencement	Maturation Cycle Position *Emerging / Expanding / Mature*	Status *E.g., Pilot / Rolling out / Established*
2009	Expanding	Rolling out

Comment on maturation / status of development

Freedom Fone is built combining the power of several open source projects that include: FreeSWITCH, Spidermonkey, PHP5, Cake PHP and JQuery. Freedom Fone uses Cepstral, a text-to-speech voice engine to synthesize voice messages.

Version 1.6 was released in the summer of 2010. A language switcher now makes it easy to translate the user interface into English, Swahili or Spanish. In September, when we have our localization interface in place, we will invite volunteers to translate the GUI into additional languages.

It is now simple to export audio files, including voice messages received through the leave-a-message component. Another valuable simplification addresses the need for callers to be able to leave a voice message by simply ending their call. The original functionality, which required callers to explicitly save their voice messages by pressing a designated number, is still available for organizations that wish to use it. System reporting has also been improved thanks to the inclusion of a report that details the duration of each call to the service.

Costs of the application & evidence of cost recovery & profit/sustainability
E.g., Development of the technical systems & content; maintenance & skills

In 2008, Kubatana was awarded USD 876,000 for Freedom Fone development through the Knight News Challenge.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

Freedom Fone's focus is on a user friendly, low cost, low power, highly scalable, do-it-yourself platform that shares information in an audio format with ordinary mobile phone users and does not require access to the internet. The benefit is access to information for all mobile users, regardless of technical proficiency or literacy. Users get easy access to information that may not otherwise be available to them in a usable form.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

No information available.

SWORB *[Maybe summary of other sections]*	**Strengths** Easy to replicate, low technical requirements for use	**Weakness** Requires some training to implement the system
	Opportunity Expansion to new areas and for new uses	**Risks and barriers** Availability of information via other means improves enough to diminish need for Freedom Fone

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

Because it provides a platform for a wide range of uses, the market potential for Freedom Fone could be significant, especially in developing regions where access to the internet and other media is limited. Implementing the service is not expensive and user demand should exist any time there is valuable information that can be conveyed via voice.

Since the public launch of version 1.5, there have been over 230 downloads of the software from the website, hundreds of email enquiries and thousands of visits to the demo site from over 3,000 different locations worldwide. The diverse spectrum of individuals and organisations who have downloaded the software cover a wide spectrum

of potential usage scenarios.	
Replicability / hurdles / issues *Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high* Freedom Fone could easily be applied in other countries, to give individuals and organizations access to another means to communicate with the public. Kubatana is discussing how to integrate the system with other initiatives, and anticipates a variety of other applications for Freedom Fone as the software matures and more organizations take it up.	
Further study / research questions	**Select for case study** No
Contact Bev Clark co-founder of Kubatana.net	**Comments on contacts made, arrangements, etc.**

Subsector *I.e., Which of Typology Subsectors* Governance / Political	Name of Application and References SMS e-Service: • http://www.e-government.go.ke/index.php?option=com_content&view=article&id=97%3Asms-service-for-tracking-id-passports-launched&catid=1%3Alatest-news&Itemid=1	Country(s) / Region Kenya

Segment / Activity
i.e., which Segment in the Typology

Other m-government services

Description of Application
Note whether it is purely information or transaction based

The e-Service is a communication and information sharing forum between citizens, Ministry of State and Registration of Persons, Public Sector Reform and Performance Contracting (PSR&PC) and the Directorate of e-Government. The project will enable citizens to access government services through mobile phones and to query the manner services are delivered and to obtain real time feedback regarding requirements, costs and status of the most commonly demanded public services.

The SMS e-Service Delivery Project is an interactive communication. It entails:
• Customer enquiries
• Institutional responses
• Tracking of service status

As information is transmitted between citizens and a particular public institution, it is simultaneously routed to Public Sector Reform and Performance Contracting for purposes of tracking customer satisfaction and resolving customer complaints relating to service delivery.

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* Increased mobile penetration and increased citizen familiarity with mobile applications would increase the viability of this application.

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* Government of Kenya	Lead role(s) Developed and operate the application

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

The e-Government service saves citizens, especially those living upcountry, time and money. At the cost of five shillings, members of the public will be able to access and query the manner and speed at which the Government is delivering services. The project is part of the roll out of e-government program which aims at modernizing services using emerging technologies such as the internet and mobile phones. Electronic services are fast, efficient and are available round the clock (24/7). By using technology, the government saves time and cost to citizen's seeking its services. The use of mobile phone to deliver school results has been a successful e-Government initiative. The e-Service delivery system provides a mechanism for monitoring and implementation of commitments made by public institutions in their public service delivery charters.

Other key players	Roles	Incentives / Business model
1. National Registration Bureau	Provides access of information and services that pertain to issuance of National Identity Cards	Improved service
2. Department of	Provides access to information and services that	Improved service

Immigration	pertain to issuance of passports	
Year of commencement 2009	**Maturation Cycle Position** *Emerging / Expanding / Mature* Expanding	**Status** *E.g., Pilot / Rolling out / Established* Rolling out

Comment on maturation / status of development

The service will initially be available to only subscribers of Safaricom service provider. The government will expand this service to cover other key areas of service delivery such as Lands and Health.

Costs of the application & evidence of cost recovery & profit/sustainability
E.g., Development of the technical systems & content; maintenance & skills

No information available.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

The application allows citizens to know the status of applications or service requests. It also offers a means of having complaints addressed. These benefits can save rural people the time and money involved in traveling to a larger centre to find out the status of an application in person.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

No information available.

SWORB *[Maybe summary of other sections]*	**Strengths** Provides unique information, saves time/money for both users and government	**Weakness** Limited service information, only available through Safaricom
	Opportunity Expand the service offering	**Risks and barriers** 5 shilling cost could limit use among low income users

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

The government plans to expand the number of services and mobile service providers through which the service can be accessed. Given the potential to save time and money, this application appears to be valuable. The service costs 5 shillings. It is unclear whether the fee will cover the service's costs, but if the government is determined to offer the service, profitability is not necessarily a concern.
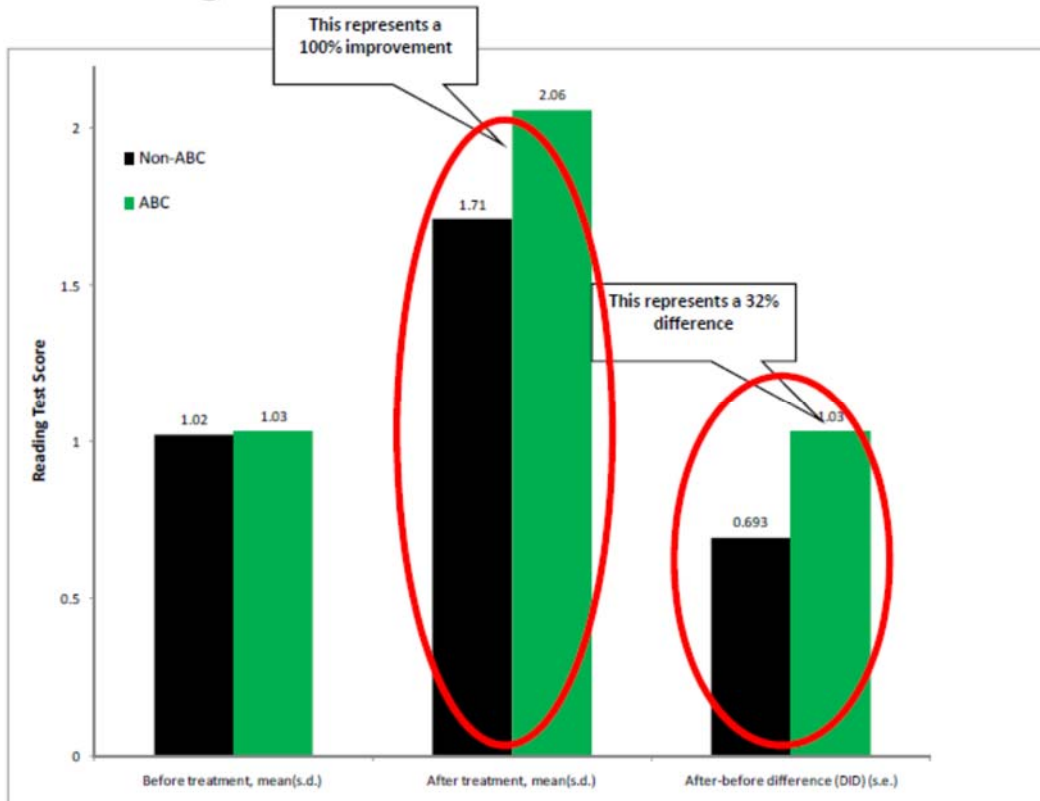
Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

This is a Government of Kenya service and is not likely to be replicated.

Further study / research questions	**Select for case study** No
Contact	**Comments on contacts made, arrangements, etc.**

Subsector *I.e., Which of Typology Subsectors* Labour, Migration and Human Development	Name of Application and References Project ABC (Alphabétisation de Base par Cellulaire): • http://mobileactive.org/files/file_uploads/Project_ABC_26feb09.pdf • http://www.cgdev.org/doc/events/08.25.09/Cell_Phone_Survey_CGD_26aug09_Final_Public.pdf • http://crs.org/niger/cell-phone-literacy/ • http://www.isbrandt.com/index.html • http://sites.tufts.edu/jennyaker/field-projects-in-africa/	Country(s) / Region Niger

Segment / Activity
i.e., which Segment in the Typology

Education, Learning & Training

Description of Application
Note whether it is purely information or transaction based

Project ABC, implemented in collaboration with Catholic Relief Services in Niger and Christopher Ksoll (Oxford University) and Travis Lybbert (University of California-Davis), is an innovative, three-year pilot program to use cell phones as a platform for literacy in Niger. The purpose of the pilot program is to use information technology (mobile phones) as a complement to traditional literacy training, providing households with the opportunity to practice their literacy skills via SMS. This addresses an important constraint to previous functional literacy programs in Niger, illiteracy rates are 80 percent.

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* Increased familiarity with mobiles and SMS could make the project more appealing.

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* Catholic Relief Services Niger	Lead role(s) Develop and operate the application, with partners

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

The purpose of the pilot program is to use information technology (mobile phones) as a complement to traditional literacy training, providing households with the opportunity to practice their literacy skills via SMS. This addresses an important constraint to previous functional literacy programs in Niger, illiteracy rates are 80 percent. This pilot project is innovative for three primary reasons:
• Building upon the functional literacy approach and materials used in Niger, the project will use cell phones as a learning tool to allow participants to practice reading and writing in local languages via SMS.
• The project will reinforce the importance of functional literacy (and numeracy) by targeting groups with a common economic "function" (producers' organizations and women's groups). A key aspect of the project will therefore be facilitating farmers' associations with access to market information via cell phones or radio (in non-cell phone villages) and training them in using such information
• In order to assess the impact of the cell-phone based literacy activities and compare its impact with "traditional" literacy programs, the project will use a rigorous program evaluation approach. This involves randomly assigning participants to cell-phone-based literacy programs ("treated" group) or non-cell phone literacy programs (comparison group).

Other key players	Roles	Incentives / Business model
1. Tufts University / Jenny Aker	Project evaluation	Improving/validating project outcomes

2. Oxford University / Christopher Ksoll	Technical assistance	Improved literacy
3. University of California – Davis / Travis Lybbert	Technical assistance	Improved literacy

Year of commencement 2008	**Maturation Cycle Position** *Emerging / Expanding / Mature* Emerging	**Status** *E.g., Pilot / Rolling out / Established* Pilot

Comment on maturation / status of development

The project kicked-off in December 2008 and the final evaluation will be conducted in January 2011. The service could be rolled out in Ghana and Mali as well.

Costs of the application & evidence of cost recovery & profit/sustainability
E.g., Development of the technical systems & content; maintenance & skills

No information available.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

- The project will use cell phones as a learning tool to allow participants to practice reading and writing in local languages via SMS.
- The project will reinforce the importance of functional literacy (and numeracy) by targeting groups with a common economic "function" (producers' organizations and women's groups). A key aspect of the project will therefore be facilitating farmers' associations with access to market information via cell phones or radio (in non-cell phone villages) and training them in using such information.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

Student Assessment of the Impact of Cell Phone Based Learning Tools*
Zinder and Dogon Doutchi (Niger)

* Based on a random sample of 25% of the 1,400 program participants.

Isbrandt, S., Souley, I., Bety, A., Sountalma, O. (2009). Projet ABC: Analyse Qualitative. CRS Niger.

Literacy Improvements

Numeracy Improvements

SWORB	Strengths	Weakness

[Maybe summary of other sections]	Works to improve numeracy/literacy, provides valuable agricultural information	Requires sponsor-funding
	Opportunity Geographic expansion, getting government funding	**Risks and barriers** Lack of familiarity with mobile technology among potential users

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

Given that literacy rates are relatively low in many rural areas, a mobile application that will improve literacy and provide valuable agricultural information appears to be a valuable proposition. The application is being pilot tested in 56 literacy centres serving 1,400 students.

Sustainability could be an issue as there is no indication of a business model to make the application self-sustaining. The end-users do not pay for the service.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

The project sponsors are considering rolling the application out in Mali and Ghana. As the service requires financial support, it requires sponsors with adequate financial resources to make it replicable.

Further study / research questions	**Select for case study**
	No

Contact	**Comments on contacts made, arrangements, etc.**
Jenny Aker Jenny.Aker@tufts.edu	

Subsector *I.e., Which of Typology Subsectors* Agriculture, Fisheries & Forestry	Name of Application and References IKSL / IFFCO / GSMA (mAgri):	Country(s) / Region India

Name of Application and References

IKSL / IFFCO / GSMA (mAgri):

- http://mobileactive.org/case-studies/iffco
- http://www.gsmworld.com/our-work/mobile_planet/development_fund/magri.htm
- http://lirneasia.net/wp-content/uploads/2009/11/Smith_PPT.pdf
- http://www.icrier.org/pdf/16apr10/Theme%205%20-%20Mr%20Rakesh%20Kapur%20-%20Presentation.pdf
- http://www.iffco.nic.in/applications/Sankhyaki.nsf/6798d1c6c0a839e765256a73002a6bc3/24e8bb7c45de903d6525773c003764ea/$FILE/Final%20AR%202009-10.pdf
- http://www.airtel.in/wps/wcm/connect/5be8f680438ec0c9a564ed0f3421b3d5/Bharti_Airtel_Annual_Report_2009_2010.pdf?MOD=AJPERES&CACHEID=5be8f680438ec0c9a564ed0f3421b3d5

Segment / Activity
i.e., which Segment in the Typology

Extension services

Description of Application
Note whether it is purely information or transaction based

The Indian Farmers Fertiliser Cooperative Limited (IFFCO), was founded in 1967, and is the largest fertilizer cooperative in the world. In mid-2007, IFFCO began offering a voice message service to its members, which provided agricultural advice in the form of minute-long voice messages in local languages. Today, the program is one of the rare mobile projects that has successfully scaled and continues to grow.

The program, which is named IKSL (IFFCO Kisan Sanchar Limited), is a joint venture between IFFCO and mobile operator Airtel, the mobile provider with the most subscribers in the country. The farmers receive SIM cards designed by Airtel, called green SIM cards, to receive the messages. The cards can also be used for regular calls. The IFFCO system is used in 18 of 28 Indian states. Messages are tailored to local languages and different climate zones. Farmers receive five messages, each one minute long, every day, except on Sundays.

There is also a helpline service, which gives farmers access to experts on farming and veterinary medicine. "One advantage of this helpline is that the farmers can tell the symptoms from the field," said Shashi Kala, who works with the program in the state of Karnataka.

The content of the messages varies from how to use certain pesticides to information on market prices.

The GSMA is working with Bharti Airtel and IFFCO to enhance the service and support its future growth. Key areas of focus will be content, systems and process enhancements.

Technology *E.g., voice, video, sms, email, GPS, multi-media* SIM-card based voice app, helpline	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* If more farmers/potential users become comfortable with SMS or other formats, this application might be seen as less relevant.

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* IFFCO	Lead role(s) Develop and operate the application

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

IFFCO, a fertilizer cooperative in India, provides cooperative members with voice messages that give advice on agricultural topics. The project aims to provide rural Indian farmers with access to crop and veterinary information and empower them through technology. The program targets farmers, especially those in rural areas who don't have access to other information. The voice messages are in local languages, so they are accessible even to illiterate farmers or those who don't speak English.

Other key players	Roles	Incentives / Business model
1. Bharti Airtel	Mobile network provider	Profit, CSR
2. GSMA	Funding, technical assistance	CSR

Year of commencement	Maturation Cycle Position *Emerging / Expanding / Mature* Mature	Status *E.g., Pilot / Rolling out / Established* Established
2007		

Comment on maturation / status of development

The subscriber base of IKSL at the end of March 2010 was 5,000,000, which predominantly focuses upon the rural community. About 22,000 Cooperative Societies have become a part of this channel in terms of diversifying their business into this emerging telecommunication market in rural India. IFFCO has been adjusting the content of messages to better meet farmers' needs. The GSMA, through its mAgri initiative, is now involved in the project to help develop additional services.

Costs of the application & evidence of cost recovery & profit/sustainability
E.g., Development of the technical systems & content; maintenance & skills

In an interview, IFFCO could not disclose the cost of the service, but it's quite expensive and the start up cost was quite high, said IFFCO administrator Tallapragada Sudhakar. The service was advertised through the cooperative, on TV and radio ads, and spread through word of mouth.

According to their 2009-2010 annual report, IFFCO has invested an amount of Rs. 3.65 Crore to acquire 72.99 per cent equity in IKSL.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

The service provides farmers with pertinent information to improve decision-making ability towards sustainable agriculture and better living. The information can lead to improved incomes for farmers.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

According to IFFCO, some farmers' yields have increased 16-25%.

SWORB *[Maybe summary of other sections]*	Strengths Voice in local language, demonstrated benefit to users	Weakness Expensive initial development costs
	Opportunity Increased customization of messages, availability on networks other than Airtel	Risks and barriers Mobile penetration/coverage, cost

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

With over 5 million users, this application clearly has significant market potential. It appears that after the initial setup costs, the ongoing support of the project is sustainable for both IFFCO and Bharti.

Replicability / hurdles / issues *Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high* The application requires a large agricultural organization with a large number of members to replicate the IKSL model. However, the reliance on basic voice service and the provision of agricultural information relevant to users appears to be an appealing formula for rural users in India.		
Further study / research questions		**Select for case study** No
Contact Rakesh Kapur IFFCO	**Comments on contacts made, arrangements, etc.**	

Subsector *I.e., Which of Typology Subsectors* Governance / Political	Name of Application and References eSMS: - http://esms.kerala.gov.in/ - http://www.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 - http://mait.com/event_images/21jan%20Bangalore%20ppt/Kerala.zip - http://www.itmission.kerala.gov.in/ksitm-e-governance-projects/146-m-governance.html	Country(s) / Region India: Kerala State

Segment / Activity
i.e., which Segment in the Typology

E-Government and administration relevant to rural development

Description of Application
Note whether it is purely information or transaction based

eSMS is an exclusive SMS Gateway established by the Kerala State IT Mission for use by various government departments for providing departmental services over mobile phones.

The M-Governance project in Kerala, is a comprehensive Mobile Governance project covering ninety odd Government Departments. The objective of the project is to integrate the advancements in mobile technology with various Government departments with an aim to create cost effective, efficient and round the clock Government information systems. The three channels of mobile communication (Voice, Signalling and Data) and a wide range of technologies(Voice Applications, Applications using signalling channel and data service based Applications) are being used for this purpose. A comprehensive and integrated Service Delivery Platform is being created to roll out the various services and the M-Governance strategy is being formulated.

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS, voice	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* The SMS platform has the potential to host many applications. Consulting is done between the Kerala State IT Mission and various departments to custom design applications. Technological progress could make the application development process easier. The increase in SMS usage and familiarity could increase the applications' viability.

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* Government of Kerala	Lead role(s) Developed platform and develop/host applications

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

In order to take the full advantage of mobile and wireless ICT technology as well as dealing with the fluidity of the interaction with the mobile society and booming mobile usage rates, the Kerala State Government has initiated action to set up about 20 m-Government Services offered by 8 departments identified for pilot level implementation and to deliver services though mobile phones accessible to the citizens anywhere, rather than the users having to visit Government offices or log on to the Internet portals to access services.

Other key players	Roles	Incentives / Business model

Year of commencement 2008	Maturation Cycle Position *Emerging / Expanding / Mature* Expanding	Status *E.g., Pilot / Rolling out / Established* Rolling out

Comment on maturation / status of development

The platform has been developed. The first service, Dr. SMS – (m-health application), an SMS based Health Information System for Kozhikode District, was launched in November 2008. The Kerala State IT Mission website lists many services planned for implementation (http://www.itmission.kerala.gov.in/ksitm-e-governance-projects/435.html).

Costs of the application & evidence of cost recovery & profit/sustainability
E.g., Development of the technical systems & content; maintenance & skills

No information available.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

The service is designed to serve all citizens with mobile phones. The benefits are the availability of services remotely, without incurring the costs or the time required to visit government offices. Since the service is SMS-based, the system is also quite easy to learn for new users.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

No information available.

SWORB *[Maybe summary of other sections]*	**Strengths** Remote access, low cost service	**Weakness** SMS does not have the ability to provide more complex applications
	Opportunity Increase number of services, expand to other technologies (WAP, USSD, Java etc)	**Risks and barriers** Translating government services supplied through traditional face-to-face service to mobile applications

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

Over 2/3 of Kerala's population are mobile subscribers. The government expects total fixed+mobile penetration to exceed 100% by the end of 2011.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

M-government services are growing in a number of developing countries. It is unclear if the Kerala model can be replicated in other jurisdictions.

Further study / research questions	Select for case study No

Contact Dr. Ajay Kumar Chairman KSITM & Principal Secretary - Dept. of IT	Comments on contacts made, arrangements, etc.

Subsector *I.e., Which of Typology Subsectors* Labor, Migration and Human Development	Name of Application and References Jokko Initiative: • http://www.jokkoinitiative.org/ • http://www.vitalwaveconsulting.com/pdf/Women-Mobile.pdf • http://www.comminit.com/en/node/312209/38 • http://mobileactive.org/how-tostan-using-mobiles-literacy-and-community-empowerment • http://www.dimagi.com/senegal-part-2-the-jokko-initiative/ • http://www.rapidsms.org/case-studies/senegal-the-jokko-initiative/	Country(s) / Region Senegal

Segment / Activity
i.e., which Segment in the Typology

Rural youth AND Rural women opportunities

Description of Application
Note whether it is purely information or transaction based

Phase One
Tostan is adding a new component to its community empowerment program (currently reaching over 800 communities in eight African countries), to teach the practical uses of standard cell phone capabilities and SMS texting. Mobile phones will increasingly serve as the platform for services provided by governments, health clinics, schools, and banks. The Jokko Initiative will provide a new generation of girls with access to the valuable tools of communication technology, and training in its applications for community engagement and positive social change.

Phase Two
The Jokko Initiative also aims to provide practical SMS-based applications. Placed within a program of community-led development, mobile phones and SMS texting have the potential to accelerate positive social change, by:

1. Connecting women with each other and with their communities, helping to build consensus on local development priorities;
2. Amplifying the voice and influence of youth and marginalized groups, in a community's decision-making process;
3. Providing a platform for exchanging information, broadcasting ideas and organizing advocacy work;
4. Accelerating social interaction and facilitating large-scale and significant cross-group effects at community and societal levels

To these ends, the Jokko Initiative is identifying mobile services that exist to serve the needs of rural communities, as well as developing new mobile applications as they are needed.

(also see the RapidSMS profile for more information on the underlying technology)

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* The application is built on UNICEF's RapidSMS platform. It's success in part depends on the usage/acceptance of SMS.
Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* Tostan (NGO)	**Lead** role(s) Co-developed the application, conduct education classes

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

The Jokko Initiative makes it possible to communicate with a network of people by simply sending a text message. Through Jokko's RapidSMS Community Forum, a user can send an SMS text message to a "magic number" that then forwards the message to all phone numbers belonging to the network. The module also introduces mobile phones as pedagogical tools to teach and reinforce literacy as well as the organization and management skills taught in Tostan's Community Empowerment Program.

The Community Forum allows a nurse, a literacy leader, a representative of a women's association or the village imam to communicate with community members about events and activities like a vaccination campaign or a literacy group meeting. Not only does the Community Forum raise awareness about events, but it also involves the entire community in decisions and spreads the news of positive social change in their villages.

Other key players	Roles	Incentives / Business model
1. UNICEF	Developed the RapidSMS platform	Development
2. Center of Evaluation for Global Action (CEGA) of the University of California Berkeley	Conducted baseline survey	Development
3. Dimagi	Assistance with application development	Development

Year of commencement	Maturation Cycle Position *Emerging / Expanding / Mature*	Status *E.g., Pilot / Rolling out / Established*
2009	Emerging	Pilot

Comment on maturation / status of development

The application is currently in use in 25 villages in Senegal. Further development/modifications to the application could be made as a result of the evaluation research being conducted in conjunction with the pilot project.

Costs of the application & evidence of cost recovery & profit/sustainability,
E.g., Development of the technical systems & content; maintenance & skills

No information available.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

Guillaume Debar of Tostan says that women, especially older women, are proud of their ability to use the phones and serve as an example to their daughters and granddaughters.

There are unexpected positive impacts of innovating the way mobiles are integrated into communities in the Cassamance. In Kagama, for example, the Tostan team received news from the local school teacher that attendance has risen since mobile literacy was included in Tostan's basic education program.

September 8, 2010 - On International Literacy Day, Tostan, along with partners UNICEF and the Center of Evaluation for Global Action (CEGA) at the University of California, Berkeley, have released initial findings of an evaluation that shows great promise for using text messaging as a means for improving literacy and community development.

The evaluation centered on a pilot of the Jokko Initiative, which was implemented in 25 villages in the Velingara region of Senegal, bringing innovative mobile technology education to 800 program participants. These villages were already engaged in Tostan's Community Empowerment Program (CEP), a 30-month holistic education program covering human rights, democracy, health and hygiene, problem solving, literacy, and numeracy.

Focusing on improving communication and reinforcing literacy during and after the CEP, the Jokko Initiative teaches participants to use cell phones and send text messages in local languages. It is designed to give participants a vital literacy practice tool and enable them to better reach out to their communities and social networks.

"While more research needs to be done to identify how best to harness cell phones in promoting literacy--the results from the pilot study are promising as they show that teaching people how to read and write messages on a cell phone can be a positive addition to a successful literacy program," says Theresa Beltramo, Economist and Evaluation Coordinator for CEGA.

Molly Melching, Executive Director of Tostan, said that this program, in her opinion, has incredible potential. "For years we have been looking for ways to address the challenge of making literacy relevant, finding ways for participants to practice their new skills, all the while engaging women and girls in the process and reinforcing existing social ties. This project does all of these things."

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

According to the evaluation conducted by CEGA in these villages, women and girls, who had the lowest rates of literacy and numeracy before the Jokko Initiative began, greatly improved over the course of the project. The percentage of women and girls who scored in the highest category for literacy and numeracy increased from 12% for women and 8% for girls at the baseline, to 29% and 33% at the follow-up. Moreover, the number of participants who were able to write a text message jumped from 8% to 62%.

During the evaluation, two rounds of data collection took place: a baseline and a second round after the first four months of Tostan's literacy and numeracy training. At the outset of the program, only 22% of the participants--the majority whom are women--reported being literate. Only 18% reported having any formal schooling. CEGA's research shows that after the four months, both literacy and numeracy increased substantially.

SWORB *[Maybe summary of other sections]*	**Strengths** Addresses literacy and communications issues simultaneously, SMS is relatively easy to learn	**Weakness** Sustainability could be a challenge
	Opportunity Expanding geographically	**Risks and barriers** Literacy, familiarity with mobile, affordability of mobile

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

It appears, from the initial pilot evaluation, that the application is producing some positive outcomes. Given low literacy rates in many developing countries, it seems that there is significant potential for an application such as this. The main issue could be sustainability, as Tostan is paying for the text messages. The issue could come down to the ability of project sponsors to develop partnerships with mobile operators to make the application sustainable.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

Since the application is built on the already international RapidSMS platform, it should be possible to replicate the service. The issue will be in finding local partners who are working in rural areas on literacy.

Further study / research questions	**Select for case study** No

Contact Guillaume Debar Project Manager Tostan International jokkoinitiative@tostan.org	**Comments on contacts made, arrangements, etc.**

Subsector *I.e., Which of Typology Subsectors* Resource Management, Rural Finance, Infrastructure & ICT	Name of Application and References SMSONE: • http://smsone.in • http://techcrunch.com/2009/11/30/smsone-micro-local-india-news/ • http://www.nasscomfoundation.org/index.php?option=com_content&view=article&id=505&Itemid=180 • http://business.in.com/article/special/5-hot-startups-to-watch-in-2010/8302/1 • http://www.netsquared.org/projects/local-sms-community-newsletter-promotion-self-employment	Country(s) / Region India

Segment / Activity
i.e., which Segment in the Typology

Water, printed media

Description of Application
Note whether it is purely information or transaction based

SMSONE is basically a very-local newsletter. The company goes to a village and scouts out an unemployed youth—preferably one who's had jobs as a street vendor or has experience going door-to-door shilling for local politicians. The youth pays the company 1000 rupees (or about $20) for the "franchise" rights to be the local reporter for that village. He goes door-to-door signing up 1,000 names, phone numbers and other basic information, then mails the slips to Ghate. Ghate enters it all in his databases and all those "subscribers" get a text introducing the youth as their village's reporter. In India all incoming texts are free so, the subscribers don't pay anything.

And what readers get is quite powerful. Right now there is no way to get a timely message to people in a village. There's no Internet access, no TV, no local paper, and frequently no electricity. All they have is a basic mobile phone. SMSONE's service can give farmers instant updates about crop pricing or news of a seed or fertilizer delivery a town away. That means the farmer only makes the trip when he knows the shipment is there, rather than wasting days of travel hoping the shipment is there.

Consider something even more fundamental: Water. Many of the villages have government-owned water pipes that are turned on for an hour or so once a day, or even in some areas once a week. Everyone has to bring their vats, pitchers and empty kerosene cans and get as much water as they can while the pipes are on. But these pipes don't really run on a schedule so people frequently miss getting the day's or week's water. Now, SMSONE subscribers get a text when the pipes are about to be turned on.

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* The viability of the app depends on the penetration of mobile phones and the usage of SMS.

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* SMSONE	**Lead** role(s) Developed and operate the application

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

SMSOne operates local SMS Community Newsletters to promote self employment amongst unemployed youth. Typically a youth collects 1,000 mobile numbers of local residents and starts a SMS based newsletter to alert, update and inform them about local/social happenings. It is a free service to citizens and yet the unemployed youth

earns about 6,000 - 10,000 per month through promotional messages. SMSONE acts as a facilitator, allowing the entrepreneurial instincts of the young person to figure out which SMS messages would interest his communities as well as local advertisers and establishments.		

Other key players 1. Local youth	**Roles** Gathers customers and forwards messages to them	**Incentives / Business model** Income generation
Year of commencement 2006	**Maturation Cycle Position** *Emerging / Expanding / Mature* Expanding	**Status** *E.g., Pilot / Rolling out / Established* Rolling out

Comment on maturation / status of development

The project was launched commercially in 2007 and is now operational in over 325 local communities. There are plans to expand nationally, throughout India.

Costs of the application & evidence of cost recovery & profit/sustainability,
E.g., Development of the technical systems & content; maintenance & skills

No information available.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

- Offer Self-employment to youths without any huge investment.
- Develop a unique media, fruits of which would be shared by all self employed youths.
- Distribute lifelong benefit to self employed youths for one time work.
- Integrate mobile users of all operators.
- Run a location based SMS newsletter.
- Update members through Local News & Happenings speedily.
- Customize SMS services as per the community demands, like emphasis on Spiritual, political or cultural alerts.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

No information available.

SWORB *[Maybe summary of other sections]*	**Strengths** Provides free local information, creates employment	**Weakness** Requires competent local youth in each village, significant training requirements as application scales up
	Opportunity Expanding nationally/internationally	**Risks and barriers** Finding enough entrepreneurial youth

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

As of March 2010, 325+ local communities are successfuly operational in 25 districts, encompassing 75+ blocks in the state of Maharashtra giving self employment opportunities to more than 350 youths. Given this success to date, the application appears to have very significant market potential in India, and possibly other developing countries.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

It should be possible to replicate SMSONE in almost any country. There is always a desire for local information and the technology does not appear to be too costly to replicate.

Further study / research questions	Select for case study
	No

Contact	Comments on contacts made, arrangements, etc.
Ravi Ghate Founder, SMSONE	SMSONE website notes that after their success and publicity from winning numerous awards, they no longer want to be contacted by a wide range of people, including consultants.

Subsector *I.e., Which of Typology Subsectors* Labor, Migration and Human Development	Name of Application and References Kazi560: • http://www.kazi560.co.ke/ • http://uk.oneworld.net/article/view/117286 • http://mobile.oneworld.net/docs/lal/Lessons_Learnt_Nigeria_2009.pdf • http://nextlab.mit.edu/spring2009/main/wp-content/uploads/2009/01/2009-04-09-toyama-next-billion.pdf • http://observatory2009.cta.int/pdf/Mobile-Devices-Discussion-Paper.pdf	Country(s) / Region Kenya

Segment / Activity
i.e., which Segment in the Typology

Employment

Description of Application
Note whether it is purely information or transaction based

Kazi 560 is a job information service that links job seekers to employers through the use of their mobile phone. Kazi was initially started in 2004 as a pilot project to provide job information to job seekers on entry jobs for people at the bottom of the pyramid then later grow to the business it is today.

The Kazi 560 service is run by Mobile for Good. The service is available to all Safaricom subscribers all over Kenya. Organizations that have used the service include Budget Car Hire, Metropolitan Hospital Numetro cinemas, KENATCO taxis, AA Kenya and Symphony. According to the company's website, their database has grown to over 30,000 subscribers within the first 4 months of starting the service. The only cost to job seekers is the Kshs 10/= charged when one receives an SMS with job information. (some sources report that it costs Kshs 7, not 10, although the 7 APPEARS to be the old, pilot pricing) One source says that the service makes 250 job matches per week. In 2006, vver 60,000 had found employment through Kazi560. In addition, some employers have said that this is the only form of recruitment they are now using.

There is also a new Kazi service, Kazi 6002-'From Chuo to Kazi'. From Chuo to Kazi is a job information service that links students seeking employment to job opportunities through their mobile phones. At the moment, there are over sixty categories in the data base with plans in add more.

Within three years of launch, Kazi560 was a profitable social franchise which could be handed over to a local entrepreneur – it is now one of Kenya's biggest job alerts service.

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* The penetration rate of mobile phones and familiarity with SMS will have an impact on this application's viability.

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* Mobile for Good	Lead role(s) Developed and operate the service

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

There is no charge to companies advertising jobs with Kazi 560, and a Kshs 10 fee for job seekers to receive SMS messages notifying them about potential jobs of interest. Within months of starting the service, there were over 30,000 subscribers and around 250 job matches were being made per week. Employers get access to a large pool of potential workers and job seekers get access to job postings possibly not available elsewhere for a low cost.

Other key players	Roles	Incentives / Business model

1. Safaricom	Mobile/SMS service provider	Revenue, CSR
Year of commencement 2003/2004	**Maturation Cycle Position** *Emerging / Expanding / Mature* Mature	**Status** *E.g., Pilot / Rolling out / Established* Established

Comment on maturation / status of development

The application has been commercially available for over five years.

Costs of the application & evidence of cost recovery & profit/sustainability,
E.g., Development of the technical systems & content; maintenance & skills

No information available about costs. However, Kazi 560 is self-sufficient, as part of Mobile for Good, which has annual revenues of over USD 100,000. Below is information from Oneworld on Mobile for Good franchises:

The following are the projected costs, revenue and net profits for starting up and running a franchise for the first 3 years[1] in US dollars in smaller, developing markets like Nepal, Caribbean and similar markets.

	Year 1	Year 2	Year 3
TOTAL REVENUE SUMMARY			
Jobs	55,000	85,000	127,500
Health Tips-HIV/AIDS	2,808	3,509	4,387
Morning Prayer & Motivational Tips	4,250	6,375	9,563
TOTAL REVENUE	**62,058**	**94,884**	**141,449**
TOTAL COST SUMMARY			
Total Salaries & Wages	21,616	32,724	37,381
Total Office Overheads	5,882	7,329	9,725
Total Content	6,000	7,500	9,000
Total Product Marketing	15,000	18,153	21,379
Cost of Business	21,632	6,000	6,000
TOTAL COSTS	**70,130**	**71,706**	**83,485**
Net Profit USD	**- 8,073**	**23,178**	**57,964**

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

- Time Saving: Using SMS as the advertising channel will save time as well as money. An HR manager at a bank said "In two days I was able to recruit a payroll accountant."
- Economical: This service FREE. They do not charge to advertise, only the recipients of the SMS are charged Kshs 10/-.
- High Reach: It is estimated that 80% of the jobseekers live in areas covered by a mobile phone signal countrywide. Kazi 560 has subscribers in almost all areas where there is mobile phone coverage.
- Immediacy and Accessibility: An SMS is typically delivered within seconds, which gives employers and the jobseekers an almost real time feel of the current vacancy. Some satisfied customers have been able to fill their positions in 48 hours.
- Reliability: Since SMS was launched, it has excelled as an acceptable communications medium and is widely accepted as new business communications channel.
- Simplicity: Technology has simplified our business processes. When a vacancy occurs, all that is needed is to contact Kazi 560 with the job profile, within five minutes the advertisement will be broadcasted, the applications will start being received in a few hours.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

There are at least 250 job matches per week through Kazi 560.

SWORB *[Maybe summary of other sections]*	**Strengths** Fast, convenient, affordable	**Weakness** Limited information provided via SMS
	Opportunity Geographic expansion	**Risks and barriers** Imbalance between job seekers and employers could make the service ineffective for one of those groups

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

Kazi560 is self-sufficient. This is partly because, as an early example of such a service in Kenya and with some high-level commercial backing, the revenue share with Safaricom is more generous than in other cases. It is also because it has a specific but large target audience: the number of people in the 1 million plus inhabitants of Kibera looking for work is high, it targets mainly the informal sector and the service is free to those seeking staff, so there is a constant supply of information. However, it was also fully supported financially for three years and had a partial subsidy for at least another two.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

As one of the applications offered through the Mobile for Good service, this application is designed to be replicated around the world. The initial investment and payback period appear to be reasonable, based on the Kenyan experience. The service would benefit from being in countries with high mobile penetration and familiarity with SMS, which today describes most countries.

Further study / research questions	**Select for case study**
- Additional information about the business plan. - How much has the business grown recently (most user/job match statistics appear to be several years old now) - How much success has Mobile for Good had with this service in other countries? - Is fraud a problem or concern?	No

Contact	Comments on contacts made, arrangements, etc.
Antony Mwaniki, Business Manager, Mobile for Good info@kazi560.co.ke or antony.mwaniki@oneworld.net or antony.mwaniki@gmail.com	

Subsector *I.e., Which of Typology Subsectors* Agriculture, Animal husbandry, Fisheries & Forestry	Name of Application and References Foodnet and Farmgain: • http://www.foodnet.cgiar.org/market/market.htm • http://farmgainafrica.org/	Country(s) / Region Uganda

Segment / Activity
i.e., which Segment in the Typology

Agro-marketing / trade

Description of Application
Note whether it is purely information or transaction based

Farmgain Africa is currently providing commodity market information for slightly scaled down service that was formerly the agricultural MIS-FOODNET national service. It has agents in 11 districts providing market information at wholesale and retail levels. It has provides the central market information from four markets in the Kampala on a daily basis.

Once a week the information is disseminated by sms/email and fax to a clientele in form of data spread sheet and market report. The same information is held on the all mobile phone networks viz MTN, Zain, Warid and UTL. It can then be accessed with a mobile phone via SMS by typing a keyword, for example, 'maize', sending it to phone number 8198 and a few seconds later the information is sent back to the user's phone.

These services are designed to meet the information needs of grass-root agricultural actors, especially local farmers and small-scale traders. Data on prices, traded volumes, market flow, growing conditions and other relevant information is collected from villages and market centres in these districts and, together with relevant national and regional information is disseminated. Close liaison is maintained with local government, local market managers, farmers' associations, radio station managers, etc.

Farmgain Africa and other firms provide MIS in Uganda after the conclusion of the USAID VOCA funded MIS that closed in September 2006.

Farmgain is a consultancy firm that specializes in agri-business, market information, value chain analysis and agro enterprise development. It provides small and large scale farmers with professional service and consultation. Farmgain has positioned itself as a specialist in the field of marketing and market information, collection, analysis and dissemination and facilitating rural agro-enterprise development and market linkages.

FarmGain staff have worked with FOODNET on a number of projects which it has been implementing and backstopping. They have also been collaborating on many other post harvest, marketing information projects and agro-enterprise development projects.

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* The viability of the service will depend in part on the popularity of SMS.
Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* Farmgain	**Lead role(s)** Helped develop and manages the application

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

The marketing information service in Uganda is operating in a public private partnership. Farmgain Africa and other firms provide MIS in Uganda.

Farmgain Africa is currently providing commodity market information for slightly scaled down formerly agricultural MIS-FOODNET national service. It has agents in 11 districts providing market information at wholesale and retail levels. It has provides the central market information from four markets in the Kampala on a daily basis.

Once a week the information is disseminated by sms/email and fax to a clientele in form of data spread sheet and market report. The same information is held on the all mobile phone networks viz MTN, Zain, Warid and UTL. It can then be accessed with a mobile phone via SMS by typing a keyword, for example, 'maize', sending it to phone number 8198 and a few seconds later the information is sent back to the user's phone.

Other key players	Roles	Incentives / Business model
1. mobile operators	SMS service providers	Revenue, CSR
2. agricultural markets	Provide pricing data	Improve market efficiency

Year of commencement	Maturation Cycle Position *Emerging / Expanding / Mature*	Status *E.g., Pilot / Rolling out / Established*
2002	Mature	Established

Comment on maturation / status of development

This market information service application was first developed in 2002 and has moved from being part of a 5 year project in part sponsored by USAID, to being a public private partnership.

Costs of the application & evidence of cost recovery & profit/sustainability,
E.g., Development of the technical systems & content; maintenance & skills

No information available.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

Farmers can use market information to:
• reduce risk associated with marketing
• decide where to sell their commodities
• check on the prices they are getting
• make decision on storage of commodities
• decide whether to grow out of season
• decide on crops to grow
• decide on value addition costs and benefits
• decide when to sell their commodities

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

No information available.

SWORB *[Maybe summary of other sections]*	Strengths Timely, convenient, specific information	Weakness Limited number of markets, goods
	Opportunity Geographic expansion	Risks and barriers Gathering market data can be labour-intensive

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

Since the service has existed since 2002, it is clearly valuable. The information is gathered by Farmgain and other private organizations, in association with the government. It is unclear if the service would be sustainable if offered on a purely commercial basis.

Replicability / hurdles / issues	
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high There are many mobile market information services being offered throughout the developing world, so the model does work in a wide range of countries. However, it is still unclear if many of these services will be self-sustaining once the support of sponsors comes to an end.	

Further study / research questions	**Select for case study**
	No

Contact	**Comments on contacts made, arrangements, etc.**
info@farmgainafrica.org	

Subsector *I.e., Which of Typology Subsectors*	Name of Application and References	Country(s) / Region
Labour, Migration and Human Development	Question Box / Open Question: • http://questionbox.org • http://www.grameenfoundation.applab.org/applab-blog/2009/10/23/what-do-farmers-want-to-know/ • http://www.grameenfoundation.applab.org/ckw/uploads/pdf/Grameen%20Foundation%20Community%20Knowledge%20Worker%20Pilot%20Report%204.24.2010.pdf • http://blog.ushahidi.com/index.php/2009/11/05/open-question-mixing-analog-digital • http://www.dw-world.de/dw/article/0,,5562366,00.html	India, Uganda

Segment / Activity
i.e., which Segment in the Typology

Education, Learning and Training

Description of Application
Note whether it is purely information or transaction based

Question Box is Open Mind's initiative that helps people find answers to everyday questions like health, agriculture, business, education and entertainment. It provides easy access to information in hard-to-reach areas and breaks through technology, language and literacy barriers. This is done through:
• Live telephone hotlines connected to live operators
• SMS (Text Messaging)
• Mobile and solar technologies that operate off the grid
• Open Question – a simple software to start your own Question Box project

Question Box is currently live near Pune, India with new projects coming up in Uganda and India. Recent pilot studies were conducted successfully in Bushneyi and Mbale districts of Uganda and Noida, India. They are also helping several organizations start their own Question Box-inspired services.

Open Question is software that lets users set up and run a very simple hotline from their office. It is Open Source, meaning users' software programmers can download and install it in their offices. Open Question works with or without Question Boxes.

All users need is a:
• Computer
• Telephone (Mobile or Landline)
• Staffer to take calls
• Internet (Optional)

Open Mind's mission is to break down the barriers of poverty by connecting hard-to-reach people with information they need or want to know.

Technology *E.g., voice, video, sms, email, GPS, multi-media*	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability*
Voice, SMS	The original Question Box distribution in India did not include the option of calling from a private mobile phone, but through the association between Open Mind and the Grameen Applab, that functionality was added for the pilot project in Uganda.

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent*	Lead role(s)
Open Mind	Developed the concept and co-developed the application

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

Question Box is Open Mind's initiative that helps people find answers to everyday questions like health, agriculture, business, education and entertainment. It provides easy access to information in hard-to-reach areas and breaks through technology, language and literacy barriers. They do this through:

- Live telephone hotlines connected to live operators
- SMS (Text Messaging)
- Mobile and solar technologies that operate off the grid
- Open Question - a simple software to start your own Question Box project

Other key players	Roles	Incentives / Business model
1. Appfrica Labs	Application development	Revenue, development
2. Grameen Applabs	Application development	Development

Year of commencement	Maturation Cycle Position *Emerging / Expanding / Mature*	Status *E.g., Pilot / Rolling out / Established*
2007	Emerging	Rolling out

Comment on maturation / status of development

The first pilot began in 2007. As experience is gained, minor changes are being made. For instance, the button on the call box initially had to be held down, but now just requires a brief push. The addition of SMS technology came during the Uganda pilot. It is not clear if the SMS option will be widely used.

Costs of the application & evidence of cost recovery & profit/sustainability,
E.g., Development of the technical systems & content; maintenance & skills

No information available.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

Callers to Question Box will experience improved livelihood outcomes due to: increased revenue and decreased losses for agricultural activities. Grameen Applabs observed numerous examples in which farmers used the remedies suggested through the helpline to treat livestock and crop diseases before their crops were destroyed or animals were so sick they had to be brought to the vet or slaughtered. Farmers also used information from the hotline to address pest problems, address nutrient deficiencies, and learn about planting, spacing, starting new enterprises, or proper livestock care.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

No information available.

SWORB *[Maybe summary of other sections]*	Strengths Fast responses to questions, local language operators, low literacy requirements, free to end-users	Weakness Sustainability, call centre hours may not be convenient for users
	Opportunity Increased call centre hours, geographic expansion, adding a means of revenue generation	Risks and barriers If expert advice is required, response times can be too long for the call's needs

Market potential assessment

E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service
The lack of an ongoing deployment in Uganda due to a lack of funding shows that the service is not self-sustaining. The devices are cheap to build and run, with the simplest version costing 100 euros, while a more sophisticated version equipped with GPS technology costs 250 euros. An additional expense is the 300-euro monthly salary of the local language operator. Funding for the Pune distribution comes from the National Internet Exchange of India (NIXI) and private donors.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high
The five-month trial in Uganda was deemed successful, with almost 2,000 farming-related questions asked. But operators ran into several major obstacles: They lacked access to crop prices in the local market and were slowed by Uganda's poor Internet speed and reliability. Without additional funding, there are no plans to continue operating in Uganda. Question Box encountered a universal problem in both India and Uganda. Users were so daunted by the wealth of information available to them for the first time, they didn't know where to start.

Further study / research questions	**Select for case study**
	No

Contact	**Comments on contacts made, arrangements, etc.**
Rose Shuman Founder, Open Mind	

Subsector *I.e., Which of Typology Subsectors* Agriculture, Fisheries & Forestry, Labor, Migration and Human Development	**Name of Application and References** LifeLines: • http://www.lifelines-india.net/ • http://observatory2009.cta.int/pdf/Mobile-Devices-Discussion-Paper.pdf • http://www.usaid.gov/our_work/global_partnerships/gda/ag_guide/ag_guide.pdf • http://southasia.oneworld.net/todaysheadlines/lifelines-education-service-goes-tollfree-in-rajasthan	**Country(s) / Region** India

Segment / Activity
i.e., which Segment in the Typology Agro-support, Agro-marketing / trade, "Education, learning & training"

Description of Application
Note whether it is purely information or transaction based Agriculture: The system's database which stores the Frequently Asked Questions (FAQs) received in the service, comprises a list of more than 350,000 questions and answers currently, and this number is growing rapidly by the day. The service is being implemented on the ground in partnership with Indian Society of Agri-Business Professionals (ISAP), TARAHaat, Datamation Foundation and IRRAD, who in turn implement the service on the ground through a network of field volunteers. These volunteers, known as Field Coordinators, work as the point of contact for using the LifeLines service and facilitate rural users to register their queries with the help of a mobile phone. ISAP also serves as the domain expert for the service. Education: The LifeLines - Education service was introduced to provide value-added and critical academic support to teachers in remote rural areas for their day to day academic transactions. Through the medium of the telephone, the service links up rural teachers with education experts whom they can access for their subject-matter and pedagogy-related queries; these experts may otherwise be located in different places and may not be as easily accessible

Technology *E.g., voice, video, sms, email, GPS, multi-media* Voice, voicemail	**Technical development path** *Note any past or expected changes and what impact technological change could have on the application and its viability* A February 2010 agreement with the government of Rajasthan implemented a toll-free number for callers all over the state to use for Lifelines.

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* OneWorld	**Lead role(s)** Initiated development of LifeLines, operates service

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe) The user dials the designated LifeLines number using a landline or mobile phone. The answer, once created, is then played back when the user calls the service for the answer to his query. The user can also retrieve the answer in text format from his / her village information centre. The user pays for the 2 calls, however, the service is not self-sustaining.

Other key players	**Roles**	**Incentives / Business model**
1. Cisco	Provides the back-office system	CSR
2. BT	Provides the information database	CSR
3. UNICEF	Resource support for education service	Development

Year of commencement	Maturation Cycle Position *Emerging / Expanding / Mature*	Status *E.g., Pilot / Rolling out / Established*
2006	Mature	Established

Comment on maturation / status of development

The service started in 2006 and both the agricultural service and the educational service are mature.

Costs of the application & evidence of cost recovery & profit/sustainability,
E.g., Development of the technical systems & content; maintenance & skills

No information available.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

Indian farmers often work in harsh environments and face daily challenges, ranging from crop failure and animal illness to indebtness. Limited communication facilities hinder timely help. The LifeLines-Agriculture service responds to this need by providing advice and guidance to farmers through critical agri-advisory and livelihood information.

The LifeLines - Education service was introduced to provide value-added and critical academic support to teachers in remote rural areas for their day to day academic transactions.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

The LifeLines India Partnership demonstrated a 20 to 30% increase in productivity among users.

SWORB *[Maybe summary of other sections]*	**Strengths** Answers to specific questions, inexpensive, wide range of information available	**Weakness** Requires a call-back to get the answer, not sustainable
	Opportunity Additional revenue generation, more timely responses	**Risks and barriers** Other agricultural information services could limit LifeLines' success

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

- Over 150,000 farmer households across 3 states - Haryana, Madhya Pradesh and Uttar Pradesh - in the agriculture sector.
- Over 455,518 teachers in 105,676 schools across the state of Rajasthan where it serves as a toll-free helpline in the education sector.
- Cumulatively LifeLines Agriculture and LifeLines Education receive and respond to an average of 600 calls/day.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

The service could grow elsewhere, but the exact system used by LifeLines is believed to be quite expensive, in particular, the back-office system provided by Cisco. Also, the service is not self-sustaining, so it would require partnerships to grow elsewhere. However, the need for agricultural extension services in developing countries is significant, so the service does meet a need.

Further study / research questions	**Select for case study**
Is the service close to self-sustaining? Has this been a significant consideration, or is agricultural/educational development the only significant consideration?	Yes

Contact	Comments on contacts made, arrangements, etc.
Shakeel Ahmad Project Manager, LifeLines shakeel.ahmad@oneworld.net	

Subsector *I.e., Which of Typology Subsectors* Agriculture, Fisheries & Forestry	Name of Application and References mKrishi: • http://www.csr360gpn.org/magazine/feature/mkrishi-connecting-indias-rural-farmers/ • http://tcsinnovations.com/index.php?option=com_content&view=article&id=545&Itemid=112 • http://www.stockholmchallenge.org/project/2010/mkrishi-innovative-platform-deliver-personalized-and-integrated-services-farmers • http://www.gomonews.com/tata-consultancy-services-working-to-turn-its-mkrishi-agricultural-info-service-into-a-global-entrepreneurial-platform/ • http://www.egovonline.net/articles-list/47/8393-eindia-2010-eagriculture-awards.html • http://www.bitc.org.uk/resources/case_studies/mkrishi.html • http://www.i4donline.net/articles/current-article.asp?Title=mKRISHITM,TCS,India&articleid=2246&typ=Features	Country(s) / Region India

Segment / Activity
i.e., which Segment in the Typology

Agro-support (e.g., weather, advertising, emergency)

Description of Application
Note whether it is purely information or transaction based

The mKRISHI application enables farmers to send queries, comprising of text, voice and pictures, specific to their land and crop to agricultural experts, using their mobile phones. The mKRISHI ecosystem provides an integrated view of the farmers profile, farming history, and the required farm parameters on a console at a remote location to an expert. Farmers can also send pictures of their crops and pests captured with mobile phone cameras; sensors provide farm specific soil and crop data, weather stations provide microclimate details and voice based querying system gives freedom to the farmers to ask any query in their local (natural) language. After analysis of the available information, the expert's advice on the farmer's query is provided on the farmer's mobile phone.

Technology *E.g., voice, video, sms, email, GPS, multi-media* Voice, text, photos	**Technical development path** *Note any past or expected changes and what impact technological change could have on the application and its viability* The service involves an integrated platform. A range of technical developments could enhance the system's capabilities.

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* Tata Consultancy Services	**Lead role(s)** Developed and operate the application

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

Most farming communities in the Indian hinterland have limited access to communication/information media that can provide them with crop-specific farming advice, meteorological predictions, and suggestions on productivity enhancement measures such as use of fertilizers, choice of seeds, and so on. Appropriate and, more importantly, timely dissemination of such information and advice can potentially lead to more effective agricultural practices, thereby ensuring enhanced productivity and efficiency, reduced environmental damage, and improved economic status of the farmers.

the mKRISHI system advises the farming community on a range of queries. Through mKRISHI, farmers can send

their queries to a remote expert through their mobile CDMA handsets. Along with their queries, they can also send a photograph of the crop through a camera phone. The information related to crop, soil and micro-environment, gathered by sensors, is sent to experts through an automatic weather station using the cellular network. Farmers receive responses to their queries through the same channel. The integrated mKRISHI solution can assist farmers in achieving better productivity, a higher standard of living, and will transform farming into a knowledge-based economic activity.

Other key players	Roles	Incentives / Business model
1. Agri-input companies	Provide services on the mKrishi platform	Revenue, CSR
2. Poultry/dairy companies	Provide services on the mKrishi platform	Revenue, CSR
3. Rural banks	Provide services on the mKrishi platform	Revenue, CSR

Year of commencement	Maturation Cycle Position *Emerging / Expanding / Mature*	Status *E.g., Pilot / Rolling out / Established*
2007	Expanding	Rolling out

Comment on maturation / status of development

mKRISHI was piloted in four villages for two years and launched on a commercial basis in several villages in Punjab and Utter Pradesh states.

The mKRISHI platform (internally called mHEALTH – PHC Platform) has been modified for delivering primary health care to villagers. Instead of farmers and soil analysis details, the system provides patient's health records and queries. Doctors could remotely prescribe medicine to patients through village health workers. Such delivery of primary health care remotely could be termed as "poor man's telemedicine" – since the entire set up is inexpensive and uses the existing wireless network.

Costs of the application & evidence of cost recovery & profit/sustainability,
E.g., Development of the technical systems & content; maintenance & skills

No information available.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

The solution broadcasts best farming practices to each farmer, and provides organizations, NGOs , and the government a platform to exchange information with farmers. TCS Mobile Agro Advisory System is best suited for a rural audience, as it:
- Breaks literacy barriers. The solution has rich content and media formats, local language interfaces, voice messaging systems that are accessible to semi-literate and number-literate users.
- Uses familiar technology: The end user needs to use mobile phone which is more popular compared to computers in rural India.
- Provides connectivity to the sources of information. It provides a framework to connect farmers to the information relating to government policies, financial institutions, crop insurance, market prices, fungicides, pesticides, seeds and cold storage availability.
- Improves social Interaction among rural community: With the help of developed Rural-Net (R-Net), a mobile phone based social networking environment, rural masses can interact with each other by posting and browsing voice microblogs in any language of their choice. The application also provides news feeds in local language and information about cloud coverage, rainfall and temperature in easy to interpret graphical format. Currently R-Net is available in its two variants Gappa Goshti and Gappa Shappa, for Maharashtra-India and Punjab-India, respectively.
- Inspires scalable business models. The technical adaptations and the business model of the Agro Advisory System can be scaled to reach a large underserved population. It provides another channel for stakeholders in the agriculture sector to address the base of the pyramid market.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

In preliminary analysis, expert advice to farmers increased yield by 20% and reduced pesticide costs by 40%.		

SWORB *[Maybe summary of other sections]*	**Strengths** Range of different technologies integrated	**Weakness** Could be considered complex to new users, end-user cost
	Opportunity Geographic and sector expansion	**Risks and barriers** Getting other agricultural value chain participants to provide information throuth mKrishi

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

Given the proliferation of agricultural information systems, there is clearly a market for an application such as mKrishi. Since it integrates SMS with voice and photo functionality, it appears to offer more potential than voice-only or SMS-only services. As Tata is the developer, there should be the resources available to expand if it is successful in its initial regions and sectors.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

In an interview, Dr Arun Pande said:

On issues/hurdes:
Some of the major challenges we faced were:
- Mobile based agro advisory system platform integrates several technologies. Establishing communication of server with the sensors in the field was a big challenge.
- Weather station and sensors did not perform well during monsoon since the solar panels did not charge the battery properly because of long cloudy days.
- It was taking time to convince the government to participate in field trials with their experts.
- Although the technology was provided to farmers at a subsidized cost, we found it challenging to convince farmers to explore the features and benefits of mKRISHI.
- Agri-input companies did not show interest in commercial development.
- Farmers were initially reluctant to pay for this service – hence we reduced the subscription fees.

On replicability:
During interactions with small and marginal farmers, we realized that the farmers in villages were expecting better primary health care than they had access to. We studied the primary health care infrastructure in villages and tribal areas, and realized that the current system meant that non emergency patients currently have to travel to receive treatment. We were convinced that the productivity of doctors and village health workers could be improved many fold by using mKRISHI like platform.

We tuned mKRISHI platform (internally called mHEALTH – PHC Platform) for delivering primary health care to villagers. Instead of farmer and his soil analysis details, we provided patient's health record and his query. Doctor could remotely prescribe the medicine to patient through village health workers. Such delivery of primary health care remotely could be termed as "poor man's telemedicine" – since the system is inexpensive and uses the existing wireless network.

Similar to mKRISHI platform, working with the health industry, across a range of organizations, such as medical professionals and pharmaceutical companies, would allow the successful development of the platform.

Further study / research questions	**Select for case study**
	No

Contact	**Comments on contacts made, arrangements, etc.**
Dr Arun Pande Head of Tata Consultancy Services, Innovation Labs	

| Subsector
I.e., Which of Typology Subsectors

Agriculture, Fisheries & Forestry | Name of Application and References

Avaaj Otalo (Voikiosk):
- http://hci.stanford.edu/research/otalo/
- http://www.stanford.edu/~neilp/pubs/chi2010_patel.pdf
- http://people.ischool.berkeley.edu/~parikh/papers/ai4d.pdf
- http://www.researchintouse.com/resources/ext/ibm0904voikiosk-ictd.pdf
- http://www2008.org/papers/pdf/p1123-agarwal.pdf
- http://www.w3.org/2008/11/Voikiosk-17Nov2008.PDF
- http://ictupdate.cta.int/en/Feature-Articles/Farmers-voices-on-the-Spoken-Web | Country(s) / Region

India |

Segment / Activity
i.e., which Segment in the Typology

Extension Services

Description of Application
Note whether it is purely information or transaction based

Avaaj Otalo is a "voice-based community forum" that connects farmers in Gujarat, India to relevant and timely agricultural information over the phone. Farmers call up a phone number, and then navigate through audio prompted menus to ask questions, listen to answers to similar questions, and listen to archives of a popular radio program for Gujarati farmers. The number farmers can call is toll-free.

Avaaj Otalo was deployed as a pilot with 63 farmers in Gujarat in 2009. There were 3,500 hits in the first month. Based on the response, the application launched across the state in 2010 with a publically accessible number.

| Technology
E.g., voice, video, sms, email, GPS, multi-media

Voice, IVR | Technical development path
Note any past or expected changes and what impact technological change could have on the application and its viability

Voikiosk is built on IBM's VoiceSite technology. The system is being modified based on user-feedback from pilot deployments. Any change in IBM's commitment to VoiceSite would have an impact on the viability of Voikiosk. After evaluating the pilot project, the developers were considering how to make user-generated voice content easier to navigate and search. |

| Leading Ecosystem Player
E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent

Stanford Human Computer Interaction Group | Lead role(s)

Co-developed the application |

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

By dialing a phone number and navigating through simple audio prompts, farmers can record questions, review and respond to others, or access content published by agricultural experts and institutions. In addition to the Q&A forum, Avaaj Otalo includes an announcements board of headline-like snippets updated regularly by DSC staff, and a radio archive to listen to past episodes of DSC's popular weekly radio program.

Other key players	Roles	Incentives / Business model
1. IBM India Research Lab	Co-developed app, provide the Spoken Web platform and voice server	CSR
2. Development Support Center	Co-developed app	Development

Year of commencement 2008	Maturation Cycle Position *Emerging / Expanding / Mature* Emerging	Status *E.g., Pilot / Rolling out / Established* Rolling out

Comment on maturation / status of development

Avaaj Otalo offers limited navigation features. Farmers must listen to all previous questions and answers before they can find those relevant to them. Even a rudimentary interface for tagging and/or searching could dramatically improve the efficiency of the system. Indexing and search of complete voice transcripts is likely to be infeasible for low-resource languages, at least with current speech recognition technologies. The developers are exploring several alternative ways to address this.

Costs of the application & evidence of cost recovery & profit/sustainability,
E.g., Development of the technical systems & content; maintenance & skills

No information available.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

Avaaj Otalo provides farmers with a knowledge base that is accessible, relevant and credible. In the pilot, the most popular feature of Avaaj Otalo was a forum for asking questions and browsing others' questions and responses on a range of agricultural topics. The forum developed into a lively social space with the emergence of norms, moderation, and a desire for both structured interaction with authorities and discussion with peers.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

One farmer self-reported an increase in income of over $3,000 due to information he obtained through the system.

SWORB *[Maybe summary of other sections]*	**Strengths** Voice-based	**Weakness** Difficult to search or quickly select information
	Opportunity Geographic expansion, getting government support	**Risks and barriers** Potentially time-consuming to navigate through the voice system to find the information being sought

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

In the pilot, the service was available through a toll-free number, so that callers incurred no airtime costs, which were borne by DSC (Development Support Centre). These airtime charges comprised the majority of AO's operational costs. A simple solution would be to use a normal toll line, and to have callers pay for their own airtime. This change is likely to have a large impact on usage. In informal discussions, some farmers indicated that they would be hesitant to use the service if it were not free. On the other hand, many farmers already call DSC for advice at their own cost. DSC has considered charging farmers for accessing Avaaj Otalo, which has worked for other agricultural question-answer services available elsewhere in India. Another possibility is to generate revenue through selling advertising to companies who target rural markets. Finally, it could be argued that Avaaj Otalo increases agricultural productivity, while being much cheaper to provide then traditional extension, and so the government should subsidize some or all of the costs.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

If the project can demonstrate success, then the proliferation of agricultural information services suggests that there is demand for such services. The system does not appear to be prohibitively expensive to build. It requires partnerships in order to devlop the system and provide the information being sought by the farmers / users.

Further study / research questions	Select for case study
	No

Contact	**Comments on contacts made, arrangements, etc.**
Neil Patel Stanford University HCI Group neilp@cs.stanford.edu	

Subsector *I.e., Which of Typology Subsectors* Multiple Subsectors	Name of Application and References FrontlineSMS: • http://www.frontlinesms.com • http://www.frontlinesms.com/_PREV/resources/download/FrontlineSMS-Basic-Introduction-Presentation.pdf • http://www.betavine.net/bvportal/partners/frontline • http://www.thedailymaverick.co.za/article/2010-08-23-frontlinesms-mass-communication-where-the-internet-ends	Country(s) / Region Over 50 countries

Segment / Activity
i.e., which Segment in the Typology

Multiple Segments, see here for examples of how FrontlineSMS is being used:
http://www.frontlinesms.com/aboutthesoftware/case-studies/

Description of Application
Note whether it is purely information or transaction based

FrontlineSMS is award-winning free, open source software that turns a laptop and a mobile phone into a central communications hub. Once installed, the program enables users to send and receive text messages with groups of people through mobile phones. FrontlineSMS can be useful in many different ways. The software was originally developed in 2005 for conservationists to keep in touch with communities in Kruger National Park in South Africa.

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* FrontlineSMS has spawned a number of sister organizations/applications: FrontlineSMS:Medic, FrontlineSMS:Credit, FrontlineSMS:Legal, FrontlineSMS:Bullyproof, FrontlineSMS:Learn, FrontlineSMS:Radio

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* Kiwanja Foundation	<u>Lead</u> role(s) Develop and manage application / platform

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

A lack of communication can be a major barrier for many grassroots non-governmental organisations (NGOs) working throughout the developing world. FrontlineSMS is the first text messaging system to be created with this problem in mind. By leveraging basic tools already available to most NGOs FrontlineSMS enables instantaneous two-way communication on a large scale. There are already successful deployments of FrontlineSMS in areas such as disaster relief coordination, natural resource management, election monitoring, field data collection and health care info requests to name but a few.

Other key players 1. Partnership Innovation, Forensic Mobile Services, MacArthur Foundation, others	Roles Application development funding	Incentives / Business model Development
2. Mobile operators	SMS service provision	Revenue

Year of commencement 2005	Maturation Cycle Position *Emerging / Expanding / Mature* Mature	Status *E.g., Pilot / Rolling out / Established* Established

Comment on maturation / status of development

The latest version of the application was released in May 2010. The application continues to generate spin-offs, the newest (not yet available) one being FrontlineSMS:Radio (see "Technical development path" for the complete list).

Costs of the application & evidence of cost recovery & profit/sustainability,
E.g., Development of the technical systems & content; maintenance & skills

No information available.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

A lack of communication can be a major barrier for grassroots non-governmental organisations (NGOs) working in developing countries. FrontlineSMS is the first text messaging system created exclusively with this problem in mind. By leveraging basic tools already available to most NGOs — computers and mobile phones — FrontlineSMS enables instantaneous two-way communication on a large scale. It's easy to implement, simple to operate, and the software is free. Just pay for the messages you send in the normal way.

FrontlineSMS turns a laptop – or desktop – computer and a mobile phone or modem into a two-way group messaging hub. Since it works anywhere there's a mobile signal, it doesn't need the Internet, a major advantage for many grassroots NGOs. Once users have the software running on a computer, they can send messages to wide groups of people, and collect responses to any questions or surveys, all via text message.

FrontlineSMS allow NGOs to:
- Create and manage all of your SMS-related contact groups
- Send and receive messages via special on-screen consoles
- Provides incoming and outgoing message history for each contact
- Engage with your contact groups – run surveys, competitions etc. via the SurveyManager
- Run your own text-based information service via the automated ReplyManager
- Export data to Excel and other programs
- No need to be on-line – works on any GSM network via your own PC or laptop

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

Data from a FrontlineSMS implementation in Malawi shows:

Impact after First six months of operation:
Fuel saving: $3,500
Travel time saving: 1,000 hours
Annual running costs: $500
Implementation costs: $3,000

SWORB *[Maybe summary of other sections]*	**Strengths** Flexible platform allows wide range of uses, easy to use, free software	**Weakness** Cost of SMS messaging
	Opportunity Expanding to new sectors	**Risks and barriers** Requires a PC

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

FrontlineSMS has significant potential. According to an August 2010 article in the Daily Maverick, the application has been downloaded 8,500 times. The number of different projects the application has been used for to date, combined with the many sister organizations derived from FrontlineSMS indicate that there is significant demand for this application.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high The application is easy to set up and only requires a PC, so there are very few hurdles to replication.

Further study / research questions	**Select for case study**
	No

Contact	**Comments on contacts made, arrangements, etc.**
Ken Banks, original concept design and development Ken.banks@kiwanja.net	

| Subsector
I.e., Which of Typology Subsectors

Labour, Migration and Human Development | Name of Application and References

JavaRosa:
- http://www.open-mobile.org/technologies/javarosa-open-rosa-consortium
- http://www.dimagi.com/javarosa/
- http://code.javarosa.org/ | Country(s) / Region

Various – Uganda |
|---|---|---|

Segment / Activity
i.e., which Segment in the Typology

various

Description of Application
Note whether it is purely information or transaction based

JavaRosa is an open-source platform for data collection on mobile devices. It is a project of Open Rosa, a member of the Open Mobile Consortium. JavaROSA has been designed for a wide and ever increasing variety of applications including taking survey data, following disease management, guiding health workers through treatment protocols at point of care, and collection of longitudinal medical records. JavaROSA's framework architecture is flexible and modular, allowing the development of wholly new applications with minimal new code. At its core, JavaRosa is based on the XForms standard -- the official W3C standard for next-generation data collection and interchange. JavaRosa is written in Java Mobile Edition (J2ME), and supports a wide array of devices, from top-end smart phones and PDAs with large screens and abundant memory, to low-end devices like the Nokia 6085 and 2630. Making JavaRosa usable on low-resource devices is one of the project's highest priorities.

Java Rosa is being used currently in projects like GATHER, run by AED/Satellife in Uganda, and in CommCare, a project that is using and expanding JavaRosa to support community health workers with their data collection tasks during home visits with patients.

| Technology
E.g., voice, video, sms, email, GPS, multi-media

data | Technical development path
Note any past or expected changes and what impact technological change could have on the application and its viability

JavaRosa is based on the XForms standard -- the official W3C standard for next-generation data collection and interchange. JavaRosa is written in Java Mobile Edition (J2ME), and supports a wide array of devices, from top-end smart phones and PDAs with large screens and abundant memory, to low-end devices like the Nokia 6085 and 2630. Making JavaRosa usable on low-resource devices is one of the project's highest priorities. |
|---|---|

| Leading Ecosystem Player
E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent

Open Mobile Consortium / Open Rosa Consortium | Lead role(s)

Application development |
|---|---|

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

A variety of tools are urgently needed to address the lack of data in low-income countries required for decision making and research at all levels of the health and other sectors. Due to recent technological advancements, there is great excitement for using mobile phones to address current gaps in information. Phones and PDAs have proven to be dramatically faster and more complete than traditional methods of pen and paper, and can be more accurate and less expensive as well. JavaRosa is an open-source platform for data collection on mobile devices. JavaROSA has been designed for a wide and ever increasing variety of applications including taking survey data, following disease management, guiding health workers through treatment protocols at point of care, and collection of longitudinal medical records. JavaROSA's framework architecture is flexible and modular, allowing the development of wholly new applications with minimal new code.

Other key players	Roles	Incentives / Business model
1. Developers (e.g. CellLife, U of Washington, Google, Dimagi, D-Tree, Datadyne)	Application development	Development

Year of commencement	Maturation Cycle Position	Status
	Emerging / Expanding / Mature	*E.g., Pilot / Rolling out / Established*
2008(?)	Expanding	Rolling out

Comment on maturation / status of development

There are a number of projects using or planning to use JavaRosa, but the platform has not yet had its 1.0 release.

Costs of the application & evidence of cost recovery & profit/sustainability,
E.g., Development of the technical systems & content; maintenance & skills

No information available.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

A variety of tools are urgently needed to address the lack of data in low-income countries required for decision making and research at all levels of the health and other sectors. JavaROSA has been designed for a wide and ever increasing variety of applications including taking survey data, following disease management, guiding health workers through treatment protocols at point of care, and collection of longitudinal medical records. JavaROSA's framework architecture is flexible and modular, allowing the development of wholly new applications with minimal new code.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

No information available.

SWORB *[Maybe summary of other sections]*	**Strengths** Flexible/modular architecture, usable on low-end phones	**Weakness** Requires technical expertise to implement
	Opportunity Simplify implementation process	**Risks and barriers** Technical expertise, Java is required

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

As JavaRosa is a platform that can be put to a range of uses, it does appear to have value and should see significant usage, especially if they can lower the technical requirements for implementing the platform. Projects using JavaRosa include: Gather (AED/Satellite, Uganda), CommCare, CDC-TZ, Animal Health Surveys, Rural Outreach for HIV testing and counseling, Cell-Life/JHHESA, RFID Patient Tracking, AquaTest

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

Since JavaRosa is a platform designed to be implemented for a variety of uses, there are not significant barriers to replicating it. There are not significant hurdles to the growth of the platform.

Further study / research questions	Select for case study
	No
Contact	**Comments on contacts made, arrangements, etc.**

Subsector *I.e., Which of Typology Subsectors* Labour, Migration and Human Development	Name of Application and References Babajob: • http://www.babajob.com/home.htm • http://mobileactive.org/case-studies/babajob-bringing-jobs-bottom-pyramid • http://www.ikensolutions.com/images/docs/Smart%20Techie%20may2010.pdf • http://research.microsoft.com/en-us/events/indiasummerschool2010/blagsvedt-babajob_ui_overview.pdf	Country(s) / Region India

Segment / Activity
i.e., which Segment in the Typology

Employment

Description of Application
Note whether it is purely information or transaction based

Babajob.com is a job website and mobile portal dedicated to connecting informal Segment workers - cooks, maids, drivers, guards, etc.- and employers to India and eventually worldwide. It's based on the simple idea that everyone deserves to get a better job – even for those who can't read English and work in another's home.

Babajob's vision is to ultimately make the informal labor market worldwide efficient by aggregating 100,000s of jobs and millions of job seekers, appropriately matching job posts and job seekers based on proximity, price and social connections (via our social networking site babalife.com as well as others) and then pushing these matched connections to both parties via the web and mobiles (voice, SMS, USSD, etc).

It's not as if there are big bulletin boards in rural areas outside of developing world cities advertising all the entry level jobs in the city to villagers, listing which ones pay more or have better working hours. Additionally, there's no "Monster" equivalent for informal employers either, allowing them to rate, sort and filter 100,000s of candidates either.

Many of the people who might be hired through babajob.com may not have access to a computer or phone, and so their accounts can be managed by a friend, relative, NGO or even a cyber-café operator – called a mentor.

Technology *E.g., voice, video, sms, email, GPS, multi-media* Mobile portal	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* There are plans to add automated voice access to overcome literacy barriers.

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* BabaJob	**Lead role(s)** Application development and operation

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

Apart from offering free services to employers and job seekers, the company also provides premium service with additional benefits for employers. For the mobile service it offers to the job seekers the company operates on a revenue sharing model with telecom operators like Airtel, Reliance and Idea, where the job seekers pay the operators for the service. Babajob has an advantage over its competitors as it makes use of the mobile technology also by sending out job alerts as well as creating profiles using the messages from job seekers.

Other key players 1. Mobile operators	Roles Mobile service, link to other mobile job applications	Incentives / Business model Revenue
2. Handset vendors	Integrate service with handsets	Revenue

Year of commencement 2007	Maturation Cycle Position *Emerging / Expanding / Mature* Expanding	Status *E.g., Pilot / Rolling out / Established* Rolling out

Comment on maturation / status of development

"As we grow, we will invest more to scale internationally, improving tools for both employers and job seekers to connect to each other and new," says Babajob founder Sean Blagsvedt. Some of the new services that Babajob plans to launch are automated voice access for illiterates and job seeker verification, where employers can pay a fee to verify that a job seeker does not have a criminal record, their references are accurate and their addresses are valid.

Costs of the application & evidence of cost recovery & profit/sustainability,
E.g., Development of the technical systems & content; maintenance & skills

No information available.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

Employers:
• Lots of great, reachable candidates
• Easy: "Just send me someone great" – agency role
• Trustworthy
• Guaranteed
• Cheap

Job Seekers
• Access to better jobs: Higher pay, closer to home, better status, better timings
• Reachable to non-literate, poor and non-web
• Knowledge of nearby jobs or higher paying jobs in the city.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

No information available.

SWORB *[Maybe summary of other sections]*	Strengths Job postings of a type not otherwise available		Weakness Requires literacy, even for informal, entry-level positions
	Opportunity Geographic expansion, addition of voice service		Risks and barriers Fraud, literacy requirements

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

According to a 2010 presentation:
• 120,000 registered users (web + mobile)
• 320,000 jobs listed and 80,000+ jobseekers
• Adding 900 positions/day

Replicability / hurdles / issues		
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high		
The job site is designed to be scalable and replicable. It does not require major regulatory change or overly large investment. The service should be of interest in a wide range of countries given the employment challenges facing much of the world.		

Further study / research questions	**Select for case study**
	No

Contact	**Comments on contacts made, arrangements, etc.**
Sean Blagsvedt Founder, Babajob	

Subsector *I.e., Which of Typology Subsectors* Rural Finance, Infrastructure & ICT	Name of Application and References CGNet Swara: • http://mobileactive.org/case-studies/cgnet-swara • http://swara.no-ip.org/ • http://www.stanford.edu/group/sdg/cgi-bin/dev/liber/?q=node/259 • http://www.alertnet.org/db/an_art/55867/2010/04/10-141112-1.htm • http://www.audiencescapes.org/citizen-journalism-only-phone-call-away-India-CGnet-Swara-MIT-mobile-communications	Country(s) / Region India

Segment / Activity
i.e., which Segment in the Typology

Broadcasting and program-related

Description of Application
Note whether it is purely information or transaction based

CGNet Swara is a new audio-based citizen journalism service in Chhattisgarh, India. Citizen journalists can call a phone number to record news, and listeners can call in to hear news recorded by citizens around them. When citizen journalists call, they simply press 1 to record news and record some audio onto the system. Listeners can call the same number, press 2, and hear the last three items that the moderators have selected to be published on to the service.

The moderators receive requests via email when a citizen journalist posts content, after which they verify the report (sometimes adding notice that a report isn't verified, sometimes investigating more, on a case-by-case basis), edit the recording, and publish it. There are currently three moderators, all professionally trained journalists.

CGNet Swara moderators use a Google SMS channel (a free SMS group service in India) to send out an SMS after a news report is published. The SMS includes the number recipients can call to hear the report. Selected stories are sent out to the CGNet mailing list, an open mailing list made up of citizen journalists, activists, expatriates, mainstream journalists, and others that are interested in Chhattisgarh. Selected stories are also translated to Hindi by moderators, so that those in the CGNet mailing list can understand reports.

Technology *E.g., voice, video, sms, email, GPS, multi-media* Voice, SMS	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* Expanded mobile coverage in rural areas would increase the application's viability.

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* CGNet / Shubhranshu Choudhary	Lead role(s) Developed and operate the application.

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

Right now the service relies on grants and charitable contributions to operate. Plans are under way to make the news service sustainable by working with local media outlets that will use news from the site. CGNet Swara doesn't provide a toll free number for reporters or listeners to call or a free call-back function. Both listeners and reporters have had to pay to get and post content. In fact, most callers have paid long distance fees in the first five months of the system (about twice that of local calling fees, project lead Choudhary estimates) because the server for Swara is located in Bangalore in another state. Choudhary estimates that calling costs could be up to one-half of daily spending for some callers (callers report paying 5-10 rupees per call, and the government of India estimates 77% of Indians spend less than Rs. 20 per day; tribal populations are among the poorest in India). Recent funding from the International Centre for Journalism will soon be used to make calls toll free (they currently cost one rupee per minute) and UNICEF has provided funds to train tribals in citizen journalism.

Other key players	Roles	Incentives / Business model
1. Microsoft Research Laboratory, MIT	Application development	Development, CSR
2. International Centre for Journalism	Providing funding to make calls toll free	Development
3. UNICEF	Provided funds to train tribals in citizen journalism	Development

| Year of commencement

2010 | Maturation Cycle Position
Emerging / Expanding / Mature

Expanding | Status
E.g., Pilot / Rolling out / Established

Rolling out |
|---|---|---|

Comment on maturation / status of development

With help from the Microsoft Research Laboratory in Bangalore and Massachusetts Institute of Technology (MIT), the service is now spreading. UNICEF has provided funds to train tribals in citizen journalism. Right now the service relies on grants and charitable contributions to operate. Plans are under way to make the news service sustainable by working with local media outlets that will use news from the site.

Costs of the application & evidence of cost recovery & profit/sustainability,
E.g., Development of the technical systems & content; maintenance & skills

No information available.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

Some of the stories have clearly had an impact on the life of the tribal journalists. Many messages are sent to an email list with journalists, activists, and other with an interest in the Chattisgarh region. In one specific case, this led to concrete action. In response to a report about school workers in the Dantewada district who hadn't been paid for more than a year, the CGNet moderators posted a message to the email list that included the number of the responsible government authority to call. After the authority was flooded with calls, all the school workers were paid in a week's time.

Another example included a first-hand report of police brutality in the region. Bill Thies, the original Audio Wiki developer who has been involved with the project, said that "the mainstream media picked up the story, and probably would have anyways," but that the first-hand report provided an interesting perspective from those directly affected by the brutalities, very recently after they happened.

Some of the stories that would not have been covered otherwise have fostered local community organizing around issues such as corruption scandals, bureaucratic waste, poverty, and the need for sustainable development. The service is also open to aid agencies, which can send out information such as when they are running an eye camp or mobile hospital in a certain village.

Aid workers say the service is already showing results and helps bring accountability in public service delivery. Shaheen Nilofar, head of UNICEF's office in Chhattisgarh's capital, Raipur, said, "It flags up social sector issues in areas where information is hard to come by and gives a space to social sector issues affecting tribal communities which the mainstream media do not address."

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

No information available.

| SWORB
[Maybe summary of other sections] | Strengths
Provides news in local languages, provides information not otherwise available. | Weakness
Difficult to moderate as service gains popularity, difficult to get stories in marginalized lanugages |
|---|---|---|

	Opportunity Making service free to listeners and reporters.	Risks and barriers Political concerns about the legality of the system, potential harassment of citizen journalists

Market potential assessment

E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

The audio news service is clearly meeting a need that is reflected in the call volume received. Unlike many audio-based content dissemination or reporting projects, CGNet Swara doesn't provide a toll free number for reporters or listeners to call or a free call-back function. Both listeners and reporters have had to pay to get and post content. In fact, most callers have paid long distance fees in the first five months of the system (about twice that of local calling fees, project lead Choudhary estimates) because the server for Swara is located in Bangalore in another state. Choudhary estimates that calling costs could be up to one-half of daily spending for some callers (callers report paying 5-10 rupees per call, and the government of India estimates 77% of Indians spend less than Rs. 20 per day; tribal populations are among the poorest in India). The fact that so many calls have come through means that Swara is meeting a need that both tribal citizen journalists and listeners felt.

In the period from launch in February 2010, to May 2010, 33 volunteer journalists have signed on, 250 stories have been uploaded, and nearly 3,000 calls to hear them have been made.

The sponsors are trying to develop a business model, possibly through an arrangement with other local media, to make the service sustainable.

Replicability / hurdles / issues

Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

The service can grow in other areas where there is a lack of media coverage of a specific area, community or language. There could be regulatory issues, as there are in India. Swara's servers have been shut down twice by their hosts without any explanation.

In addition, there are political issues related to operating in a conflict zone. Under condition of anonymity, a senior police officer in Raipur, the state capital, said: "We cannot afford a loose cannon like this service in a state which is at war with insurgents."

Further study / research questions	Select for case study No

Contact Shubhranshu Choudhary Founder, journalist smitashu@gmail.com	Comments on contacts made, arrangements, etc.

Subsector *I.e., Which of Typology Subsectors* Labour, Migration and Human Development	Name of Application and References M4Lit: • http://m4lit.wordpress.com • http://m4lit.files.wordpress.com/2010/03/m4lit_mobile_literacies_m walton_20101.pdf • http://m4lit.files.wordpress.com/2010/03/m4lit_project_report_svosl oo_20102.pdf • http://www.shuttleworthfoundation.org/m4lit/ • http://www.stockholmchallenge.org/project/2010/m4lit-mobile-phones-literacy • http://www.slideshare.net/stevevosloo/m4lit-a-teen-mnovel-project-in-south-africa • http://marionwalton.files.wordpress.com/2009/09/mlearn2009_07_s v_mw_ad.pdf	Country(s) / Region South Africa

Segment / Activity
i.e., which Segment in the Typology

Education, Learning & Training

Description of Application
Note whether it is purely information or transaction based

The m4Lit (mobile phones for literacy) project set out to explore the viability of using mobile phones to support reading and writing by youth in South Africa (SA). If mobile phones proved to be a legitimate alternative and complement to printed literature then their potential for increasing youth literacy practices of reading and writing in SA, and indeed the developing world, would be significant. Most developing countries are book-poor and mobile phone-rich, after all. In the pilot phase of the project a mobile novel (m-novel) was written and published in September 2009 on a mobisite and on MXit.

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* The m4Lit project is hosted on the messaging platform MXit and on a mobisite. The viability of the project in part depends on the usage of these technologies.
Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* Shuttleworth Foundation	Lead role(s) Incubated/funded the project.

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

Users/readers of the m4Lit project's novels must pay for their own mobile internet usage or MXit usage to read / participate in the m4Lit project. There are no other charges involved. The project does not appear to have explored means of generating revenues, but is focused more strongly on literacy.

Other key players	Roles	Incentives / Business model
1. Sam Wilson/Clockwork Zoo	Story author	Literacy, income
2. Frontera	Mobisite development	Literacy, income

Year of commencement 2009	Maturation Cycle Position *Emerging / Expanding / Mature* Emerging	Status *E.g., Pilot / Rolling out / Established* Rolling out

Comment on maturation / status of development

Three Kontax stories have been released on MXit and on kontax.mobi: Kontax 1, Kontax 2: The Big Win and Kontax 3: The Holiday Diaries. A new m-novel offering called Yoza – a funky youth-zone with engaging stories that include further Kontax episodes as well as stories from other genres, e.g. soccer, HIV/AIDS and teen chick-lit – launched in August 2010.

Costs of the application & evidence of cost recovery & profit/sustainability,
E.g., Development of the technical systems & content; maintenance & skills

The Shuttleworth Foundation provided USD 77,240.44 in funding.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

The project encourages young people to read and write, which could improve literacy levels. The project also provides a platform for publication of local content in local languages, which would not only aid literacy, but also increase access to local cultural resources.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

No information available.

SWORB *[Maybe summary of other sections]*	Strengths Appealing to young readers, no charges other than mobile access	Weakness Requires understanding of mobisites and/or MXit
	Opportunity International expansion, exploring avenues to sustainability	Risks and barriers Not all teens will like the m-novels, cost may prevent access

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

Monetisation of mobile novels could be achieved through sponsorship, advertising, or selling Kontax merchandise, e.g. wallpapers. However, the m4Lit project has no intention of charging for content, as its focus is literacy. In terms of demand, data from the pilot project show that In less than one month, it is estimated that 473,000 chapters were read on MXit. Initial uptake of the recently launched Yoza was impressive: in the first three weeks there were 57,688 unique visitors who left 7,766 comments.

The m4Lit pilot project was a first step into the use of mobiles for teen reading and writing of longer form texts. Digital publishing is a highly contested space right now, with the likes of Amazon's Kindle and Apple's iPad battling for dominance of the e-reader market in the developed world. In developing countries, those devices are simply unaffordable for the majority of the population. Mobile phones offer a potential substitute. While the uptake "data suggest a substantial amount of interest [in m-novels]", there is "plenty of room for growth" given the number of teens with mobile phones. Kontax showed that, for some teens, mobile phones are a viable platform for distributing stories and enabling reader participation.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

M4Lit's research suggests that m-novels can appeal to youth and young adults in Africa. They are working to ensure that the project uses open source software. It appears that this type of application could grow in other countries if sponsors are found, or if there is success with some of the potential avenues to sustainability.	
Further study / research questions	**Select for case study** No
Contact Steve Vosloo Project Founder steve.vosloo@shuttleworthfoundation.org	**Comments on contacts made, arrangements, etc.**

Subsector *I.e., Which of Typology Subsectors* Labor, Migration and Human Development	**Name of Application and References** Cellbazaar: • http://corp.cellbazaar.com • http://corp.cellbazaar.com/images/international/MIT_Innovations_CellBazaar.pdf • http://www.lirneasia.net/wp-content/uploads/2008/05/Mobile-2-0-CellBazaar-e-marketplace-v3.0.pdf • http://www.mitpressjournals.org/doi/pdfplus/10.1162/itgg.2009.4.1.71 • http://mobileactive.org/cellbazaar-bangladeshs-burgeoning-mobile-marketplace	**Country(s) / Region** Bangladesh

Segment / Activity
i.e., which Segment in the Typology

Private Segment development

Description of Application
Note whether it is purely information or transaction based

CellBazaar leverages the simple, widespread power of SMS to bring the market to mobile phones. By sending simple text messages to 3838, users can post items for sale, look for items to buy, and obtain current market prices of products or services. Alternatively, WAP provides an even faster experience as users browse a simple graphic menu to access the entire marketplace.

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS / WAP / Voice	**Technical development path** *Note any past or expected changes and what impact technological change could have on the application and its viability*

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* Cellbazaar	**<u>Lead</u> role(s)** Developed and manage the application

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

CellBazaar earns direct revenues through the use of the following platforms:
1. WAP: CellBazaar gets a share of Grameenphone's browsing fees (BDT0.02/kilobyte)
2. SMS: CellBazaar gets a share of the Grameenphone's SMS fees (BDT 1.15/text message)
3. IVR: CellBazaar gets a share of the Grameenphone's airtime fees for accessing the IVR platform (BDT3/minute)

In addition, CellBazaar receives the following indirect revenues:
4. A share of Grameenphone's airtime fees on calls resulting from posts
5. Revenues from targeted advertising as well as classifieds from several local newspapers.

The rough revenue breakdown, which parallels the volume breakdown, is roughly WAP 50%, SMS 25%, Voice 20% for Cellbazaar.

Other key players	**Roles**	**Incentives / Business model**
1. Grameenphone	Mobile network / SMS provider	Revenue
2. Katalyst	SME development	Development
3. Thakral, BracNet	Technology providers	Revenue
4. Prothom Alo, The Daily Star	Provide newspaper classified ads	Revenue
5. Brac Bank	Financing	Development

Year of commencement 2006	Maturation Cycle Position *Emerging / Expanding / Mature* Mature	Status *E.g., Pilot / Rolling out / Established* Established

Comment on maturation / status of development

CellBazaar's e-marketplace only makes the "search" component of a transaction available, although the mobile phone is also used in the negotiation component (to make first contact, discuss the product and price in detail). CellBazaar is not involved in the final stages of the transaction when money changes hands. The possibility exists of expanding CellBazaar to enable completion of the transaction on the mobile platform in a way that might be similar to the service offered by eBay. Such a development would be expected to improve the efficiency of more stages of a transaction between distant parties.

Costs of the application & evidence of cost recovery & profit/sustainability,
E.g., Development of the technical systems & content; maintenance & skills

No information available.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

The service reduces search costs for consumers and could increase consumer demand. For sellers, the cost of sales are reduced. The market also enables less popular goods to be sold inexpensively since there is a large subscriber base for the service.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

According to a survey reported by Quadir in Nokia's Expanding Horizons magazine (2008:13), "two out of ten sellers surveyed were able to sell their items within ten days of posting."

SWORB *[Maybe summary of other sections]*	**Strengths** Low cost, large number of listings, includes an IVR for those with literacy issues	**Weakness** Only available in English, not Bangla; just listings, there is no functionality to conduct transactions within Cellbazaar
	Opportunity Geographic expansion, add functionality to enable transactions within Cellbazaar	**Risks and barriers** Lack of familiarity with mobile technology for rural/BOP users

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

There were 3.5 million registered Cellbazaar users at the end of 2009, and 84,000 registered sellers. On average, CellBazaar reportedly receives an average of 90,000 hits per day and over 1,000 new posts per day with 15% monthly growth. While initially popular in urban areas, CellBazaar claims that the application has since become popular in rural areas too. By 2008, 51% of posts were from rural areas, according to CellBazaar officials.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

The service should be replicable. Cellbazaar is often described as a mobile Craigslist for Bangladesh, so the basic concept is clearly popular around the world. Cellbazaar has an exclusive relationship with the largest mobile operator in Bangladesh, Grameenphone. However, this type of relationship does not appear to be essential for the service to exist and succeed. If more functionality, such as the ability to conduct transactions via a mobile platform, could require regulatory changes in some developing nations.

Further study / research questions	Select for case study
	No

Contact	Comments on contacts made, arrangements, etc.
Kamal Quadir Founder and CEO of CellBazaar kamal@cellbazaar.com	

Subsector *I.e., Which of Typology Subsectors* Rural Finance, Infrastructure & ICT	Name of Application and References Ekgaon CAM AND Self-Help MIS: • http://www.ekgaon.com/CAM • http://www.ekgaon.com/files/OutLook_Business.pdf • http://event.stockholmchallenge.org/project/2008/Economic-Development/Enabling-financial-inclusion-and-increasing-efficiency-Self-Help-Groups-Microcredit-Federation • http://mobileactive.org/files/file_uploads/Engineering%20Rural%20Development.pdf • http://www.zdnetasia.com/mobile-banking-yet-to-take-off-in-rural-india-62202064.htm • http://www.ashoka.org/fellow/5539 • http://www.yourstory.in/news/3197-ekgaon-wins-nasscom-social-innovation-honours-2010	Country(s) / Region India

Segment / Activity
i.e., which Segment in the Typology

Mobile Money, m-Banking and micro-finance related services

Description of Application
Note whether it is purely information or transaction based

CAM is a mobile information services framework for rural areas in the developing world. CAM is a three-tier document-based architecture for providing remote rural information services for SHGs in Microfinance. The key design elements of CAM are:
• camera-based - barcodes link CAM to paper-based processes
• user interface - finely tuned to rural users and the constraints and opportunities of mobile devices
• offline networking - using SMS and other SMTP-based protocols
• mobile phones - long battery life, wireless connectivity, solid-state memory, low price
• localisation - easy to localize, even if phone doesn't support target language
• web-based - easy to connect to existing web services

The CAM framework consists of the CAMBrowser, a single mobile phone application, CAMForm paper forms, equipped with embedded processing instructions and the CAMServer, an on-line service that links CAM with web-based services. They are currently pilot-testing the CAM framework with select partners.

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* Ekgaon is searching for additional ways to generate revenues, possibly through an "Easy Money Transfer" urban-rural remittance system or mobile advertising (it is working with Google).

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* Ekgaon	**Lead** role(s) Developed and manage application.

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

Ekgaon works with the self-help groups of banks, MFIs and insurers. Each group member has a card with a bar code. If a financial institution wants to collect funds from a client, a designated member of their group goes to visit with a camera-enabled mobile phone and a printer. They then take a photo of the membership card's bar code and sends it to the Ekgaon server via SMS or mobile internet. The MFI's server is synched to the Ekgaon server. The

MFI server verifies the bar code data and records the transaction. The agent then prints a receipt for the client and collects the money. Ekgaon gets paid 25 paise per transaction from its partners. In 2008, they made Rs. 1.5 crore.

Other key players	Roles	Incentives / Business model
1. Financial institutions	Connect their servers to Ekgaon, serve their clients with Ekgaon's technology	Cost-savings, customer service
2. Government social payment schemes	Connect their servers to Ekgaon, serve the citizens using Ekgaon's technology	Cost-savings, citizen service

Year of commencement	Maturation Cycle Position *Emerging / Expanding / Mature*	Status *E.g., Pilot / Rolling out / Established*
2006	Mature	Established

Comment on maturation / status of development

The service launched in 2006. Ekgaon is now working on an urban-rural remittance service. They have also developed a "Monitoring Entitlements for Rural Communities" (MERComs) service for government payments, in partnership with Concern Worldwide, an Irish non-government development agency and Women's Organization for Socio Cultural Awareness (WOSCA).

Costs of the application & evidence of cost recovery & profit/sustainability,
E.g., Development of the technical systems & content; maintenance & skills

In 2008, Ekgaon generated Rs. 1.5 crore in revenue (approx. USD 350,000).

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

The main problem in rural financial services is the non-availability of accurate, timely and needed information for decision making at higher levels. In the microfinance sector, due to the lack of information, self-help group members could not ascertain the financial position (profitability) of their group. Since Ekgaon's data is captured using a mobile phone and sent to the online server, the field staff monitoring the Self Help groups would supply the computer printed reports to the SHG's which help them to overcome all the difficulties in terms of reports, book-keeping and portfolio management. This also enables the other stakeholders like banks, NGOs and MFIs to track their loan repayments online.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

No information available.

SWORB *[Maybe summary of other sections]*	Strengths Simple for end-users, uses common SMS technology	Weakness Lack of familiarity with non-cash transactions among many rural people
	Opportunity Geographic expansion, service expansion	Risks and barriers Difficult to get rural people and MFIs to buy into the value proposition

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

A 2010 interview revealed that Ekgaon was serving "over seven MFIs" serving over 300,000 clients. Ekgaon plans to reach 5 million clients in the next three years. The company is also exploring additional revenue generating opportunities, such as urban-rural remittances, mobile advertising and e-government services, such as through the MERComs service.

Replicability / hurdles / issues

Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high Given the usage of microfinance throughout rural areas of the developing world, the Ekgaon system appears to be replicable. Ekgaon also uses common technology (SMS) and open source software, which enhance replicability prospects.	

Further study / research questions	**Select for case study** No
Contact Vijay Pratap Singh Aditya Founder, Ekgaon Info@ekgaon.com	**Comments on contacts made, arrangements, etc.**

Subsector *I.e., Which of Typology Subsectors* Agriculture, Animal husbandry, Fisheries & Forestry	Name of Application and References Infotrade: • http://www.infotradeuganda.com/ • http://missymposium.fituganda.com/presentation/fituganda_presentation.pptx • http://www.fituganda.com/newsarticle.php?pid=5&aid=15 • http://www.fituganda.com/newsarticle.php?pid=5&aid=17	Country(s) / Region Uganda

Segment / Activity
i.e., which Segment in the Typology

Agro-marketing / trade

Description of Application
Note whether it is purely information or transaction based

INFOTRADE provides critically analyzed information collected from 20 district markets in Uganda covering a total of 46 commodities. Data is collected thrice weekly, verified and posted on a website. Information can be accessed by email, or directly on a mobile phone.

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* Increased mobile penetration and usage/familiarity with SMS could make the application more viable.

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* FIT Uganda	Lead role(s) Developed and manage the application

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

The SMS service provided by Infotrade is free of charge. More information is available on the Infotrade website for paying members. Prices of 46 commodities are available for no charge.

Other key players	Roles	Incentives / Business model
1. mobile operators	SMS providers	Revenue
2. ABDC/ASPS-Danida	Funding and technical assistance	Development

Year of commencement 2008	Maturation Cycle Position *Emerging / Expanding / Mature* Mature	Status *E.g., Pilot / Rolling out / Established* Established

Comment on maturation / status of development

Infotrade has expanded coverage from 28 to 46 different commodities in 21 districts. The original intent was to provide information free of charge to end users, with plans to explore revenue opportunities to eventually become sustainable. There is no indication that the service is yet sustainable.

Costs of the application & evidence of cost recovery & profit/sustainability,
E.g., Development of the technical systems & content; maintenance & skills

No information available.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

The service provides customized market information free of charge to end-users. The market information provided helps farmers plan for future crops or markets.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

No information available.

SWORB *[Maybe summary of other sections]*	**Strengths** Customized information, free to end-users	**Weakness** Limited regional coverage
	Opportunity Expand geographically and to additional commodities	**Risks and barriers** Lack of familiarity with mobile applications

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

According to a 2010 presentation, Infotrade users include: 25,000 using Website, mobile phones 256 hits (individual user requests), 23 notice boards, 25 blackboards, 18 radio stations, 2 print media partnerships, 1,311 mail subscribers, 295 web2phone users (weekly SMS subscription service). The information provided appears to be valuable based on the number of users and the proliferation of agricultural information services throughout the developing world.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

Replication of agricultural market information systems like Infotrade requires partnering with information providers for market prices or employing people to collect the information. As the service expands they will need to go into partnerships and agreements with more third party entities to ensure that they can provide localized and context specific information.

Further study / research questions	**Select for case study** No

Contact Enoth Mbeine Senior Consultant BDS enoth@fituganda.com	**Comments on contacts made, arrangements, etc.**

Subsector *I.e., Which of Typology Subsectors* Labour, Migration and Human Development	Name of Application and References MILLEE: • http://www.millee.org/ • http://www.cs.cmu.edu/~mattkam/publications/CHI2010a.pdf • http://www.cmu.edu/news/archive/2009/October/oct21_millee.shtml • http://www.dnaindia.com/money/report_learn-english-through-gilli-danda-on-mobile_1320174	Country(s) / Region India

Segment / Activity
i.e., which Segment in the Typology

Education, Learning and Training

Description of Application
Note whether it is purely information or transaction based

Since MILLEE began in 2004, the sponsors have conducted 10 rounds of fieldwork spanning almost 12 months in India. The project did not start with a preconceived idea, but instead the sponsors spent time with local stakeholders to understand their needs. Exploratory studies revealed social and infrastructural challenges to using desktop computers to promote learning in school settings. On the other hand, there is a tremendous opportunity for out-of-school learning via educational games on cellphones.

The researchers followed a human-centered design process, in which they consulted experienced local English teachers on instructional and game designs. The foundational games that were built have gone through numerous iterations since 2006, through formative evaluations with four communities of rural and urban slums learners in both North and South India. By field-testing with multiple communities, the researchers observed user behaviors with the technology that generalize across settings. Through ethnographic studies, the researchers also studied how social factors such as gender and caste affected MILLEE gameplay in everyday rural environments.

The sponsors do not believe it is practical to develop "one-size-fits-all" games for national or global use. Rather, the games need to be tailored to local practices. In particular, games were adapted to the traditional village games with which the target child learners are already familiar, so as to ensure culturally appropriate game designs. The end-product is therefore not only the games themselves, but a suite of tools and methods for adapting and extending them for local use.

The researchers have concluded a summative evaluation where 27 students attended an after-school program at a village in Uttar Pradesh, India three times per week over a semester to learn English using MILLEE games. Participants exhibited significant post-test gains at the end of this intervention. The above learning gains were achieved by combining theory and practice. The games drew on the latest research in language acquisition. The researchers also reviewed 35 successful commercial language learning packages to identify their best practices. By reusing those best practices as the starting point, the researchers avoided reinventing the wheel.

With a generous donation of 450 cellphones from Nokia, MILLEE games are being deployed with 400 rural children in 20 villages in India. The researchers will compare their learning gains against 400 children in another 20 villages. They will deploy MILLEE games with another group of children from the urban slums to understand how rural children benefit vis-à-vis their slums counterparts using the same MILLEE approach. The MILLEE games that the researchers plan to deploy will target an entire academic year of the local, official English curriculum. The learning gains will be evaluated against a standardized exam for English in India. As a major credentialing system in the country, this exam is not only a highly credible metric with stakeholders but will also allow the benchmarking of MILLEE learning gains against more conventional teaching approaches.

Technology *E.g., voice, video, sms, email, GPS, multi-media* Educational games installed on the mobile device	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* The games developed are customized for each round of development.

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* MILLEE / Matthew Kam	Lead role(s) Developed and testing the application/games.

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

MILLEE designs immersive, enjoyable, language learning games on mobiles, modeled after the traditional village games that rural children find familiar. The project's rationale is entirely educational.

Other key players 1. Nokia	Roles Provided mobile handsets for latest research	Incentives / Business model CSR, development

Year of commencement 2004	Maturation Cycle Position *Emerging / Expanding / Mature* Emerging	Status *E.g., Pilot / Rolling out / Established* Pilot

Comment on maturation / status of development

The current round of research taking place in 2010 with the assistance of Nokia is the 11th round in India. MILLEE is also preparing to conduct research in China and Kenya.

Costs of the application & evidence of cost recovery & profit/sustainability,
E.g., Development of the technical systems & content; maintenance & skills

No information available.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

Children experienced learning benefits through the use of the MILLEE games. In addition, there were social benefits. Friendships were strengthened through the process of learning and playing the games, and children were more inclined to develop relationships with people of different castes.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

Learning Progress (Means per-week)

Source: http://www.cs.cmu.edu/~mattkam/publications/CHI2010a.pdf

SWORB *[Maybe summary of other sections]*	**Strengths** Free, effective	**Weakness** Power supply, uneven sharing of phones among siblings
	Opportunity Additional funding/partnerships	**Risks and barriers** Electricity, familiarity with mobile technology

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

The experience to date suggests that the games can aid in language learning and thus they could be valuable learning tools. The focus is entirely on education, so there has been no consideration of sustainability. The assistance of Nokia in 2010 has enabled MILLEE to dramatically expand the scale of its research in India, but it is unclear whether additional support or new partners will be found once the current round of research is completed.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

The main challenge is creating partnerships to fund the roll-out of the games, and local educational partners to allow the usage of the MILLEE games as part of their curricula.

Further study / research questions	**Select for case study** No

Contact Matthew Kam Carnegie Mellon mattkam@cs.cmu.edu	**Comments on contacts made, arrangements, etc.**

Subsector *I.e., Which of Typology Subsectors* Rural Finance, Infrastructure & ICT	Name of Application and References Gaon Ki Awaaz: • http://gaonkiawaaz.wordpress.com/ • http://mobileactive.org/case-studies/gaon-ki-awaaz-news-alerts-rural-villagers • http://www.imii.co.in/Gaon_ki_Awaz.html • http://www.livemint.com/2010/06/13210908/Phone-news-bulletins-to-empowe.html?atype=tp	Country(s) / Region India

Segment / Activity
i.e., which Segment in the Typology

Broadcasting and program-related

Description of Application
Note whether it is purely information or transaction based

One call can bring news to hundreds in rural villages in India. Gaon Ki Awaaz, which means "Village Voice" in the Avhadi language, sends out twice-daily news calls to subscribers directly over their mobile phones. Launched in December 2009, the project recently expanded to 250 subscribers spread over 20 villages.

Sunil Saxena, dean of the International Media Institute of India which launched the project, said that Gaon Ki Awaaz was developed in order to meet the needs of rural populations. Gaon Ki Awaaz has two reporters, Divyakar Pratap Singh and Priya Gupta, who produce news reports by recording 30-to 60-second voice notes on their phones. Those short news bulletins are sent as multi-media messaging (MMS) to local editor Satyenda Pratap for review and are then sent on to Saxena for final review. The reporters are from the village of Rampur-Mathura (where the pilot is being run) so they can transmit reports in the local dialect, Avhadi.

Subject matter for the broadcasts can include alerts such as when health camps are coming to a nearby area, farm tips, events happening in the village such as religious and/or community-oriented celebrations, or local-centric government announcements.

Technology *E.g., voice, video, sms, email, GPS, multi-media* Voice	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* The 30-60 second voice reports are sent as MMS messages to be edited and put on the system. The end-users receive automated voice calls. Increased penetration and usage of mobile phone would increase the application's viability.

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* International Media Institute of India	**Lead** role(s) Developed the application

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

The service provides twice daily local news, via voice, in local dialect. Users have recently started to pay Rs. 30 for a 3 month subscription. Local businesses can also advertise on the service.

Other key players	Roles	Incentives / Business model
1. Netxcell Ltd	IT company that uses an application called Mobile Internet Platform to broadcast bulletins as voice calls to subscribers	Revenue for providing service
2. Knight Fund	Financial support	Development

Year of commencement 2009	Maturation Cycle Position *Emerging / Expanding / Mature* Expanding	Status *E.g., Pilot / Rolling out / Established* Pilot

Comment on maturation / status of development

The organization is in talks with angel investors and is looking to foundations and corporations for assistance. The service is also hoping to get advertisements from agri-business and telecom companies, as well as public interest advertising from bodies such as the World Health Organization and the United Nations Children's Fund. The project is currently in the pilot stage.

Costs of the application & evidence of cost recovery & profit/sustainability,
E.g., Development of the technical systems & content; maintenance & skills

It is estimated that the total cost of the initial four-month project was roughly USD 1,000. The only costs have been the purchase of three MMS-equipped phones (for the two reporters and local editor), which cost about USD 100 each, and the monthly broadcast fees. Because the transmission costs of the short robo-calls are fairly cheap (founder Sunil Saxena estimates that the expansion of the subscriber to 250 raised the monthly fee to roughly USD 300; before that is was under USD 100), the project is able to operate with a small budget.

Despite the small budget, Gaon Ki Awaaz is now trying to become sustainable by bringing in independent revenue. Gaon Ki Awaaz recently got its first advertisers – in early March 2010 one of the village merchants, who was part of the original group of 20 users, bought an ad that was played before the news. Saxena says that they are looking to eventually bring in two types of adverts from local merchants and from national agricultural companies. The plan is to start with hyper-local advertising in order to gauge the response, and then start looking to agri-companies to have them sponsor some bulletins. Users have recently started to pay Rs. 30 for a 3 month subscription. 42 of 45 people approached initially have agreed to pay the fee.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

The service provides a platform for villagers to share their knowledge, obtain information or even report about the social abuses and human rights violations. Compiled in Avadhi, the Hindi dialect spoken in the area, bulletins give news on theft, village fairs, weddings, births and deaths. They also provide information on health camps, local school and board examinations, coaching classes, government directives on employment, healthcare, farm prices and so on.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

No information available.

SWORB *[Maybe summary of other sections]*	Strengths Local news, voice service, inexpensive to set-up	Weakness No customization/personalization, costs the end-user
	Opportunity Geographic expansion	Risks and barriers Highly localized news requires many separate services/reporters to replicate

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

Given the initial success getting subscribers to pay, and the appeal of a voice service in areas with lower literacy rates, the application appears to have potential.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high The cost of the system used is low, as are the technical barriers to setting up such a system. Therefore, it appears that this application could easily be replicated. By its local nature, one implementation of the service could never serve a very large number of people or a large area, but since it is not costly to set up, it should be possible to replicate the application in numerous additional communites and countries.

Further study / research questions	**Select for case study**
	No

Contact	**Comments on contacts made, arrangements, etc.**
Sunil Saxena Dean, International Media Institute of India sunil.s@imii.co.in	

Subsector *I.e., Which of Typology Subsectors* Labour, Migration and Human Development	Name of Application and References SoukTel: • http://www.souktel.org/ • http://mobileactive.org/case-studies/souktel • http://www.netsquared.org/projects/souktel-mobile-phone-job-service • http://www.clickatell.com/success/souktel.php • http://www.dotopen.com/organizations/view/souktel	Country(s) / Region Palestinian Territories

Segment / Activity
i.e., which Segment in the Typology

Employment, Agro-marketing, Agro-support

Description of Application
Note whether it is purely information or transaction based

Souktel's JobMatch application is a cellphone based service that uses SMS technology to link people with jobs and connect aid agencies with people who need help. Founded by Palestinian, Canadian and American graduate fellows at Harvard and MIT, Souktel has been working in Palestine since 2005. They provide two services: JobMatch and AidLink. If looking for work, JobMatch helps create and SMS "mini-CV" that highlights skills and experience. Once the CV is sent from the phone to a main database, users can search JobMatch for all available jobs. Or find the position that matches a particular skill set. If looking for staff, JobMatch lets users design an SMS mini "Job Ad" describing the work offered and the skills needed. Users can then browse JobMatch for all available CVs.

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* Souktel uses SMS, but would like to also provide service via WAP if it finds the funding required to do the necessary development.

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* Souktel	Lead role(s) Developed and manage the JobMatch application.

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

Souktel is designed to be self-financing so it can sustain long-term impact in local communities: Job-seekers pay a modest premium SMS/data rate to search job ads/post mini-CVs; employers pay slightly higher per-use fees to post jobs/search CVs. Even with moderate usage volumes, this model lets SoukTel cover over 80% of running costs.

Other key players	Roles	Incentives / Business model
1. Clickatell	Messaging provider	Revenue from message traffic
2. USAID	Financing	Development
3. World Bank	Financing	Development

Year of commencement 2006	Maturation Cycle Position *Emerging / Expanding / Mature* Mature	Status *E.g., Pilot / Rolling out / Established* Established

Comment on maturation / status of development

According to a 2009 interview, at least 2,000 people use the service each month in Palestine and the service has about 8,000 total users. In the past year, JobMatch has connected about 500 people with jobs. Users tend to be between the ages of 18 and 25, and the system recently expanded to include internships and volunteer opportunities. In 2009, Souktel launched services in the Iraq and Somaliland.

Costs of the application & evidence of cost recovery & profit/sustainability,
E.g., Development of the technical systems & content; maintenance & skills

Even with moderate usage volumes, SoukTel's business model lets them cover over 80% of operating costs.

Job-seeker ARPU (average revenue per user) is about $1/month (net of mobile network revenue-share) and employer ARPU is about $10/month. With 8K job-seekers and 200 employers, current net income is roughly $10K/month—more than enough to cover minimal running costs (office space, servers, IT/outreach staff). Surplus revenue finances R&D and new market expansion.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

Target users are people with mobile phones in low income communities. The benefit of the service is the potential to find employment.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

Since launch in 2007, Souktel has impacted more than 20,000 low-income job-seekers: First, over 2,000 users in developing countries have found jobs, apprenticeships, or training that leads to income. Each newly-employed worker supports an average of 5 family members—meaning that close to 10,000 additional people have benefitted indirectly from Souktel's technology. As of late 2009, there were a further 8,000 job-seekers and 200 employers using the application daily to get information about jobs/staff. Each month, about 50 new users are matched with jobs or internships (temporary labour firms, the main competing solution, only match about 10 people per month). These numbers also show SoukTel's impact on regional economic development: Each job-seeker who finds work through Souktel earns about $400/month. In a year, 2,000 matched job-seekers earn a combined $9.6 million in new income—that's close to $10 million injected into local communities.

SWORB *[Maybe summary of other sections]*	**Strengths** Low cost to users and sponsor, customized job ads based on user mini-CV	**Weakness** Requires incurring the cost of SMS messages, the service is at the mercy of the job market
	Opportunity Geographic expansion, WAP service	**Risks and barriers** People could be reluctant to try the service if it perceived to be difficult to use

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

Employment is an issue in low income communities world-wide. Since mobile penetration is significant in many low income communities already, it appears that this application should have very widespread appeal.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

Souktel has been intentionally designed to be easily scalable and replicable across the developing world. The SMS-accessible software service requires minimal hardware, minimal set-up time, and minimal added cost to increase its scope and reach. For technical scale-up, their database and gateway structure are easily expandable to accommodate thousands of new users (right now we're adding hundreds of new users every month). For service model scale-up, they work with national mobile networks to promote Souktel among large numbers of job-

seekers and employers through low-cost, high-reach PR channels—enabling quick growth with minimal expenditure. Replicating Souktel is also easy. The organization is expanding their East Africa service into new areas of the former Somalia. In a matter of weeks, they "cloned" their database system to create a local version that runs on hub servers, but with a front end that's managed remotely in local languages. They are now helping local colleagues build ties with local mobile networks, employers, and community groups to get a 'critical mass' of new job seekers and employers using the technology.	

Further study / research questions	**Select for case study**
	No

Contact	**Comments on contacts made, arrangements, etc.**
Jacob Korenblum Co-Founder, SoukTel info@souktel.com	

Subsector *I.e., Which of Typology Subsectors* Labour, Migration and Human Development	Name of Application and References Tiendatekweb.com: • http://www.frogtek.org/solution • http://tiendatekweb.com/ • http://mobileactive.org/mobile-tools/frogtek • http://www.technologyreview.com/communications/26468/page2/ • http://mobileactive.org/mobileactive-barcamp-technology-change-changing	Country(s) / Region Latin America (Colombia first)

Segment / Activity
i.e., which Segment in the Typology

SMEs and micro-businesses / private Segment development

Description of Application
Note whether it is purely information or transaction based

The product is a point-of-sales software application that allows micro-retailers to record all store expenses and revenues directly on a mobile phone; the camera even serves as a bar code reader which allows them to record sales and inventory at the product level. In exchange micro-retailers gain access to financial reporting, personalized recommendations and additional value-added services.

All applications run on advanced mobile phones ("smart" phones) that have touch-screens and synchronize wirelessly with our Web servers. The company is currently working with Android-based Google phones (e.g., the G1).

Technology *E.g., voice, video, sms, email, GPS, multi-media* Data, POS	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* The application currently only works with Android smartphones. The success of Android phones in Latin America will have a significant impact on the viability of this application.

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* Frogtek	Lead role(s) Developed and manage the application.

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

Tiendatek is an accounting and inventory management tool for small shopkeepers in the developing world. It runs on Android phones and connects to servers for backup and business advice. The applications will be installed on phones which will then be distributed locally and financed by Microfinance Institutions. In addition, Frogtek will offer an internet-based service to provide the micro-entrepreneur with real-time reporting, analysis, and personalized recommendations to improve business and increase profits.

Other key players 1. BBVA	Roles Financing and connecting TiendaTek to its BancaMia MFI in Latin America	Incentives / Business model Revenue and CSR

Year of commencement 2010	Maturation Cycle Position *Emerging / Expanding / Mature* Emerging	Status *E.g., Pilot / Rolling out / Established* Rolling out

Comment on maturation / status of development

TiendaTek won BBVA's Open Talent competition in 2010. BBVA is a leading Spanish bank that operates extensively throughout Latin America. With the financial and institutional support valued at €100,000 Frogtek will distribute TiendaTek product to shopkeeper clients of BancaMia, one of the largest microfinance institutions in Colombia and partly owned by BBVA. As part of this project Frogtek will develop mobile educational and marketing tools to help both shopkeepers and BancaMia improve their respective businesses as well as strengthen their relationship.

Costs of the application & evidence of cost recovery & profit/sustainability,
E.g., Development of the technical systems & content; maintenance & skills

No information available

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

Many small businesses in developing/emerging regions don't know their break-even sales point, cannot analyze an investment opportunity or their cost structure, can't trust family outsiders as employees, don't optimize their inventory or purchasing decisions, find it daunting to take out a loan and in general have a severe lack of clarity on the business status. All these factors combine to keep micro-retailers operating in a sub-optimal manner, reducing their profits and limiting their growth. TiendaTek seeks to address these shortcomings.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

No information available.

SWORB *[Maybe summary of other sections]*	**Strengths** Provides functionality not otherwise available	**Weakness** Requires Android smartphone
	Opportunity Expand to other mobile operating systems	**Risks and barriers** There are instances where shops keep two sets of books, one for the government, and one for themselves, this app could make it harder to do this.

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

"The lack of normal computers or laptops in these places means that they covet smart phones more than we do," explains del Ser. "I think we'll see those devices spread rapidly among certain demographics, like the small shopkeepers we work with."

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

The application could grow in developing countries as it offers valuable tools. However, the concern about book-keeping and government taxation could be a hurdle to widespread acceptance.

Further study / research questions	**Select for case study** No

Contact David del Ser david@frogtek.org	**Comments on contacts made, arrangements, etc.**

Subsector *I.e., Which of Typology Subsectors* Labour, Migration and Human Development	Name of Application and References BBC Janala - http://www.bbc.co.uk/worldservice/trust/whatwedo/where/asia/bangladesh/2010/01/100115_bangaldesh_janala_project_overview.shtml - http://mobileactive.org/press-one-english-bbc-janala-offers-english-language-courses-over-mobiles - http://blogs.worldbank.org/edutech/learning-the-queens-english-on-your-mobile-phone	Country(s) / Region Bangladesh

Segment / Activity
i.e., which Segment in the Typology

Education, Learning and Training

Description of Application
Note whether it is purely information or transaction based

BBC Janala (Window), launched in November 2009 is a unique multi-platform (including mobile, internet and TV) project that harnesses multimedia technology to provide affordable education to potentially millions of people in the Bangladeshi-speaking community. There are over 50 million mobile phone users in Bangladesh today – and the number is growing. By dialling "3000" any of these users can access hundreds of English language audio lessons and quizzes. Content is updated weekly and caters to all levels of experience with 'Essential English' for beginners, 'Pronunciation' for intermediaries and 'Vocabulary in the News' for those more advanced. To make the lessons affordable, BBC Janala has teamed up with all six of Bangladesh's mobile operators who have agreed to cut the cost of calls to the service by up to 75%. Each lesson lasts three minutes and costs less than the price of a cup of tea from a Dhaka tea stall (or 3 pence). At the end of December 2009 – a month after launching – over 750,000 calls had been made to the mobile phone service.

Technology *E.g., voice, video, sms, email, GPS, multi-media* Voice	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* The main development that could have an impact on the viability of this application is overall mobile penetration, increased penetration would increase viability.
Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* BBC World Service Trust	Lead role(s) Initiated project and co-developed the application with BBC Learning English.

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

BBC Janala has teamed up with all six of Bangladesh's mobile operators who have agreed to cut the cost of calls to the service by up to 75%. Each lesson lasts three minutes and costs less than the price of a cup of tea from a Dhaka tea stall (or 3 pence). The project is designed to help people learn English and does not include a mandate for sustainability.

Other key players	Roles	Incentives / Business model
1. DFID	Funding	Development
2. Mobile operators	Provide discounted airtime	CSR

Year of commencement 2009	Maturation Cycle Position *Emerging / Expanding / Mature* Emerging	Status *E.g., Pilot / Rolling out / Established* Pilot

Comment on maturation / status of development
BBC Janala is a project that started in Bangladesh in November 2009 and ends in April 2011.

Costs of the application & evidence of cost recovery & profit/sustainability,
E.g., Development of the technical systems & content; maintenance & skills
No information available.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.
BBC's research indicates that speaking English is no longer an ambition of the wealthy, and that good English is essential for anyone who wishes for better employment prospects. BBC Janala provides low income Bangladeshi's the opportunity to learn English and enhance their employment prospects.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.
No information available.

SWORB *[Maybe summary of other sections]*	**Strengths** Lessons available by multiple channels, affordable	**Weakness**
	Opportunity Find ways to make service sustainable	**Risks and barriers** Cost, though low, still could be a barrier to low income users

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service
A high number of Bangladeshis surveyed – around 84% – said that English learning was a top priority for their future, and 99% said they wanted their children to learn.
To date over two million audio lessons have been accessed (listened to), 177,000 short audio have been taken and stories and feedback recorded. In addition, over 100,000 audio lessons have been downloaded from BBC Janala mobile internet site (some observers consider this rather remarkable, given the difficulties for many to access the mobile internet and the fact that it has not been advertised). 46% of first-time users have returned to the service -- this is also noteworthy, given that mobile value-added services in Bangladesh typically have only a 5% repeat rate.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high
Lessons are presented in Bengali, so the service as is, cannot be replicated. However, lessons learned from the project could be applied to future services in other countries.

Further study / research questions	**Select for case study**
	No

Contact	**Comments on contacts made, arrangements, etc.**
Sara Chamberlain Head of BBC World Service Trust Interactive	

Subsector *I.e., Which of Typology Subsectors* Rural Finance, Infrastructure & ICT	Name of Application and References 4400 Initiative: • http://mobileactive.org/case-studies/voices-youth • http://mobileactive.org/mobilemedia • http://www.unicef.org/nepal/5476_6211.htm • http://www.unicef.org/nepal/5474_6209.htm	Country(s) / Region Nepal

Segment / Activity
i.e., which Segment in the Typology Broadcasting and program-related

Description of Application
Note whether it is purely information or transaction based A recently launched campaign at a popular youth radio program in Nepal focuses on the voices of youth – or at least, text messages of youth. Regardless, the SMS campaign seems to be making strides. UNICEF in Nepal has teamed up with the popular Nepali radio program Saathi Sanga Man Ka Kura, which means "chatting with my best friend." The program, also called SSMK, is run by the non-governmental organization Equal Access Nepal. SSMK has been on the air for 10 years and reaches millions of youth listeners (primarily ages 13 to 26) throughout Nepal. In April, UNICEF and SSMK launched a campaign that allows young listeners to take an active role in a conversation, all via SMS. Rupa Joshi, a communications specialist with UNICEF, explains the origins of the campaign. "When UNICEF Nepal launched its website in November 2009, we developed a special meta-site just for young people called the "Voices of Youth" designed and managed by the SSMK team. The idea was to maximise the participation of young people and reflect their voices on issues that affect their lives. During the discussions a point was raised about the reach of the internet in a geographically and economically strapped country like ours, and how we could reach children and young people out of e-connection. This was when SSMK's increasing number of responses from listeners via mobile phones, even from remote regions of the country, came up as a solution. The number of youngsters using mobile phones is increasing exponentially in the country, and it was agreed that we could get their responses much more if the service could be toll-free." Now, every week on the program, the radio team frames a topic or a question and invites the listeners to respond via a free text message to an established short code, 4400. (The campaign is also referred to as the "4400 initiative.") The responses are then posted on a forum on the UNICEF Voices of Youth (VOY) meta-site, or the "Freedom Express" debate platform.

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS, radio	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* Increased usage of SMS would improve the service's viability.

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* UNICEF	Lead role(s) Developed and operates the application.

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe) There are no charges for the service. The service is only designed to give youth in Nepal a voice.

Other key players	Roles	Incentives / Business model
1. FOCUSONE	SMS provider	Revenue

2. Saathi Sanga Man Ka Kura	Radio program to which listeners send SMS messages	Development, information, entertainment

| Year of commencement

2010 | Maturation Cycle Position
Emerging / Expanding / Mature

Emerging | Status
E.g., Pilot / Rolling out / Established

Pilot |
|---|---|---|

Comment on maturation / status of development

Initially the service is intended just for response to queries aired on SSMK. Depending upon the volume and nature of response, the service will be expanded and modified to address other queries that young people may have.

Costs of the application & evidence of cost recovery & profit/sustainability,
E.g., Development of the technical systems & content; maintenance & skills

The group began planning for the SMS campaign in January and the cost to launch was minimal. UNICEF relied on their existing staff members and worked with the SSMK staff with whom they have an operational contract. Approximately USD 2,000 were allocated to an intermediary company to help set up the system. The 4400 short code is free to listeners, and UNICEF incurs a cost of 2 Nepalese rupees per SMS sent. This works out to about USD 1,000/month to support the initiative.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

The SMS service not only provides young listeners with a platform from which to speak about important issues, but also connects the listeners to an online discussion forum (if they have Internet access) to read what others are saying about a particular topic. A viewer can also text "VOYQ" to 4400 to receive a text message with that week's topic, in English. In this way, even if an individual misses the broadcast, he or she can still participate in the conversation via SMS or on the web.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

No information available.

| SWORB
[Maybe summary of other sections] | **Strengths**
Free, low start-up costs, works in conjunction with popular radio program | **Weakness**
Requires administrative time to monitor and post incoming messages |
|---|---|---|
| | **Opportunity**
Expand the use of the platform to issues beyond those raised through the SSMK program | **Risks and barriers**
SSMK program could change/end |

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

The SSMK radio program has millions of listeners in Nepal. In roughly the first six weeks of offering the SMS service, the station received over 33,000 messages, which came from approximately 4,000 listeners.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

The service is targeted at the listeners of a specific Nepali radio program and therefore is not replicable. However, the technologies used and lessons learned could be applied to the creation of similar services in other countries or for other programs in Nepal.

Further study / research questions	Select for case study
	No

Contact	Comments on contacts made, arrangements, etc.
John Brittain Chief of Communication, UNICEF jbrittain@unicef.org	

| Subsector
I.e., Which of Typology Subsectors

Labour, Migration and Human Development | Name of Application and References

Multimedia Word and Drumming Strokes games:
- http://www.cs.cmu.edu/~mattkam/publications/CHI2010b.pdf | Country(s) / Region

China |
|---|---|---|

Segment / Activity
i.e., which Segment in the Typology

Education, Learning & Training

Description of Application
Note whether it is purely information or transaction based

Based on an analysis of 25 traditional Chinese games currently played by children in China, we present the design and implementation of two culturally inspired mobile group learning games, Multimedia Word and Drumming Strokes. These two mobile games are designed to match Chinese children's understanding of everyday games. An informal evaluation reveals that these two games have the potential to enhance the intuitiveness and engagement of traditional games, and children may improve their knowledge of Chinese characters through group learning activities such as controversy, judgments and self-correction during the game play.

| Technology
E.g., voice, video, sms, email, GPS, multi-media

Mobile games | Technical development path
Note any past or expected changes and what impact technological change could have on the application and its viability

The researchers identified some important elements in traditional Chinese games, not all the elements were leveraged during the design process of the two mobile learning games, e.g. handmade game objects and predefined game/arena boundaries could be leveraged to further improve the intuitiveness and engagement of mobile games. |
|---|---|

| Leading Ecosystem Player
E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent

Various academic researchers | Lead role(s)

Researching, developing and testing the games. |
|---|---|

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

The games are designed purely as educational tools and not with any consideration for profit or sustainability.

| Other key players
1. Chinese Academy of Sciences, Berkeley, Carnegie Mellon, Nokia Research | Roles
Members of the research team are from these institutions/organizations | Incentives / Business model
Education |
|---|---|---|
| 2. Chinese government | Funding | Education |

| Year of commencement

2009 | Maturation Cycle Position
Emerging / Expanding / Mature

Emerging | Status
E.g., Pilot / Rolling out / Established

Pilot |
|---|---|---|

Comment on maturation / status of development

The current experiments were preliminary studies. The results do not yet validate the researchers' approach quantitatively. They plan to continue the evaluation with more participants for a longer duration in rural areas.

Costs of the application & evidence of cost recovery & profit/sustainability,
E.g., Development of the technical systems & content; maintenance & skills

No information available.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

Both the Multimedia Word game and the Drumming Stroke game can help children learn essential Chinese language skills via game playing in groups. The researchers performed informal evaluations to understand the game play dynamics qualitatively. Results show that digital games have the potential to enhance the intuitiveness and engagement of traditional games, and it is encouraging to see that children can continuously improve their knowledge in characters through group activities such as controversy, judgment and self-correction.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

No.	Pre-test:SC	Pre-test:CC	Post-test:SC	Post-test:CC
1	33	20	34	21
2	17	11	18	12
3	21	17	N/A	N/A
4	27	14	31	15
5	18	14	21	16
6	18	11	21	12

Table 2. Scores of six participants in both pre- and post-tests. (SC: single-component character, CC: composed-component character. The pre-test data of Participant # 3 was not used in the analysis due to the lack of post-test data.)

SWORB *[Maybe summary of other sections]*	**Strengths** Provides incentive to learn	**Weakness** Games do not leverage all aspects of traditional games
	Opportunity Improve intuitiveness of games	**Risks and barriers** Low income, rural children might not have enough access time with a mobile phone to get the full benefit of the games

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Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

The preliminary research suggests that the mobile games could be valuable learning tools for Chinese students. It is unclear how much potential there would be outside of China.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

These games are designed specifically for a Chinese environment. Lessons learned about mobile educational

games could possibly be applied to projects elsewhere.	
Further study / research questions	**Select for case study**
	No

Contact	**Comments on contacts made, arrangements, etc.**
Vidya Setlur Nokia Research Palo Alto, Palo Alto, CA, U.S.A vidya.setlur@nokia.com	

Subsector *I.e., Which of Typology Subsectors* Labour, Migration and Human Development	Name of Application and References Dr Math: • http://www.slideshare.net/stevevosloo/mobile-learning-south-african-examples • http://playpen.meraka.csir.co.za/~acdc/education/TEDC2010/proceedings/Final-DrMath_goes_Mobicents.pdf • http://www.csmonitor.com/World/Africa/Africa-Monitor/2010/0924/South-Africa-strike-sends-students-beyond-the-classroom-to-learn	Country(s) / Region South Africa

Segment / Activity
i.e., which Segment in the Typology

Education, Learning & Training

Description of Application
Note whether it is purely information or transaction based

Dr Math provides tutors to help with mathematics homework. Pupils use Mxit on their mobile phones. Tutors are from University of Pretoria. The service runs from 14:00 – 22:00 Sunday – Thursday. Tutoring is mostly in English, but some in Afrikaans.

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* Dr Math uses the Mxit platform, so any technological changes that affect Mxit could impact Dr Math's viability too. In 2009 a new framework for running the Dr Math service called C³TO (Chatter Call Centre/Tutoring Online) was developed. C³TO is an open source platform developed at Meraka Institute.
Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* Meraka Institute	**Lead role(s)** Developed the application.

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

Students message with Dr Math tutors using Mxit, which means messages are billed as data usage, not SMS messages. This means that the cost per message is less than one cent. Sustainability is not a focus of the project.

Other key players	Roles	Incentives / Business model
1. University of Pretoria	Provides the math tutors	Improving math education
2. Mxit	Provides messaging platform	Revenue from messaging

Year of commencement 2007	Maturation Cycle Position *Emerging / Expanding / Mature* Mature	Status *E.g., Pilot / Rolling out / Established* Established

Comment on maturation / status of development

The problem eventually arose, however, that Dr Math was growing far beyond any expectations. Dr Math needed to have facilities where tutors could safely tutor from home or from university labs. Dr Math needed to be able to scale the software to handle increased numbers. Dr Math also needed to expand the protocol sets so that Dr Math could also communicate with pupils who did not use Mxit but used other chat systems such as Google Chat,

Jabber, or Nok-Nok. Multiple Dr Math servers needed to be available in different areas to handle the future load. In addition, the platform needed to be more generic so it could used to assist in other domains such as dispensing information about HIV/AID or other health issues. These problems prompted the Meraka Institute to do a complete redesign and rewrite of Dr Math using Jboss, Mobicents, and Seam in 2009.

Costs of the application & evidence of cost recovery & profit/sustainability,
E.g., Development of the technical systems & content; maintenance & skills

No information available.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

The tutoring service provides students opportunities to improve their math skills.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

No information available.

SWORB *[Maybe summary of other sections]*	**Strengths** Low cost, personal tutoring	**Weakness** Limited graphical capabilities
	Opportunity Expanding the number of tutors, upgrading interface	**Risks and barriers** Service relies on volunteer tutors from a university

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

A September 2010 comment from a project sponsor said that Dr. Math is currently helping 12,000 learners on MXit, but could be helping many more if they had additional volunteer tutors. There are about 100 tutors who help with the Dr Math service.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high.

As the service is based on Mxit, it could easily be replicated anywhere that Mxit is available. If SMS messaging is required, then the service would become significantly more expensive and might not be replicable without partnerships to ensure affordability.

Further study / research questions	**Select for case study** No

Contact Laurie Butgereit Meraka Institute lbutgereit@meraka.org.za	**Comments on contacts made, arrangements, etc.**

Subsector *I.e., Which of Typology Subsectors* Rural Finance, Infrastructure & ICT	Name of Application and References Managing News: • http://mobileactive.org/mobile-tools/managing-news • http://managingnews.com • http://developmentseed.org/product/managing-news	Country(s) / Region Afghanistan

Segment / Activity
i.e., which Segment in the Typology

Broadcasting and program-related

Description of Application
Note whether it is purely information or transaction based

Managing News originated as a news aggregation and republishing platform heavily integrated with RSS/Atom. Users can track a diverse set of RSS/Atom feeds, visualize them, and republish selected reports on a platform that allows for mapping and pluggable visualizations. Managing News has subsequently added SMS functionality to the system. The system is based on Drupal, and integrates several open source projects including OpenLayers, SimplePie, and many Drupal plug-ins. Managing News allows NGOs to monitor on the ground security situations around the world.

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* Managing News is built on over 30 open source projects. The platform's SMS functionality is provided via SlingshotSMS, another Development Seed program.

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* Development Seed (http://developmentseed.org/about)	<u>Lead</u> role(s) Developed the application.

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

Managing News is an open source project that is provided free of charge. The aggregated news feeds and mapping information are designed to be freely available. The platform does not appear to have been developed with sustainability in mind.

Other key players 1. Knight Foundation	Roles Helped fund key module development to improve Drupal's mapping and aggregation tools.	Incentives / Business model Development

Year of commencement 2009	Maturation Cycle Position *Emerging / Expanding / Mature* Expanding	Status *E.g., Pilot / Rolling out / Established* Rolling out

Comment on maturation / status of development

The platform is currently deployed in at least three distributions. The software is in version 1.1.

Costs of the application & evidence of cost recovery & profit/sustainability,
E.g., Development of the technical systems & content; maintenance & skills

No information available.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

The service provides users with customized information and location details.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

No information available.

| **SWORB** *[Maybe summary of other sections]* | **Strengths** Customized information, free | **Weakness** Requires technical knowledge to set up the system |
| | **Opportunity** Simplify set-up | **Risks and barriers** Other similar services may become established (e.g. Ushahidi) |

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

The application definitely has a wide range of potential uses, and is free to use, so there should be a market for it.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

Managing News is a platform designed to be use for a range of uses in a range of locations. The main hurdle is the technical knowledge required to set up the system.

Further study / research questions	**Select for case study** No

Contact Alex Barth info@developmentseed.org	**Comments on contacts made, arrangements, etc.**

Subsector *I.e., Which of Typology Subsectors* Rural Finance, Infrastructure & ICT	Name of Application and References SocialTxt: • http://www.praekeltfoundation.org/socialtxt.html	Country(s) / Region South Africa

Segment / Activity
i.e., which Segment in the Typology

Various

Description of Application
Note whether it is purely information or transaction based

SocialTxt is a mobile messaging platform that uses the available advertising space on 'please call me' (PCM) messages, to communicate selected information to a specific target audience. Current marketing and media tools used by nonprofit organizations to communicate to their intended beneficiaries or supporters audience, is limited to radio, television, print & word of mouth. These forms of communications bear no guarantee of reaching the end user or intended benficiary. Through use of the PCM advertising space, SocialTxt's objective is to give non-profit organizations the ability to reach a potential 900,000 individuals in South Africa per day with essential information aligned towards the Millennium Development Goals (MDGs). South Africans currently send a total of 30 Million PCM messages per day accross all three mobile network operators (Vodacom, Cell C, MTN), with clients allowed to send a maximum of 8 PCMs per day - free of charge. The objective therefore is to use this tool for mass messaging which will have a positive social impact.

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* Using the advertising space on please call me messages relies on the popularity of SMS and please call me messages, as well as the provision of free please call me messages by operators.

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* Praekelt Foundation (http://www.praekeltfoundation.org/about.html)	Lead role(s) Developed the application.

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

It is unclear if this service has any profit potential as the monetary relationship between Praekelt and NGOs who would use the SocialTxt platform is unclear. The use of the available advertising space on please call me messages appears to be a novel avenue of communicating an NGO's message.

Other key players 1. Mobile operators	Roles Provide the network over which the service operates	Incentives / Business model Increased revenue, CSR

Year of commencement 2007	Maturation Cycle Position *Emerging / Expanding / Mature* Expanding	Status *E.g., Pilot / Rolling out / Established* Rolling out

Comment on maturation / status of development

The Praekelt Foundation has carried out four projects with South African NGOs using SocialTxt. The foundation is

in negotiations with various mobile operators in Africa, to start introducing SocialTxt, so that NGOs with a continental footprint can run multi-country communication campaigns.

Costs of the application & evidence of cost recovery & profit/sustainability
E.g., Development of the technical systems & content; maintenance & skills

No information available.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

Through use of the PCM advertising space, SocialTxt gives non-profit organizations the ability to reach individuals with essential information aligned towards the Millennium Development Goals (MDGs). The information recipients benefit by receiving information to which they would not otherwise be exposed.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

No information available.

SWORB *[Maybe summary of other sections]*	**Strengths** Free to end-users, uses common text messaging technology	**Weakness** Limited space to provide information
	Opportunity Geographic expansion in Africa	**Risks and barriers** Lack of cooperation from mobile operators is a risk

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

Given the international efforts behind meeting the Millenium Development Goals, the SocialTxt application appears to have value. It is unclear if there is any revenue potential or prospect for sustainability.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

The Praekelt Foundation has been negotiating with African operators to enable the roll-out of the service throughout the continent, in order to allow for the conduct of large-scale communications campaigns.

Further study / research questions	**Select for case study** No

Contact Marcha Neethling Project Manager marcha@praekeltfoundation.org	**Comments on contacts made, arrangements, etc.**

Subsector *I.e., Which of Typology Subsectors* Agriculture, Animal husbandry, Fisheries & Forestry	Name of Application and References Behtar Zindagi • http://www.trai.gov.in/NFCNPrts/session5/3-sUDHANSHUJAIN.pdf • http://www.financialexpress.com/news/behtar-zindagi-launch-aims-at-rural-uplift/571196/0 • http://www.tataindicom.com/ek-behtar-zindagi.aspx • "Mobiles and Rural Development: Case Studies", J.P. Auffret, February 6, 2011	Country(s) / Region India

Segment / Activity
i.e., which Segment in the Typology

Agro support

Description of Application
Note whether it is purely information or transaction based

Behtar Zindagi is a mobile and IVR based information service comprised of information services for Agriculture (information on life cycle of crops), Weather Alerts and Advisories, Commodity Prices, Coastal and Inland Fisheries (fishing zones, wind speed, wave height), Livestock, Health, Rural Finance and Education. The service is customized by state and market segment and available in 20 languages. Customers dial a single number – 5567.

Technology *E.g., voice, video, sms, email, GPS, multi-media* IVR	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* Development plans including the addition of m-government services.

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* Handygo	Lead role(s) Application developer

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

The service aims to revolutionize the delivery of information to rural residents through mobile and IVR. Per minute as well as subscription based pricing – with subscription of 20 Rs. per 30 days and pay as you go of Rs. 2 / minute. Promotion is through radio, print media, kiosk, promotional vehicle, posters and paintings, opinion leaders.

Other key players	Roles	Incentives / Business model
1. Bharti Airtel	Sole provider of access to the service	Revenue, CSR
2. India Meteorological Department	Provision of weather information	Development
3. India National Center for Ocean Information Services (INCOIS)	Ocean conditions	Development

Year of commencement 2010	Maturation Cycle Position *Emerging / Expanding / Mature* Expanding	Status *E.g., Pilot / Rolling out / Established* Rolling out

Comment on maturation / status of development
Handygo plans to deliver end-to-end solutions through Behtar Zindagi in the field of m-governance and others.

Costs of the application & evidence of cost recovery & profit/sustainability,
E.g., Development of the technical systems & content; maintenance & skills
Handygo invested over Rs 1 million to develop the application.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.
The service empowers rural citizens by providing actionable information.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.
No information available.

SWORB *[Maybe summary of other sections]*	**Strengths**	**Weakness**
	• Provides a wide range of information for rural people	• Only available through Airtel initially
	Opportunity	**Risks and barriers**
	• Expand offering into other m-government information services	• Information services relies on numerous partnerships, which must be maintained

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service
Behtar Zindagi has grown from its early 2010 start to over 500,000 subscribers. By 2012, 60% of country's projected 650 million total mobile subscriber base will be from rural areas.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high
For the service to grow elsewhere, a broad range of partnerships must be developed with information providers. This represents a significant hurdle to replicating the Behtar Zindagi service.

Further study / research questions	**Select for case study**
	No

Contact	**Comments on contacts made, arrangements, etc.**
Praveen Rajpal CEO, F Technologies (Handygo)	

Subsector *I.e., Which of Typology Subsectors* Agriculture, Animal husbandry, Fisheries & Forestry	Name of Application and References eExtension Service • http://www.e-extension.gov.ph/ • "Mobiles and Rural Development: Case Studies", J.P. Auffret, February 6, 2011	Country(s) / Region Philippines

Segment / Activity
i.e., which Segment in the Typology

Extension services

Description of Application
Note whether it is purely information or transaction based

The Philippine eExtension Service is an addition to Techno Gabay, a national extension system that has the goal of providing farmers with access to best practices and latest science and technology to improve agricultural methods and increase agricultural productivity. PCCARD and DOST work with local governments to establish local Farmers Information and Technology Service Centers (FITS) which provide a local presence. The eExtension Services are provided via SMS and voice. and include eFarming, eTraining and eLearning.

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS, voice	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* Increased mobile penetration among rural agricultural workers will increase the usage of this service.

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* Philippine Agricultural Training Institute, Philippine Council for Agriculture, Forestry and Natural Resources Research and Development (PCARRD) and Department of Science and Technology (DOST)	Lead role(s) Developed the application

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

The objective is to provide access to best practices and real time information through online learning, advisory services, current news and etrading to farm, fisheries and natural resource sectors. The service is government funded and does not charge end users.

Other key players	Roles	Incentives / Business model
1. Commission on Information and Communications Technology (CICT)		Development
2. Department of Agriculture	Provision of information / expertise	Development
3. University of Philippines	Provision of information / expertise	Development / education
4. Globe Telecom Foundation for Agriculture Related Missions		Development, CSR

Year of commencement 2009	Maturation Cycle Position *Emerging / Expanding / Mature* Mature	Status *E.g., Pilot / Rolling out / Established* Established

Comment on maturation / status of development

The Farmers' Contact Centre service launched in November 2009.

Costs of the application & evidence of cost recovery & profit/sustainability,
E.g., Development of the technical systems & content; maintenance & skills

No information available.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

The service provides an alternative to traditional extension services providing enhanced reach and access as well as new services. It will provide technical assistance to the farmers, extension workers, in terms of making their farming a profitable enterprise. Likewise, it will facilitate information exchange among the traders and investors in the agriculture and fisheries sector.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

No information available.

SWORB *[Maybe summary of other sections]*	**Strengths**	**Weakness**
	• Provides a wide range of information • Free to end-users	• Lack of staff expertise
	Opportunity	**Risks and barriers**
	• Expand awareness of the services available	• Funding • Rural ICT infrastructure

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

There are significant numbers of people employed in the farming, fisheries and natural resource sectors who would be potential users of this service. Sustainability is an issue only in that ongoing government commitment to the service must be maintained.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

Potenial hurdles include ongoing funding, staff expertise and capability and rural ICT infrastructure development.

Further study / research questions	**Select for case study**
	No

Contact	**Comments on contacts made, arrangements, etc.**

Subsector *I.e., Which of Typology Subsectors* Agriculture, Animal husbandry, Fisheries & Forestry	Name of Application and References Informacion Mensajeria Movil • "Mobiles and Rural Development: Case Studies", J.P. Auffret, February 6, 2011	Country(s) / Region Colombia

Segment / Activity
i.e., which Segment in the Typology

Extension services

Description of Application
Note whether it is purely information or transaction based

Informacion Mesajeria Movil is a series of text message based subscription services. Subscribers can choose services that include training, best practices, advisory and news for Agriculture, Science and Technology, Fishing and Aquaculture, Rural Opportunities and Credit Instruments.

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* Changes in SMS usage will affect viability.

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* Ministry of Agriculture and Rural Development	<u>Lead</u> role(s) Application development

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

The main objectives of the application are strengthening and enhancing the competitiveness of the agriculture sector as well as furthering connections between citizens and the Ministry of Agriculture and Rural Development. Revenues are generated through subscription fees and government funding.

Other key players Mobile operators (Comcel, Movistar, Tigo, Avantel)	Roles Provision of SMS services	Incentives / Business model Revenue, CSR

Year of commencement	Maturation Cycle Position *Emerging / Expanding / Mature* Expanding	Status *E.g., Pilot / Rolling out / Established* Established

Comment on maturation / status of development

No information available.

Costs of the application & evidence of cost recovery & profit/sustainability,
E.g., Development of the technical systems & content; maintenance & skills

There were approximately 2,000 subscriptions in 2010 and an increasing number of SMS messages per month.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

The application adds to traditional extension services.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

No information available.

SWORB [Maybe summary of other sections]	Strengths	Weakness
	Opportunity • Promotion to farmers and rural areas	**Risks and barriers** • Funding • Partnering for content

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

The service charges a subscription fee, and receives some government funding, which puts it ahead of many similar extension services in other countries in terms of sustainability. There are currently around 2,000 subscribers to the service.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

The service is specific to Colombia. The technology used could be replicated, but new relationships for content provision would be required in a new jurisdiction.

Further study / research questions	Select for case study
	No

Contact	Comments on contacts made, arrangements, etc.

Subsector *I.e., Which of Typology Subsectors* Agriculture, Animal husbandry, Fisheries & Forestry	Name of Application and References Virtual City AgriManagr • http://www.virtualcity.co.ke/solution.php?alias=agrimanagr	Country(s) / Region Kenya

Segment / Activity
i.e., which Segment in the Typology

Agro-marketing / Trade

Description of Application
Note whether it is purely information or transaction based

AgriManagr automates produce purchasing transactions and reduce your costs while improving relationships with your customers and suppliers. Virtual City's AgriManagr solution has been used in the Dairy, Tea, Coffee and Cotton industries.

In the tea industry, Kenya Tea Development Agency (KTDA), one of Kenya's major private tea management agencies that currently manages up to 60 tea factories in the small scale tea sub-sector, needed an accurate method of collecting, recording and accounting for tea leaves from the small-scale farmers at the field level. Through this automation, the agency wished to increase productivity at the field level by streamlining field processes. The issues to be addressed were to include;
• On Site Data Capture with the use of PDAs
• On Site Transaction Processing
• Onsite Electronic Weighing
• Data Reconciliation
• Data Transfer (via VPN over the GSM network)
• Electronic Data Backup

The tea industry solution, which is still in the pilot implementation stage, is a simple and easy to use 3 module system that is used to accurately capture and deliver the growers' green leaf weights from the buying centre up until delivery to the factory.

1) Module 1 involves the actual capture of individual grower's weights at the buying centre.

2) Module 2 involves the delivery and count of the total number of green leaf bought at a particular buying centre.

3) Module 3 is the part of the system that captures the weights delivered by the truck to the factory; this module runs on a PC connected to the weighing scale at the off-loading. The system also generates some web reports that show a summary of the various weights collected at the various stages of the system.

Both modules 1 and 2 are captured on the PDA.

Technology *E.g., voice, video, sms, email, GPS, multi-media* Bluetooth, PDA, SMS, email	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* Increased smartphone usage should increase the affordability / viability of the application. The application is being adapted for use in the value chains of dairy co-ops, which will include internet and Visa payment engines and M-Pesa based payments.

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* Virtual City	Lead role(s) Developed and markets the application

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

As the solution provider, Virtual City's business model is to be paid in full for turn-key delivery of the system. It plays no role in the value chain transactions and has no share in that.

Other key players	Roles	Incentives / Business model
1. African Enterprise Challenge Fund	Funding	Development
2. USAID	Funding	Development

Year of commencement	Maturation Cycle Position *Emerging / Expanding / Mature*	Status *E.g., Pilot / Rolling out / Established*
2009	Expanding	Rolling out

Comment on maturation / status of development

A USD 0.75 million African Enterprise Challenge Fund (AECF) award will finance the migration of AgriManagr to the value chains of 15 Dairy Co-ops in three Kenyan provinces involving 90,000 small scale dairy producers. It will include complete value chain tracking and include Internet and Visa payment engines, as well as (for a first time in Virtual City's experience) the incorporation of M-PESA based payments to the producers. In this case, rather than being paid on a one-time Turn-Key delivery basis, Virtual City will migrate its business model to monthly payments, but still not to a transaction-based formula.

Costs of the application & evidence of cost recovery & profit/sustainability,
E.g., Development of the technical systems & content; maintenance & skills

No information available.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

The overall initial reaction to the technology solution and the benefits from the system was extremely positive and proved to be valuable to the organisation, the Tea factories and the farmers through improvements in efficiency, accuracy and bottom line through exact collection of weights delivered and their value. It is understood that on the basis of this, the system will be more widely deployed in KTDA's territory.

The benefits include;
1) Increased efficiencies at the collection centre leading to increased productivity
- Transaction time reduced from 3 minutes with the manual system to 22 seconds using AgriMnr.
- Reduced time in manual data entry and reconciliations.
- Reduced fraud at collection points due to electronic weight data collection and records of grower's leaf at the Buying Centres. No adding, editing or deleting of records without proper authority.
- Upscaled personnel due to training and knowledge on new technologies.
- Continuous sending of data to the HQ for reconciliation reduces time and other resources on manual reconciliations.
- The application is very flexible & easy to use thus suits the different users.

2) Reduced administrative costs;
- Automated goods received notes and growers copies virtually eliminate paper documents.
- The average annual factory cost for paper, data entry reconciliation, communication and fraud was approximately Kshs. 60 million. This has reduced due to elimination of paper documents and fraud, and their replacement by electronic data entry and reconciliation.
- The cost of delivery has also been reduced by 75%.

3) Reduced incidences of fraud;
- No manipulation of data; use of automated balance reconciliation will mean that there is no tampering of transactions, as these figures will be directly transferred from the database system to the handheld devices.

- No cases of "ghost farmers"; farmer information is electronically put into the system. Leaf is weighed one grower at a time, unlike previously where the bags were standardized before they were loaded onto the lorry.
- The process is fully automated, i.e., all the data is captured in the PDA and a summary of the transaction is sent to the printer (via Bluetooth) and it's from here that the grower or the clerk can swipe the grower's smart card and automatically update the day's transaction. The grower's receipt shows the days' collection and the cumulative weight for the month.

4) Increased revenues for the farmers
The use of handheld electronic technology in automating the produce purchase to increase efficiency while reducing fraud has proven very successful where the average weight per transaction per farmer has increased by about 9%. This transforms directly into 9% (USD 300) additional income for the typical small scale grower .

5) Increased productivity
The volume of tea delivered to the factories has increased as the electronic weighing scale has a higher weight as it calculates to the decimal point as opposed to the manual system where the weight was rounded off, tare weights are standard and deducted from the weight so the reading is more accurate and the cases of fraud have been reduced.

6) Improved relationships between the growers, green leaf buyers and the factory;
The introduction of new technology and control systems has led to an increase in efficiency and simplified business processes; this has led to improved relations between the growers, green leaf buyers and the factories and generally increased productivity.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

For tea producers:
- Transaction time reduced from 3 minutes with the manual system to 22 seconds using AgriMnr.
- The use of handheld electronic technology in automating the produce purchase to increase efficiency while reducing fraud has proven very successful where the average weight per transaction per farmer has increased by about 9%. This transforms directly into 9% (USD 300) additional income for the typical small scale grower.

SWORB *[Maybe summary of other sections]*	**Strengths** • Design based on a clearcut commercial objective which included requirements for benefits to both the owner and other players in the value chain (the latter to create harmony and loyalty).	**Weakness** • The Solution serves primarily the interests of the owner and is limited in terms of the number of players to date. • There could be other players who could benefit from inclusion, e.g., banks, and the growers could possibly benefit from their inclusion. However, they are already benefitting from the increased stability and revenues created by the solution.
	Opportunity • The principles behind the AgriManagr solution could be expanded and/or transferred to other value chains and sectors.	**Risks and barriers** Risks • The involvement of Virtual City working for a system owner with the financial resources to pay for the solution actually reduces roll-out risks since, as an accomplished and technologically savvy commercial player, they seem able to roll out solutions efficiently. • However, there is possibly a developmental risk in organizing only part of the sub-sector, in the interest of one leading player.

		Barriers • A barrier to use of Virtual City's solutions is currently the cost and financial arrangements

Market potential assessment

E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

In an interview, CEO John Waibochi admitted that even Virtual City's successful cases are largely still in proof-of-concept stages and that there are limits related to the challenge of migrating any one solution into a multi-product or more variable, less focused value chain application. Virtual City has been successful by containing its risks and thus owes its growth to rational and sensible business decision-making, as well as to good entrepreneurial acumen that has won it several significant financial awards.

A USD 0.75 million African Enterprise Challenge Fund (AECF) award will finance the migration of AgriManagr to the value chains of 15 Dairy Co-ops in three Kenyan provinces involving 90,000 small scale dairy producers.

In its AgriManagr application for the Cotton industry, the project owner was RVP which controls 60 field agents. In this case, USAID provided financial support for the project.

Replicability / hurdles / issues

Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

The principles behind the AgriManagr could be expanded and/or transferred to other value chains and sectors, especially those with a well resourced leading player.

A potential weakness of Virtual City, from the rural development perspective, is that they link only a part of any one sub-sector, typically a single value chain controlled by one main player. Valuable players like banks, who could be strengthening the position of farmers for fertilizer loans, etc., have not been involved in any of the Virtual City cases. However, it is also possible that Virtual City could be encouraged to play a role in the scaling up and roll-out of one or more of the other existing ventures, such as DrumNet, KACE or one of the extension service applications. These organizations have more specific rural development expertise which could be leveraged and dynamically merged with Virtual City's technological and business acumen, to created more integrated solutions than they have done to the present.

To date, Virtual City has not played a role in these other applications because the leading players of these (e.g., DrumNet and KACE) have had limited financial resources and could not meet Virtual City's business model demand for payment on an up-front turn-key basis. As well, both organizations have been under the financial thumbs of donors who may not have been interested in paying a commercial organization, even if the solution would have been well executed. In addition, donors often insist on open source software design, which may not be to the liking of a commercial player such as Virtual City.

Further study / research questions	**Select for case study** Yes

Contact John Waibochi CEO, Virtual City	**Comments on contacts made, arrangements, etc.**

Subsector *I.e., Which of Typology Subsectors* Agriculture, Animal husbandry, Fisheries & Forestry	**Name of Application and References** Mkulima Farmer Information Service – Green Dreams • http://greendreams.edublogs.org/	**Country(s) / Region** Kenya

Segment / Activity
i.e., which Segment in the Typology

Agro-marketing / trade

Description of Application
Note whether it is purely information or transaction based

Mkulima FIS is a farmer information resource and helpline available over mobile phones and the web. It is a mobile IVR (Interactive Voice Response), service that uses USSD (Unstructured Supplementary Services Data) to lead a farmer through a set of options as they seek information for a particular issue they need information on. The USSD options would lead up to a final call providing the farmer with a voice recording addressing the issue he/she will have specified by selecting the options according to the USSD tags. The software being used is USSD, IVR, SMS and Web applications, enabling farmers access information over a variety of devices from low end mobile phones to smart phones and computers that can carry content in video format.

The Mkulima FIS system will consist of a database which will be contributed to by various agencies as shown below, through a web portal. Verified data will be added to the database created by Green Dreams. Farmers will be able to access the database through their mobile phones through a USSD/IVR interface, or via the web, for example from a Digital Village site.

The users will also be able to interact with a Feedback mechanism that will enable the Information system to encompass user generated data thus capturing indigenous localized knowledge from farmers as well as information from the experts in the field of agriculture.

Main features of the delivery mechanism that are tailored to farmer needs are the following:
• Voice - The average age group of farmers in Africa is above 50 years and many have difficulty reading, especially from small mobile phone screens. Voice also allows for easier language customization where written language may be less developed in certain vernacular.
• Availability - The service will be available 24x7, day and night, allowing farmers the comfort of knowing they can access information when they choose to.
• Language – The service will be customized in a variety of local languages, allowing ease of use and wide outreach considering Kenya is a country with many different languages.

Technology *E.g., voice, video, sms, email, GPS, multi-media* IVR, USSD, SMS	**Technical development path** *Note any past or expected changes and what impact technological change could have on the application and its viability* The system is still under development.

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* Green Dreams	**Lead role(s)** Application development

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

Currently information farmers need to make informed decisions leading to productive and profitable agriculture are available in technocratic institutions all around the world and online. The gap exists between the information the farmers need and the location of the information as well as the amount of information the farmer would have to go

through to find the specific information they need. Simple information such as the type of Maize that would grow in the highlands of Kenya and that which would grow in the lowlands of Kenya is unavailable widely to farmers with many planting the wrong crop on their land leading to poor yields despite a considerable fertilize and labour investment.

Farmers will pay for calls to Safaricom to access the service and Green Dreams expects to receive approximately 1 Ksh per call minute. Break-even volume would need to be 1.2 million call minutes per month. Based on the experience of other applications, this will not be easy to achieve and the owner is staking a lot in the interest and motivation of Safaricom to advertise and promote the product since the comp-any will host the prime database and stands to gain the largest share of the revenue through the data traffic generated. Since Safaricom's voice traffic and voice traffic revenue have taken a large hit recently in the wake of the take-over of its nearest rival Zain by Airtel of India, and resulting drastic cuts in voice call tariffs, Safaricom should be well motivated to promote this service, or any other it deems to stand a good chance of succeeding, as a means to grown its alternative revenue streams.

Other key players	Roles	Incentives / Business model
1. Safaricom	Hosting database and providing access	Revenues
2. Biovision Foundation	Aggregate information from stakeholders and institutions	Agricultural development

Year of commencement	Maturation Cycle Position *Emerging / Expanding / Mature*	Status *E.g., Pilot / Rolling out / Established*
N/A	Emerging	Not yet operational

Comment on maturation / status of development

The system has been developed for very little cost to date. As a purely educational and information dissemination application, the main costs will be in the creation and maintenance of the database and associated web portal. Green Dreams had applied to the Rockefeller Foundation for a grant of USD 300,000 to cover the initial development and first year of operating expenses, but was turned down.

Costs of the application & evidence of cost recovery & profit/sustainability,
E.g., Development of the technical systems & content; maintenance & skills

Green Dreams had applied to the Rockefeller Foundation for a grant of USD 300,000 to cover the initial development and first year of operating expenses, but was turned down.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

Mkulima FIS will enable farmers to:
- make informed decisions on their agricultural activities
- educate themselves on sustainable agricultural practices.
- share their knowledge
- increase efficiencies in production by being able to access inputs and information cost effectively
- access markets
- advertise their crops or livestock
- improve their crop and livestock yields
- improve their soils thus the environment
- improve their family health
- access expert advice when needed

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

No information available.

SWORB *[Maybe summary of other sections]*	**Strengths** • Advanced concept tailored to farmer needs and with best experts providing the information. • Voice based service appropriate to the needs and educational level of most Kenyan farmers.	**Weakness** • No funding at present. • Needs widespread adoption in order to be viable.
	Opportunity • No existing information service appears to have yet secured a large part of the market, therefore the service could have a critical role • Could link up with existing services such as KACE to provide an important complementary service, which would help to market it. • Partnership with Safaricom could assist with advertisement and promotion.	**Risks and barriers** • Other services have not made widespread inroads to the majority of farmers without major promotion and partnerships. This is a costly and time-consuming exercise.

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

The Mkulima FIS provides information in a similar way to a number of other agricultural information systems available in other countries. Clearly there is a widespread percieved need for such a service in developing countries. Given the lack of success in obtaining financing, it is unclear whether the service is seen by donors or financiers as being sustainable or of sufficient value.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

The Mkulima FIS is similar to many other farmer information systems currently operational throughout the developing world.

Further study / research questions	**Select for case study** No

Contact Su Kahumbu Stephanou Founder, Green Dreams Ltd. Email: info@organic.co.ke	**Comments on contacts made, arrangements, etc.**

Subsector *I.e., Which of Typology Subsectors* Agriculture, Animal husbandry, Fisheries & Forestry	Name of Application and References iCow – Green Dreams • http://greendreams.edublogs.org/ • http://www.bbc.co.uk/news/technology-11496993	Country(s) / Region Kenya

Segment / Activity
i.e., which Segment in the Typology

Agro-marketing / trade

Description of Application
Note whether it is purely information or transaction based

iCow is a voice based mobile app developed for the dairy industry. iCow uses voice prompts to help farmers monitor their dairy cow fertility cycle from the time the cow is inseminated until she delivers. The app teaches farmers how to make appropriate feeds, reminds farmers to 'dry' off the cow two months before calving and prompts the farmer to take certain actions during the cycle. iCow helps the farmers get the best productivity out of his cow, whilst ensuring the cow and calf are healthy and treated well too.

Technology *E.g., voice, video, sms, email, GPS, multi-media* Voice	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* Currently under development and designed to be part of the Mkulima Farmer Information Service & Helpline.

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* Green Dreams	Lead role(s) Application developer

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

All cow owners need to track the fertility cycle of their cows. Most rural farmers have mobile phones or access to mobile phones. iCow is a tool that will help farmers track their cow cycles through their mobile phone. iCow is an agri mobile app.

iCow is a simple voice based mobile application that will help farmers track the estrus stages of their cows helping them to manage their breeding as well as cow nutrition leading up to the calving day. This will be done via a series of voice prompts and sms messages that will be sent to the farmer during the course of the 365 day cow cycle.

Other key players Safaricom	Roles Hosting database and providing access	Incentives / Business model Revenues

Year of commencement N/A	Maturation Cycle Position *Emerging / Expanding / Mature* Emerging	Status *E.g., Pilot / Rolling out / Established* Not yet operational

Comment on maturation / status of development

iCow is one of many mobile agri apps being developed by Green Dreams Ltd. These agri apps are plugins for the larger app Mkulima Farmer Information Service & Helpline (Mkulima FISH) currently under development. Once

plugged into Mkulima FISH , iCow will also be able to send the farmer an sms with the phone number of the closest AI service in his/her area and closest veterinary officer.

Costs of the application & evidence of cost recovery & profit/sustainability,
E.g., Development of the technical systems & content; maintenance & skills

No information available.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

iCow is a simple voice based mobile application that will help farmers track the estrus stages of their cows helping them to manage their breeding as well as cow nutrition leading up to the calving day.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

No information available.

SWORB *[Maybe summary of other sections]*	**Strengths** • Advanced concept tailored to farmer needs • Fills an unmet need for many rural farmers that will increase income	**Weakness** • No funding at present.
	Opportunity • No existing application appears to have yet addressed this market opportunity • Partnership with Safaricom could assist with advertisement and promotion.	**Risks and barriers** • Many farmers are not familiar with artificial insemination and the significance of the cow estrus cycle, so will not be aware of this applications' benefits.

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

The information provided by iCow helps farmers maximize their dairy production, thereby increasing their income. The application clearly has value to dairy farmers. It is unclear whether iCow and the Mkulima FIS will be sustainable services.

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

iCow appears to be easily replicable in other markets.

Further study / research questions	**Select for case study** No

Contact Su Kahumbu Stephanou Founder, Green Dreams Ltd. Email: info@organic.co.ke	**Comments on contacts made, arrangements, etc.**

2 INADEQUATE INFORMATION AVAILABLE FOR FULL ANNEX F (7)

Subsector *I.e., Which of Typology Subsectors* Agriculture, Animal husbandry, Fisheries & Forestry	Name of Application and References Portal CONAPROLE: • http://www.eleche.com.uy	Country(s) / Region Uruguay

Segment / Activity
i.e., which Segment in the Typology

Agro-marketing / trade

Description of Application
Note whether it is purely information or transaction based

Access to information through Internet connection and providing SMS services to cooperative partners with information on their referrals, quality of milk delivered, receivable balances, detail of liquidations and purchases, as well as general information about the Cooperative's activities, information and connections.

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability* No information

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* CONAPROLE	Lead role(s) Provides SMS services to cooperative partners

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

Other key players	Roles	Incentives / Business model

Year of commencement	Maturation Cycle Position *Emerging / Expanding / Mature*	Status *E.g., Pilot / Rolling out / Established*

Comment on maturation / status of development

No information.

Costs of the application & evidence of cost recovery & profit/sustainability
E.g., Development of the technical systems & content; maintenance & skills

No information.

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

No information.		

Quantifiable benefits		
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material. No information.		

SWORB *[Maybe summary of other sections]*	**Strengths**	**Weakness**
	Opportunity	**Risks and barriers**

Market potential assessment		
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service No information.		

Replicability / hurdles / issues		
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high No information.		

Further study / research questions	**Select for case study**
	No

Contact	**Comments on contacts made, arrangements, etc.**

Subsector *I.e., Which of Typology Subsectors* Agriculture, Animal husbandry, Fisheries & Forestry	Name of Application and References Ratin SMS: • http://www.eagc.org/section.asp?ID=41 • http://www.eagc.org/documents/EAGC_ANNUAL_REPORT_2009.pdf • http://www.ratin.net/section.asp?id=3 • http://www.ratin.net/smstip_view.asp	Country(s) / Region Kenya, Tanzania, Uganda

Segment / Activity
i.e., which Segment in the Typology

Agro-marketing / trade

Description of Application
Note whether it is purely information or transaction based

To assist the stakeholders in the grain industry that cannot access commodity prices through internet, EAGC initiated an SMS facility which has been tested and is now operational. SMS codes for Kenya, Tanzania and Uganda were set up and tested by CELLNET-Kenya Ltd. RATIN SMS is a low-cost, highly implementable cell phone based platform that seeks to redress lack of market information. To receive an SMS you pay far less compared to making a phone call or web access. The benefits of SMS also center on convenience and flexibility since the SMS facility connects farmers, traders and processors to the market. Currently, most users of RATIN SMS are farmers who cannot access the prices through the web.

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability*

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent*	Lead role(s)

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

Other key players 1	Roles	Incentives / Business model
2		
3		

Year of commencement	Maturation Cycle Position *Emerging / Expanding / Mature*	Status *E.g., Pilot / Rolling out / Established*

Comment on maturation / status of development

Costs of the application & evidence of cost recovery & profit/sustainability,

E.g., Development of the technical systems & content; maintenance & skills		

Description of benefit & impact for beneficiaries
Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.

Quantifiable benefits
Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.

SWORB [Maybe summary of other sections]	Strengths	Weakness
	Opportunity	Risks and barriers

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

Further study / research questions	Select for case study *Yes / No*
Contact **Comments on contacts made, arrangements, etc.**	

Subsector *I.e., Which of Typology Subsectors* Agriculture, Fisheries & Forestry; Labour, Migration and Human Development; Governance / Political	Name of Application and References China Mobile Rural Information Network: • http://www.chinamobileltd.com/images/pdf/2010/csr/en/7.pdf (page 3)	Country(s) / Region China

Segment / Activity *i.e., which Segment in the Typology* Agro-marketing/trade, Employment, other m-government applications

Description of Application *Note whether it is purely information or transaction based* Since 2006, China Mobile began efforts to create a unified nationwide Rural Information Network – a service platform built to provide information regarding the needs of rural residents, rural businesses and rural authorities. In 2009, to better serve rural residents, agricultural enterprises and rural governments, China Mobile completed the third full-scale upgrade of our Rural Information Network, enhancing operational capabilities and allowing for needs and services for new product development, production, and distribution as well as a centrally-shared information database to be accessed and utilized across the country. In the last three years, through the development of the Rural Information Network, China Mobile has set up a platform that allows rural users to access and share information – a platform that aims to help them improve their livelihoods. As of the end of 2009, the Rural Information Network had 15.38 million customers. The service had an average of 33,000 calls per day to the 12582 Rural Information hotline service, and had approximately 700,000 hits on the www.12582.com Rural Information Network website. The Rural Information Network has become a main channel through which rural residents access information on rural production and development. Due to the diversity of information demands in rural areas, China Mobile has enhanced the Agricultural Information Service, using SMS, voice service and the Internet to set up multiple rural information categories: • Agricultural Seasonality Guidance: Timely weather forecasts as well as updates on agricultural production issues • Agricultural Industry Information: Information on specific industries relevant to local farmers and traders • Pricing: Information on local market trends with up-to-date pricing data for agricultural products and services • Supply and Demand Information: Connections for buyers and sellers of different products and services • Agricultural Resource Information: Latest updates on fertilizer, mulching film and other products needed for agricultural production • Best Practice: Allows people to share stories of agricultural success. Facing challenges on rural employment during the global economic crisis, China Mobile enhanced the "Rural Recruitment Network" service. In 2009, the hotline for this service was used more than 80,000 times on average per month, providing over 540,000 job opportunities and have obtained the approval and support of both the government and rural workers. Moreover, to address office management issues at local government levels in rural areas, China Mobile continued to promote the Rural Administration Information Service. In 2009, the company implemented pilot programs in Chongqing, Sichuan, Yunnan, Gansu and Xizang. The services provided on government document dissemination, teleconferencing, policy distribution and data collection under the pilot programs has helped to increase efficiency for local government offices and decrease costs associated with office management. Local government agencies have complimented the service as a helping hand for local government office administration and a tool that allows local governments to better exchange ideas and resources with the public. China Mobile also offers a rural microcredit service via mobile, about which I can find no information other than the China Mobile report referenced above.

Technology *E.g., voice, video, sms, email, GPS, multi-media*	Technical development path *Note any past or expected changes and what impact*

SMS, voice	*technological change could have on the application and its viability*

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent*	**Lead role(s)**	

Business Model / Rationale *E.g., Market differentiation, clear revenue/profit potential (describe)*		

Other key players 1	**Roles**	**Incentives / Business model**
2		
3		

Year of commencement	**Maturation Cycle Position** *Emerging / Expanding / Mature*	**Status** *E.g., Pilot / Rolling out / Established*

Comment on maturation / status of development		

Description of benefit & impact for beneficiaries		

SWORB *[Maybe summary of other sections]*	**Strengths**	**Weakness**
	Opportunity	**Risks and barriers**

Market potential assessment *E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service*	

Replicability / hurdles / issues *Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high*	

Further study / research questions	**Select for case study** *Yes / No*
Contact	**Comments on contacts made, arrangements, etc.**

Subsector _I.e., Which of Typology Subsectors_ Agriculture, Fisheries & Forestry	Name of Application and References CELAC: http://www.celac.or.ug/index.php?option=com_content&view=article&id=18&Itemid=37	Country(s) / Region Uganda

Segment / Activity
i.e., which Segment in the Typology Agro-marketing / trade

Description of Application
Note whether it is purely information or transaction based Collecting and Exchanging of Local Agriculture Content (CELAC) is a project of BROSDI (Busoga Rural Open Source and Development Initiative) aiming at use of ICT methods and knowledge sharing to enhance poverty reduction and food security. CELAC operates in all the four regions in Uganda. The CELAC Project seeks to collect and exchange this local agricultural content that works from the farmers. It is common knowledge that the vast compiled agricultural content is for the literate, technologically advanced and economically privileged, leaving the farmers with little to salvage in terms of knowledge. Phone Short text Messages (SMS) - The project has a database of phone numbers to whom local agro-related information is sent every Monday. The category in the database is composed of farmers, Community Development Workers, Agricultural Extension Workers and any other interested person.

Technology	Technical development path
E.g., voice, video, sms, email, GPS, multi-media SMS	_Note any past or expected changes and what impact technological change could have on the application and its viability_

Leading Ecosystem Player	Lead role(s)
E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent	

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

Other key players	Roles	Incentives / Business model
1		
2		
3		

Year of commencement	Maturation Cycle Position	Status
	Emerging / Expanding / Mature	_E.g., Pilot / Rolling out / Established_

Comment on maturation / status of development

Description of benefit & impact for beneficiaries

SWORB _[Maybe summary of other sections]_	Strengths	Weakness
	Opportunity	Risks and barriers

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the

service	
Replicability / hurdles / issues *Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high*	

Further study / research questions	**Select for case study** *Yes / No*
Contact	**Comments on contacts made, arrangements, etc.**

Subsector *I.e., Which of Typology Subsectors* Agriculture, Fisheries & Forestry	Name of Application and References Distance Diagnostics through Digital Imaging (DDDI) – International Regional Organization for Plant and Animal Health (OIRSA): • http://www.dddi.org/index.cfm?show=overview	Country(s) / Region Honduras, Mexico, Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Panama, Dominican Republic

Segment / Activity
i.e., which Segment in the Typology Extension services

Description of Application
Note whether it is purely information or transaction based The Distance Diagnostics through Digital Imaging "system" allows textural information and descriptive images to be submitted directly from Extension offices, for rapid diagnosis by resource professionals. The system utilizes conventional software and hardware which has proven to be effective and reliable. By employing such programs and equipment, expenses for the system were reduced and much development time was saved. Taking advantage of the Internet and the World Wide Web for submission of information and images, vastly improves the convenience of accessing such material as needed by various individuals.

Technology *E.g., voice, video, sms, email, GPS, multi-media* Data, images	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability*

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent*	Lead role(s)

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

Other key players	Roles	Incentives / Business model
1		
2		
3		

Year of commencement	Maturation Cycle Position *Emerging / Expanding / Mature*	Status *E.g., Pilot / Rolling out / Established*

Comment on maturation / status of development

Description of benefit & impact for beneficiaries

SWORB *[Maybe summary of other sections]*	Strengths	Weakness
	Opportunity	Risks and barriers

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

Replicability / hurdles / issues

Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high	
Further study / research questions	**Select for case study** *Yes / No*
Contact	**Comments on contacts made, arrangements, etc.**

Subsector *I.e., Which of Typology Subsectors* Labour, Migration and Human Development	Name of Application and References KerjaLokal (Grameen AppLab): http://www.grameenfoundation.applab.org/applab-blog/2010/05/03/village-phone-operators-are-trained-to-be-keralokal-agents/	Country(s) / Region Indonesia

Segment / Activity
i.e., which Segment in the Typology

Employment

Description of Application
Note whether it is purely information or transaction based

KerjaLokal is a blue collar job search service that can be accessed via the mobile phone. The KerjaLokal.com microsite can be accessed from a mobile device through a WAP browser.

Technology *E.g., voice, video, sms, email, GPS, multi-media* WAP micro-site	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability*

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent*	Lead role(s)

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

Other key players 1	Roles	Incentives / Business model
2		
3		

Year of commencement	Maturation Cycle Position *Emerging / Expanding / Mature*	Status *E.g., Pilot / Rolling out / Established*

Comment on maturation / status of development

Description of benefit & impact for beneficiaries

SWORB *[Maybe summary of other sections]*	Strengths	Weakness
	Opportunity	Risks and barriers

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

Replicability / hurdles / issues
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high

Further study / research questions	Select for case study

	Yes / No
Contact	**Comments on contacts made, arrangements, etc.**

Subsector *I.e., Which of Typology Subsectors* Agriculture, Fisheries & Forestry	Name of Application and References Weather Application (Grameen AppLab): http://www.grameenfoundation.applab.org/section/uganda-weather-apps#1	Country(s) / Region Uganda

Segment / Activity
i.e., which Segment in the Typology

Agro-support

Description of Application
Note whether it is purely information or transaction based

The Application Laboratory has partnered with the Ugandan Department of Meteorology to provide a weather information service. The service provides Ugandans with a three day as well as seasonal forecast for farming and general information purposes.

The application allows anyone with a mobile phone to send and receive text messages to find out the local weather forecast by city or district. Users send a SMS to a short code with the keyword weather and the location (city or district) for which they wish to receive information. A text reply gives the morning, afternoon, and three day forecast as well as high and low temperatures for the date queried. People can also obtain a seasonal forecast. These forecasts provide Ugandans with information that is not currently available on-demand and enables people to make informed decisions.

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability*

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent*	**Lead role(s)**

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

Other key players 1	Roles	Incentives / Business model
2		
3		

Year of commencement	Maturation Cycle Position *Emerging / Expanding / Mature*	Status *E.g., Pilot / Rolling out / Established*

Comment on maturation / status of development

Description of benefit & impact for beneficiaries

SWORB *[Maybe summary of other sections]*	**Strengths**	**Weakness**
	Opportunity	**Risks and barriers**

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

Replicability / hurdles / issues *Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high*	

Further study / research questions	**Select for case study** *Yes / No*
Contact	**Comments on contacts made, arrangements, etc.**

3   COMPLETED PROJECTS – NOT CURRENTLY ACTIVE (7)

Subsector *I.e., Which of Typology Subsectors* Agriculture, Fisheries & Forestry	**Name of Application and References** Farmers Information Communication Management (FICOM): http://www.syngentafoundation.org/index.cfm?pageID=160	**Country(s) / Region** Uganda

Segment / Activity   *i.e., which Segment in the Typology*   Agro-marketing / trade (e.g., advertising, pricing, strategic link-ups)

Description of Application   *Note whether it is purely information or transaction based*   The Farmers Information Communication (FICOM) project began in 2005 and has surpassed expectations: farmers are generating income, using business skills and starting new enterprises. The programme became self sustaining and as of June 2007, was run by the Kayunga District Farmers Association. Important tips on growing crops are relayed from the Uganda National Farmers Federation headquarters to district level offices, and then to 24 'village phone centres', in which each farmers' group owns a mobile phone. The farmers also send and receive SMS messages with updates on market prices, saving at times a whole day's travel to market.

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS	**Technical development path** *Note any past or expected changes and what impact technological change could have on the application and its viability*

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent*	**Lead role(s)**

Business Model / Rationale   *E.g., Market differentiation, clear revenue/profit potential (describe)*

Other key players	**Roles**	**Incentives / Business model**
1		
2		
3		

Year of commencement	**Maturation Cycle Position** *Emerging / Expanding / Mature*	**Status** *E.g., Pilot / Rolling out / Established*

Comment on maturation / status of development

Description of benefit & impact for beneficiaries

SWORB *[Maybe summary of other sections]*	**Strengths**	**Weakness**
	Opportunity	**Risks and barriers**

Market potential assessment   *E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service*

Replicability / hurdles / issues *Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high*	
Further study / research questions	**Select for case study** *Yes / No*
Contact	**Comments on contacts made, arrangements, etc.**

Subsector *I.e., Which of Typology Subsectors* Resource Management	Name of Application and References Greenpeace India/SMS Lead Generation: http://mobileactive.org/case-studies/greenpeace-india-sms-lead-generation	Country(s) / Region India

Segment / Activity
i.e., which Segment in the Typology

Environment & Climate

Description of Application
Note whether it is purely information or transaction based

The SMS lead generation campaign is a filter mechanism designed to source 'warm prospects'. An SMS text message was sent to 56,137 people, all qualified as potential warm prospects with an interest in environmental issues. It said "Hi, don't you wish your city was cleaner 'n' greener? Begin by planting a free sapling offered by Greenpeace. Reply GREEN to 6363 to get your free sapling. Sender Greenpeace'. The text message was sent to the mobile phones of prospects in and around the region of Bangalore and Pune. The offer to receive a free sapling fit well with Greenpeace's objective to improve the environment and it allowed recipients to feel they are actively involved in combating the problem. Take up was much higher than expected.

Project completed: Greenpeace is still seeking a more effective system to reduce travel time so that recruiters can approach more people each day. Greenpeace also found from this test that it is vital to respond quickly to interest – within two days or interest will be lost.

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability*

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent*	Lead role(s)

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

Other key players	Roles	Incentives / Business model
1		
2		
3		

Year of commencement	Maturation Cycle Position *Emerging / Expanding / Mature*	Status *E.g., Pilot / Rolling out / Established*

Comment on maturation / status of development

Description of benefit & impact for beneficiaries

SWORB *[Maybe summary of other sections]*	Strengths	Weakness
	Opportunity	Risks and barriers

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the

service	
Replicability / hurdles / issues *Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high*	
Further study / research questions	**Select for case study** *Yes / No*
Contact	**Comments on contacts made, arrangements, etc.**

Subsector *I.e., Which of Typology Subsectors* Agriculture, Fisheries & Forestry	Name of Application and References Agricultural Market Information Systems (AMIS): http://www.electronicgovernment.se/AMIS/about.htm	Country(s) / Region Bangladesh

Segment / Activity
i.e., which Segment in the Typology

Agro-marketing / trade

Description of Application
Note whether it is purely information or transaction based

The designed system used actual agricultural data and took into account both the low literacy levels of farmers as well as the limitations of the mobile screens and text capacities. The database design uses simplified codes for the agricultural produce and market operation in Bangladesh. The proposed commercial system will collect up-to-date market information (via cell phone or computer) fed into a database managed on a SMS Server, which would then be accessible to clients requesting price information for agricultural products via text messaging. The text messages would both request and receive price information.

The prototype was tested both for data collection and dissemination of 50 agricultural items.

Market investigators collect up-to-date agricultural commodities prices information from a grower's – level market on market days and send price information using text messaging over cell phones into a database managed on a SMS Server, which in turn would be accessible to clients requesting price information for agricultural products through a text message request. Given the low literacy levels of farmers as well as limitations of cell phone screens and text capacities, the system uses simplified messaging.

Project duration : September 2007 to June 2009

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability*

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent*	<u>Lead role(s)</u>

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

Other key players	Roles	Incentives / Business model
1		
2		
3		

Year of commencement	Maturation Cycle Position *Emerging / Expanding / Mature*	Status *E.g., Pilot / Rolling out / Established*

Comment on maturation / status of development

Description of benefit & impact for beneficiaries

SWORB	Strengths	Weakness

[Maybe summary of other sections]	**Opportunity**		**Risks and barriers**
Market potential assessment *E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service*			
Replicability / hurdles / issues *Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high*			
Further study / research questions			**Select for case study** *Yes / No*
Contact	**Comments on contacts made, arrangements, etc.**		

Subsector *I.e., Which of Typology Subsectors* Labour, Migration and Human Development	Name of Application and References M4Girls: http://mobileactive.org/case-studies/m4girls-empowering-female-students	Country(s) / Region South Africa

Segment / Activity
i.e., which Segment in the Typology

Education, Learning & Training

Description of Application
Note whether it is purely information or transaction based

The M4girls project is a partnership between Nokia, Mindset Network, and the Department of Education (North West Province/South Africa) to test the provision of educational content on a mobile phone platform to girl learners. The project targeted the development of Mathematics competencies in Grade Ten girl learners from underserved communities, and aimed to empower girl learners in the following ways:
- Access to mathematics (as a pilot subject area and driven by priority areas in education in South Africa);
- Exposure to a complementary platform of curriculum-aligned Mathematics content (Mindset content) on mobile phones; and
- Exposure to technology in the form of mobile phones.

Two schools were selected as pilot schools for the project by the North West Department of Education in South Africa. The project involved issuing 20 girl learners in the two schools (ten in each school) with Nokia 6300 mobile phones that contained curriculum-aligned Mathematics content which was developed locally by Mindset Network. The content was presented in the form of easy-to-navigate games and videos that target the girl learners directly without requiring mediation or facilitation. Two games (Mathstermind and Fashion Empire), 47 videos, and two mobisodes ('cartoon' episodes applying Mathematics) were loaded onto the phones. The project ran from April to November, 2008.

Technology *E.g., voice, video, sms, email, GPS, multi-media* Games, videos	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability*

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent*	Lead role(s)

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

Other key players	Roles	Incentives / Business model
1		
2		
3		

Year of commencement	Maturation Cycle Position *Emerging / Expanding / Mature*	Status *E.g., Pilot / Rolling out / Established*

Comment on maturation / status of development

Description of benefit & impact for beneficiaries

SWORB *[Maybe summary of other sections]*	Strengths	Weakness
	Opportunity	Risks and barriers

Market potential assessment	
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service	

Replicability / hurdles / issues	
Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high	

Further study / research questions	**Select for case study** *Yes / No*

Contact	**Comments on contacts made, arrangements, etc.**

Subsector *I.e., Which of Typology Subsectors* Agriculture, Fisheries & Forestry	Name of Application and References First Mile Project: - http://www.ifad.org/rural/firstmile/ - http://www.sdc.admin.ch/en/Home/Projects/The_Web_in_the_service_of_Tanzania_s_smallholder_farmers - http://www.ifad.org/rural/firstmile/FM_3.pdf	Country(s) / Region Tanzania

Segment / Activity
i.e., which Segment in the Typology

Agro-marketing / trade

Description of Application
Note whether it is purely information or transaction based

The First Mile Project is about how small farmers, traders, processors and others from poor rural areas learn to build market chains linking producers to consumers. Good communication is vital. The project encourages people in isolated rural communities to use mobile phones, e-mail and the Internet to share their local experiences and good practices, learning from one another. While communication technology is important, real success depends on building trust and collaboration along the market chain. Ultimately farmers and others involved develop relevant local knowledge and experience and share it – even with people in distant communities – to come up with new ideas.

The First Mile Project is supported by the Government of Switzerland and is implemented in collaboration with the Agricultural Marketing Systems Development Programme (AMSDP) of the Government of the United Republic of Tanzania. The AMSDP is a seven-year programme to increase rural poor peoples' food security and incomes by improving the structure and performance of the country's crop marketing systems. Technical assistance for the First Mile is provided by the International Support Group.

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability*

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent*	Lead role(s)

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

Other key players	Roles	Incentives / Business model
1		
2		
3		

Year of commencement	Maturation Cycle Position *Emerging / Expanding / Mature*	Status *E.g., Pilot / Rolling out / Established*

Comment on maturation / status of development

Description of benefit & impact for beneficiaries

SWORB *[Maybe summary of*	Strengths	Weakness
	Opportunity	Risks and barriers

other sections]		
Market potential assessment *E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service*		
Replicability / hurdles / issues *Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high*		
Further study / research questions		**Select for case study** *Yes / No*
Contact	**Comments on contacts made, arrangements, etc.**	

Subsector *I.e., Which of Typology Subsectors* Rural Finance, Infrastructure & ICT	Name of Application and References Starbus: • http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.156.1918&rep=rep1&type=pdf • http://depts.washington.edu/ddi/	Country(s) / Region Kyrgyzstan

Segment / Activity
i.e., which Segment in the Typology

Transport

Description of Application
Note whether it is purely information or transaction based

The system is a proof-of-concept engineered to create a bottom-up, transportation information infrastructure using only GPS and SMS. Transportation is a very important shared resource; enabling efficient and effective use of such resources aids overall development goals. The system, *bus, involved the development of a hardware device (a *box) containing a GSM modem and a GPS unit, that can be installed on a vehicle and used to track its location. The *box communicates via SMS with a server connected to a basic GSM phone. The server runs route a prediction algorithm and users can send SMS messages to the server to find when a bus will arrive at their location.

The system has been built and pilot tested in early 2009.

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS, GPS	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability*

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent*	Lead role(s)

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

Other key players 1	Roles	Incentives / Business model
2		
3		

Year of commencement	Maturation Cycle Position *Emerging / Expanding / Mature*	Status *E.g., Pilot / Rolling out / Established*

Comment on maturation / status of development

Description of benefit & impact for beneficiaries

SWORB *[Maybe summary of other sections]*	Strengths	Weakness
	Opportunity	Risks and barriers

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the

service	

Replicability / hurdles / issues *Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high*		
Further study / research questions		**Select for case study** *Yes / No*
Contact	**Comments on contacts made, arrangements, etc.**	

Subsector *I.e., Which of Typology Subsectors* Labour, Migration and Human Development	Name of Application and References ICT Bites: • http://www.spidercenter.org/project/ict-based-service-teacher-education-secondary-school-teachers-tanzania • http://sites.google.com/site/ictbites/ • http://m-e-learning.blogspot.com/2009/12/evaluation-of-pilot-project-in-tanzania.html	Country(s) / Region Tanzania

Segment / Activity
i.e., which Segment in the Typology

Education, Learning & Training

Description of Application
Note whether it is purely information or transaction based

The project "ICT-Based In-Service Teacher Education for Secondary School Teacher in Tanzania" (ICT BITES) was set up to deal with the shortage of qualified teachers. The project was initiated by the Ministry of Education and Vocational Training in Tanzania and is funded by SPIDER, The Swedish Program for ICT in Developing Regions.

There is a special focus in the project on in-service education of "Licensed Teachers", teachers with only a few weeks of formal teacher education. A number of these licensed teachers are enrolled in an education program run by the Open University of Tanzania. 50 students in this group will participate in the project pilot, using ICT to increase their capacity as teachers.

The project will use available infrastructure and media to "Develop models for communication and distribution of learning material for different technical environments (broadband, VSAT, mobile phones, CD/DVD, memory cards etc)."

Technology *E.g., voice, video, sms, email, GPS, multi-media* Multi-media(?)	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability*

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent*	Lead role(s)

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

Other key players 1	Roles	Incentives / Business model
2		
3		

Year of commencement	Maturation Cycle Position *Emerging / Expanding / Mature*	Status *E.g., Pilot / Rolling out / Established*

Comment on maturation / status of development

Description of benefit & impact for beneficiaries

SWORB	Strengths	Weakness

[Maybe summary of other sections]	**Opportunity**		**Risks and barriers**
Market potential assessment *E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service*			
Replicability / hurdles / issues *Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high*			
Further study / research questions			**Select for case study** *Yes / No*
Contact	**Comments on contacts made, arrangements, etc.**		

4 PRE-PILOT APPS OR PLATFORMS FOR BUILDING APPS (10)

Subsector *I.e., Which of Typology Subsectors* Labour, Migration and Human Development	Name of Application and References GeoChat: • http://www.open-mobile.org/technologies/geochat-mobile-field-communications-and-situational-awareness • http://instedd.org/geochat	Country(s) / Region Various

Segment / Activity
i.e., which Segment in the Typology various

Description of Application
Note whether it is purely information or transaction based GeoChat is a flexible open source group communications technology that lets team members interact to maintain shared geospatial awareness of who is doing what where -- over any device, on any platform, over any network. GeoChat allows teams to stay in touch one another in a variety of ways: over SMS, over email, and on the surface of a map in a web browser. GeoChat allows networks of organizations and individuals to form cross-organizational virtual teams on the fly, linking field to headquarters -- keeping everyone on your team connected, in sync, and aware of who is doing what, and where. GeoChat is in beta and being tested by rapid response teams in Thailand and Cambodia, spanning provincial to sub-district health officers and volunteers.

Technology *E.g., voice, video, sms, email, GPS, multi-media* GPS, SMS, email	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability*

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* InSTEDD (Innovative Support to Emergencies, Diseases and Disasters) (http://www.instedd.org/about/history/)	Lead role(s) Developed the application.

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

Other key players	Roles	Incentives / Business model
1		
2		
3		

Year of commencement	Maturation Cycle Position *Emerging / Expanding / Mature*	Status *E.g., Pilot / Rolling out / Established*

Comment on maturation / status of development

Costs of the application & evidence of cost recovery & profit/sustainability, *E.g., Development of the technical systems & content; maintenance & skills*		
Description of benefit & impact for beneficiaries *Identify the target users, describe the benefits they receive & the impacts, direct &/or indirect.*		
Quantifiable benefits *Identify any evident quantifiable measures of benefit & summarize any economic or social analysis contained in the source material.*		
SWORB *[Maybe summary of other sections]*	**Strengths**	**Weakness**
	Opportunity	**Risks and barriers**
Market potential assessment *E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service*		
Replicability / hurdles / issues *Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high*		
Further study / research questions		**Select for case study** No
Contact	**Comments on contacts made, arrangements, etc.**	

Subsector *I.e., Which of Typology Subsectors* Agriculture, Fisheries & Forestry; Resource Management	Name of Application and References EpiCollect: • http://www.spatialepidemiology.net/epicollect/ • http://www.epicollect.net/	Country(s) / Region n/a

Segment / Activity
i.e., which Segment in the Typology

Research; Environment & Climate

Description of Application
Note whether it is purely information or transaction based

The sponsors provide a generic framework, consisting of mobile phone software, EpiCollect, and a web application. Data collected by multiple field workers can be submitted by phone, together with GPS data, to a common web database and can be displayed and analysed, along with previously collected data, using Google Maps (or Google Earth). Similarly, data from the web database can be requested and displayed on the mobile phone, again using Google Maps. Data filtering options allow the display of data submitted by the individual field workers or, for example, those data within certain values of a measured variable or a time period.

There is no information about its use in developing countries.

Technology *E.g., voice, video, sms, email, GPS, multi-media* GPS, data	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability*

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* Imperial College London (http://www.epicollect.net/instructions/ABOUTUS.html)	**Lead** role(s) Developed the application

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

Other key players 1	Roles	Incentives / Business model
2		
3		

Year of commencement	Maturation Cycle Position *Emerging / Expanding / Mature*	Status *E.g., Pilot / Rolling out / Established*

Comment on maturation / status of development

Description of benefit & impact for beneficiaries

SWORB *[Maybe summary of other sections]*	Strengths	Weakness
	Opportunity	Risks and barriers

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service

Replicability / hurdles / issues *Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high*	
Further study / research questions	**Select for case study** *Yes / No*
Contact	**Comments on contacts made, arrangements, etc.**

Subsector *I.e., Which of Typology Subsectors* Labour, Migration and Human Development	Name of Application and References Mesh4X: • http://www.open-mobile.org/technologies/mesh4x-seamless-information-sharing-across-devices-and-platforms	Country(s) / Region various

Segment / Activity
i.e., which Segment in the Typology

various

Description of Application
Note whether it is purely information or transaction based

Mesh4x allows organizations to create seamless cross-organizational information sharing between different databases, desktop applications, websites, and devices. It allows users to create or join a shared "data mesh" that links together disparate software and servers and synchronizes data between them automatically. Users choose the data they wish to share and others do the same, enabling dispersed groups within or across organizations to see and synchronize data. Using Mesh4X, changes to data in any one location in the mesh are automatically synchronized to every other location. For cases where no Internet access is available at all, there is no longer any need for the slow transport of files physically between locations. Mesh4X gives users the option to synchronize all data via a series of SMS text messages. Using Mesh4X, users have access to more information, and sooner, when making critical decisions. When users need to collaborate with multiple organizations toward a shared goal, everyone will have a more complete and up-to-date understanding of needs, resources, and who is doing what where.

Technology *E.g., voice, video, sms, email, GPS, multi-media* data	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability*

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* InSTEDD	Lead role(s) Developed the application.

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

Other key players	Roles	Incentives / Business model
1		
2		
3		

Year of commencement	Maturation Cycle Position *Emerging / Expanding / Mature*	Status *E.g., Pilot / Rolling out / Established*

Comment on maturation / status of development

Description of benefit & impact for beneficiaries

SWORB *[Maybe summary of other sections]*	Strengths	Weakness
	Opportunity	Risks and barriers

Market potential assessment *E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service*	

Replicability / hurdles / issues *Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high*	

Further study / research questions	**Select for case study** *Yes / No*

Contact	**Comments on contacts made, arrangements, etc.**

Subsector *I.e., Which of Typology Subsectors* Labour, Migration and Human Development	**Name of Application and References** Mobilisr: • http://www.open-mobile.org/technologies/mobilisr-enterprise-open-source-mobile-messaging • http://www.cell-life.org/cellphones-4-hiv/mobilisr	**Country(s) / Region** South Africa

Segment / Activity *i.e., which Segment in the Typology* Various

Description of Application
Note whether it is purely information or transaction based

Mobilisr is an open source enterprise class mobile messaging platform for NGOs around the world. Mobilisr is a collaboration between Cell Life, a South African NGO, and the Preaekelt Foundation, members of the Open Mobile Consortium. NGOs are often in need of communicating via SMS with a broad number of constituents, patients, or clients - both broadcasting out as well as for two-way communications. However, right now, robust broadcast, two-way, voice, and USSD communications for NGOs are primarily serviced by individual applications or commercial vendors, limiting the options for organizations. In response to this need, the Praekelt Foundation and Cell Life, South-African based organization, are collaboratively developing an open source enterprise-level messaging platform. It allows users to:
• broadcast SMS information to a wide audience of contacts; subscription services
• send interactive USSD requests for certain standard HIV information, for example; polls which allow a question to be asked via SMS to a group of people, who can reply giving their view; and free-text question
• Voicemail: users send a PCM (Please Call Me - which is a free message) to the system which, in turn, send a short pre-recorded voicemail to their inbox, which they can listen to at their convenience.
• WAP module for delivering WAP-content directly to WAP-enabled mobile phones.

Mobilisr is currently in private beta with two large-scale pilot projects running in South Africa. Mobilisr supports the work of Soul City, a large HIV-aids organization in South Africa, for example, with their broadcast communications and also their 'Soul Buddyz Clubs'-initiative. Soul City primarily works on prevention of infection and general health messaging. The 'Soul Buddyz'-initiative focusses on children and youth. Mobilisr is used in prevention messaging to the club members. We are also planning to provide cellphone information to support Soul City's mass media programmes, particularly their radio programmes, to be broadcast in 9 South African languages.

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS, voicemail, multi-media	**Technical development path** *Note any past or expected changes and what impact technological change could have on the application and its viability*

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* Cell Life (http://www.cell-life.org/about-us)	**Lead role(s)** Developed the application.

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

Other key players	**Roles**		**Incentives / Business model**
1			
2			
3			

Year of commencement	**Maturation Cycle Position** *Emerging / Expanding / Mature*		**Status** *E.g., Pilot / Rolling out / Established*
Comment on maturation / status of development			

Description of benefit & impact for beneficiaries		
SWORB *[Maybe summary of other sections]*	**Strengths**	**Weakness**
	Opportunity	**Risks and barriers**
Market potential assessment *E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service*		
Replicability / hurdles / issues *Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high*		
Further study / research questions		**Select for case study** *Yes / No*
Contact	**Comments on contacts made, arrangements, etc.**	

Subsector *I.e., Which of Typology Subsectors* Labour, Migration and Human Development	Name of Application and References Rapid Android: - http://www.open-mobile.org/technologies/rapid-android-data-and-logistics-sms-server-android - http://rapidandroid.org/	Country(s) / Region UNICEF

Segment / Activity
i.e., which Segment in the Typology

Various

Description of Application
Note whether it is purely information or transaction based

Built on the same conceptual model as another OMC technology, RapidSMS, Rapid Android is a unique platform where, for the first time ever, a phone can now be used not only as a data entry tool but a data aggregation platform.

Rapid Android allows users to use the Android phone as a mini-server, in addition to using it as an SMS client, allowing users in the field to enter data, to create surveys, and rapidly analyze data in the field. Rapid Android is a complete two-way SMS solutions that unlike other tools on the market, allows for analysis and processing on the actual phone. Rapid Android simplifies the SMS gateway problem for mobile deployments that exists in many parts of the world -- that is, the absence or cost of international or local gateways that create high barriers to entry for many organizations. It is a hybrid - both an SMS Gateway server AND a client; indicating that traditional technical lines are beginning to blur as are the types of applications we can hosting on a phone. Rapid Android makes deploying field based SMS data collections systems both easier and more affordable.

Developed in conjunction with UNICEF, the initial project was a anti-malaria bed net program in Nigeria. Information on non-health uses of Rapid Android are non-existent.

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability*

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* UNICEF Innovation	Lead role(s) Co-developed the application with Dimagi.

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

Other key players 1	Roles	Incentives / Business model
2		
3		

Year of commencement	Maturation Cycle Position *Emerging / Expanding / Mature*	Status *E.g., Pilot / Rolling out / Established*

Comment on maturation / status of development

Description of benefit & impact for beneficiaries

SWORB	Strengths	Weakness

[Maybe summary of other sections]	**Opportunity**		**Risks and barriers**
Market potential assessment *E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service*			
Replicability / hurdles / issues *Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high*			
Further study / research questions			**Select for case study** *Yes / No*
Contact	**Comments on contacts made, arrangements, etc.**		

Subsector *I.e., Which of Typology Subsectors* Labour, Migration and Human Development	Name of Application and References Mobile Researcher: • http://community.populi.net/mobileresearcher/index.php/about/	Country(s) / Region Multiple

Segment / Activity
i.e., which Segment in the Typology

Multiple

Description of Application
Note whether it is purely information or transaction based

Mobile Researcher is a SaaS platform which transforms the ubiquitous mobile phone into a cutting-edge research tool. Leverage web and mobile technologies to design and deploy surveys to fieldworkers in minutes, monitor, manage and communicate with your team and analyse responses in real-time. Using Mobile Researcher, the process of data collection, capture, storage and analysis takes place instantly with data available immediately from anywhere in the world. Manage surveys, people and data from your web-based console. Surveys are designed and deployed from an online application where administrators log-in to collaborate on survey design, manage staff and analyse and export response data. Conduct surveys and capture data from a standard mobile phone. A tiny application is installed on each fieldworker's phone. The application downloads assigned surveys and facilitates their conduction, storage and submission directly from the phone.

Though it could be used for non-health applications, to date, all case study information about Mobile Researcher has focused on health-related applications.

Technology *E.g., voice, video, sms, email, GPS, multi-media* Application to input, store and submit survey results from mobile phone.	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability*

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* Clyral (http://www.clyral.com/web/pages/about)	Lead role(s) Developed the application.

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

Other key players	Roles	Incentives / Business model
1		
2		
3		

Year of commencement	Maturation Cycle Position *Emerging / Expanding / Mature*	Status *E.g., Pilot / Rolling out / Established*

Comment on maturation / status of development

Description of benefit & impact for beneficiaries

SWORB *[Maybe summary of*	Strengths	Weakness
	Opportunity	Risks and barriers

other sections]		
Market potential assessment *E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service*		
Replicability / hurdles / issues *Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high*		
Further study / research questions		**Select for case study** *Yes / No*
Contact	**Comments on contacts made, arrangements, etc.**	

Subsector *I.e., Which of Typology Subsectors* Labour, Migration and Human Development	Name of Application and References InSTEDD GeoChat: • http://instedd.org/geochat	Country(s) / Region Thailand, Cambodia (beta testing)

Segment / Activity
i.e., which Segment in the Typology

Multiple

Description of Application
Note whether it is purely information or transaction based

InSTEDD GeoChat is a unified mobile communications service designed specifically to enable self-organizing group communications in the developing world. The service lets mobile phone users broadcast location-based alerts, report on their situation, and coordinate around events as they unfold, linking field, headquarters, and the local community in a real-time, interactive conversation visualized on the surface of a map. Once you create a GeoChat group, you may use it as the text equivalent of a push-to-talk radio: send the group a message on the Web, by email, or by SMS, and the rest of the group receives it. GeoChat allows information to flow over multiple messaging channels, including dedicated SMS servers, a cell phone plugged into a laptop, a satellite phone, and even Twitter. GeoChat is hosted "in the cloud" via Amazon, so there is no server to deploy. GeoChat has global SMS coverage through Clickatel, has a US domestic SMS shortcode, and may easily be integrated with gateways of local carriers.

The focus on crisis and post-crisis situations does not appear to be consistent with the sub-sectors and segments of interest for this project.

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability*

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* InSTEDD	Lead role(s) Developed the application

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

Other key players	Roles	Incentives / Business model
1		
2		
3		

Year of commencement	Maturation Cycle Position *Emerging / Expanding / Mature*	Status *E.g., Pilot / Rolling out / Established*

Comment on maturation / status of development

Description of benefit & impact for beneficiaries

SWORB *[Maybe summary of other sections]*	Strengths	Weakness
	Opportunity	Risks and barriers

Market potential assessment *E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service*	

Replicability / hurdles / issues *Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high*	

Further study / research questions	**Select for case study** *Yes / No*

Contact	**Comments on contacts made, arrangements, etc.**

Subsector *I.e., Which of Typology Subsectors* Labour, Migration and Human Development	Name of Application and References Text To Change: • http://www.texttochange.org	Country(s) / Region Uganda, Cameroon, Tanzania, Namibia, Madagascar

Segment / Activity
i.e., which Segment in the Typology

Any

Description of Application
Note whether it is purely information or transaction based

Text to Change offers an interactive Mobile SMS Quiz with knowledge questions linked with a rewarding system (incentive). By means of this edutainment and this interactive way of communicating, the sponsors intend to reach out to millions of people in Africa and around the world in order to spread the message of partner organizations and make it a subject of discussion. The SMS Quiz is designed to raise and help resolve key issues around local development programs.

To date, the focus of the various Text to Change implementations has been health-related issues.

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability*

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* Text to Change (http://www.texttochange.org/background)	Lead role(s) Developed the application.

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

Other key players 1	Roles	Incentives / Business model
2		
3		

Year of commencement	Maturation Cycle Position *Emerging / Expanding / Mature*	Status *E.g., Pilot / Rolling out / Established*

Comment on maturation / status of development

Description of benefit & impact for beneficiaries

SWORB *[Maybe summary of other sections]*	Strengths	Weakness
	Opportunity	Risks and barriers

Market potential assessment
E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the

service	
Replicability / hurdles / issues *Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high*	

Further study / research questions	**Select for case study** *Yes / No*
Contact	**Comments on contacts made, arrangements, etc.**

Subsector	Name of Application and References	Country(s) / Region
I.e., Which of Typology Subsectors Labour, Migration and Human Development	Voices of Africa Mobile Reporting: • http://www.voicesofafricamediafoundation.org/	Ghana, Cameroon, Kenya, Tanzania, South Africa

Segment / Activity
i.e., which Segment in the Typology

Education, Learning & Training

Description of Application
Note whether it is purely information or transaction based

The training programme combines several face to face workshops with practical assignments for an optimum learning experience. During the initial workshop trainees are introduced to the basics of mobile reporting. When they are familiar with the mobile phone, trainees go back to their communities and practice their newly acquired skills by making short video reports about diverse topics in their communities. They publish each report on the training website and receive individual feedback by email or Skype from our professional coaches.

There is not much documentation on the implementation of mobile reporting.

Technology *E.g., voice, video, sms, email, GPS, multi-media* video	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability*

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* Voices of Africa Media Foundation (http://www.voicesofafricamediafoundati on.org/about-us.html)	Lead role(s) Developed the application.

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

Other key players	Roles		Incentives / Business model
1			
2			
3			

Year of commencement	Maturation Cycle Position *Emerging / Expanding / Mature*	Status *E.g., Pilot / Rolling out / Established*

Comment on maturation / status of development

Description of benefit & impact for beneficiaries

SWORB *[Maybe summary of other sections]*	Strengths	Weakness
	Opportunity	Risks and barriers

Market potential assessment *E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service*		
Replicability / hurdles / issues *Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high*		
Further study / research questions		**Select for case study** *Yes / No*
Contact	**Comments on contacts made, arrangements, etc.**	

Subsector *I.e., Which of Typology Subsectors* various	Name of Application and References Sembuse and MXit: • http://whiteafrican.com/2009/04/26/sembuse-east-africas-first-mobile-social-network/ • http://en.wikipedia.org/wiki/MXit • http://www.mxitlifestyle.com/	Country(s) / Region East Africa, South Africa

Segment / Activity
i.e., which Segment in the Typology

various

Description of Application
Note whether it is purely information or transaction based

The two applications are very similar:

Sembuse
For 15% of the cost of a normal 160 character SMS message in Kenya you can now send one with 1000 characters in it. Sembuse is a mobile social network. It's a way for East Africans to connect with each other via short messaging, cheaper than normal SMS messages (much like it's counterpart Mxit in South Africa). It's a new release by Symbiotic, a Kenyan firm that specializes in making mobile phone related applications. To get the application on your phone, point your device to to m.sembuse.com (or s.zunguka.com). It's a free download for anyone with a GPRS or 3G enabled phone, and you can try it out immediately.

MXit
MXit (pronounced "mix it") is a free instant messaging software application developed by MXit Lifestyle in South Africa that runs on GPRS/3G mobile phones and on PCs. It allows the user to send and receive one-on-one text and multimedia messages to and from other users, as well as in general chat rooms. MXit also supports gateways to other instant messaging platforms such as MSN Messenger, ICQ and Google Talk. MXit does not charge for one-on-one messages though mobile operators may charge for data usage. There are also a number of pay-services, including chatrooms.

Technology *E.g., voice, video, sms, email, GPS, multi-media* SMS	Technical development path *Note any past or expected changes and what impact technological change could have on the application and its viability*

Leading Ecosystem Player *E.g., MNO, Bank, ISP, Farmers' Union, Commercial Agent* • Sembuse: Symbiotic Media Consortium (http://www.symbiotic.co.ke/about) • MXit: MXit Lifestyle (http://forum.mxit.com/viewtopic.php?f=99&t=1880)	Lead role(s) The players listed (left) developed the applications.

Business Model / Rationale
E.g., Market differentiation, clear revenue/profit potential (describe)

Other key players	Roles	Incentives / Business model
1		
2		
3		

Year of commencement	Maturation Cycle Position *Emerging / Expanding / Mature*	Status *E.g., Pilot / Rolling out / Established*

Comment on maturation / status of development

Description of benefit & impact for beneficiaries		
SWORB *[Maybe summary of other sections]*	**Strengths**	**Weakness**
	Opportunity	**Risks and barriers**
Market potential assessment *E.g., Will the application grow? Is it valuable? Focus on user demand & service provider sustainability for the service*		
Replicability / hurdles / issues *Can it grow elsewhere? Will it grow naturally, or are there hurdles? E.g., Needs dominant player, needs regulatory change, investment too high*		
Further study / research questions		**Select for case study** *Yes / No*
Contact	**Comments on contacts made, arrangements, etc.**	

Subsector	Segment	Development Challenges / Issues
Agriculture, Animal husbandry, Fisheries & Forestry	• Livelihood	• Transition from subsistence to income generation • Small-scale farmers face relatively high transaction costs
	• Agro- support (e.g., weather, advertising, emergency)	• Detrimental / catastrophic impact of storms or draught (see rural finance/insurance)
	• Agro-marketing / trade (e.g., advertising, pricing, strategic link-ups)	• Lack of contact with global markets • Control of information & resources by middlemen • Geographic/transportation challenges to trade
	• Other rural SME & micro-businesses	• Financing for start-ups
	• Extension services	• Access to timely assistance • Literacy & capacity building challenges
	• Innovation (e.g. new supply chain / business models)	• Access to information & finance (see rural finance)
	• Research	• Access to most recent information on crops, pests, etc.
Resource Management	• Water	• Lack of wells & irrigation • Water contamination • Cost of water
	• Land	• Land ownership • Soil erosion • Appropriate fertilizer use
	• Environment & Climate	• Impact of climate change
Labor, Migration and Human Development	• Employment	• Lack of information • Lack of jobs
	• Education, learning & training	• Low literacy, especially amongst women • Costs of schooling
	• Rural Youth	• Opportunities, mentoring, skills, finance
	• Rural Women opportunities	• Opportunities for business & self-betterment
	• SMEs and micro-businesses / private Segment development	• Training & mentoring •
	• Migration	• Urbanization • Cost of Remittances

Governance / Political	• E-Government and administration relevant to rural development, including:
	  o Census & social status related data collection or enquiry
	  o Election & opinion management
		• Corruption
		• Opportunity to consult political leaders
		• Empowerment & participation
		• Information about issues

	• Awareness raising	• Availability of programs to rural people
	• Other m-government services	• Registrations of all personal data, companies, land ownership, etc. • Taxation & other levies

Rural Finance, Infrastructure & ICT	• Mobile Money, m-Banking and micro-finance related services	• Regulatory, technological, literacy challenges
	• Agricultural insurance services	• Detrimental / catastrophic impact of storms or draught • Access to insurance for small farmers
	• Transport	• Infrastructure (roads, vehicles...) • Cost of transportation in rural areas
	• Broadcasting & program related	• Potential for local & regional participation & voice
	• Printed media	• Distribution, choice of printed media

submitted to

The World Bank

Kenya Case Study Report

Mobile Applications for Rural Development

March 2011

TABLE OF CONTENTS

1 Introduction

1.1   General

This report summarizes findings of the Kenya case study research conducted in country by Intelecon with the assistance of its local associate during the period October 20-27. Meetings were held with the 13 players in the mobile applications (m-apps) market listed in Table 1:

Table 1: Interviews Held

	Company	Application	Comment
1.	Kenya Agricultural Commodities Exchange (KACE)	SMS Sokoni, SMS Soko Leo, Soko Hewani	Agri support & market linkages using SMS and broadcast radio
2.	PRIDE Africa	DrumNet	Agri support & Agri marketing m-app using SMS and m-Pesa for payment
3.	KenCall	Farmers' Helpline	Agri Extension voice call application
4.	Teknobyte	National Farmers' Information System (NAFIS)	Agricultural Extension IVR based voice call application
5.	Grundfos	Grundfos LIFELINK	Resource management m-app using m-Pesa for payment
6.	Mobile4Good	Kazi560	Job advertising and matching m-app using SMS
7.	TxtEagle	TxtEagle	Web and Mobile based BPO employment creation application using SMS and m-Pesa for payment. (Telephone interview ahead of field visit)
8.	Ushahidi	Ushahidi Crisis Information, Crowdsourcing	e-Government and related commercial m-app using SMS & GIS mapping
9.	UAP Insurance	Kilimo Salama	Financial infrastructure – Agri Insurance using mobile data and m-Pesa for payment
10.	Green Dreams	M-Kulima Fish & iCow	Additional player identified in country rolling out a new SMS and voice based agricultural support service
11.	Mobile Ventures	Jipange KuSave	Additional player identified in country rolling out a new m-savings application using m-Pesa
12.	Virtualcity	AgriManagr, Distributr services	Additional player identified in country with agricultural marketing, distribution and traceability high-end VDN oriented PDA based m-apps.
13.	Safaricom	m-Pesa	Interview mainly to discuss applications established and sponsored by other companies, using m-Pesa as payment engine

The six primary applications studied and described in following sections of this report are those shaded in the table. However, some comments are made on all 13 applications, for the purpose of describing the overall market dynamics at play related to rural development in Kenya.

1.2   National Context

Kenya is a very fertile ground for the development of mobile applications. With the possible exception of India (which has population twenty-times that of Kenya), it has the most number of commercially active applications, and applications at the pilot stage, compared to any country in the world. At least four reasons are responsible for this, as described in following subsections.

1.2.1   Growth and Pervasiveness of M-PESA

In the mobile money / mobile banking field, the success, maturation, runaway growth and pervasive presence of m-Pesa across the country has provided a payment engine upon which many other applications can be created. Allied to this, the Central Bank of Kenya's recent publication of Draft Regulations on Agency Banking have confirmed the legality of the direction along which banks interested in the "Bottom of Pyramid" and rural clients are most likely to expand, consolidating the use of m-money and m-banking platforms as mechanisms for transformational financial sector development.

The creator of M-PESA, the mobile operator Safaricom, has a winning blend of market dominance and market-oriented opportunism and energy which feeds creative development of mobile applications by external players leveraging on Safaricom's network. M-PESA subscription growth has ballooned since its launch in 2007 as shown in Figure 1.

Figure 1: M-PESA Subscribers
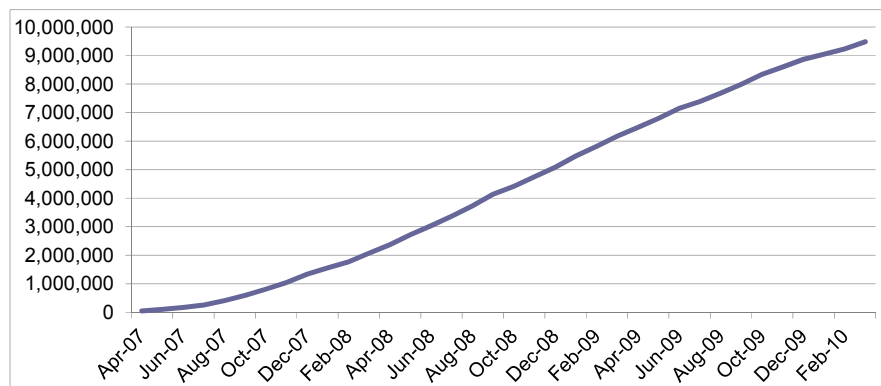
1.2.2   Mobile Penetration Generally

In a population of 39 million, nearly 20 million have access to mobile phones. Of these, nearly 10 million make use of M-PESA and this reaches the majority of households including in rural areas[1].

Table 2: Mobile Data	
Mobile operators	4[2]
Mobile penetration	51.0%
Number of mobile subscribers	19,900,000[3]

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[1] 70% of households were M-PESA users by 2009, according to the study by Willian Jack, Tavneet Suri, "Mobile Mobile Money: The economics of M-PESA, Working Paper 16721, National Bureau of Economic Research, USA, January 2011
[2] Communications Commission of Kenya, 2010. Quarterly Sector Statistics Report
[3] Ibid

Handset penetration

As in Sri Lanka and the Philippines, where in-depth case studies were conducted, smartphone penetration is some years behind the developed world. The top handsets are Nokia, though some do have 3G capability:

Table 2: Top Handsets, Jan 2001

Rank	Handset
1	Nokia 2330c
2	Nokia 5130 XprssMusic
3	Nokia 1680c
4	Nokia 2700c
5	Nokia 2680s
6	Nokia 2690
7	Nokia 2600c
8	Nokia 2730c
9	Nokia 2220s
10	Nokia 3110c

1.2.3   The Economy, Ease of Doing Business and Consumer Confidence

Despite Kenya's historic reputation for government corruption, election fraud and tribalism, the post-election political coalition has managed to create and pass a new constitution, giving rise to a new era of hope. This is combined with evidence that the new governmental structure enshrined by the constitution, more open poll-counting methods already tested in the referendum and a bi-election, are indeed giving people and investors new confidence.

Evidence of the general improvement in business climate has recently come through a *TNS Research International* quarterly report showing the latest wave of **Consumer Confidence Index** improvement (see Figure 2), following a dip in growth before the referendum on the new constitution[4].

Figure 2: Confidence Index

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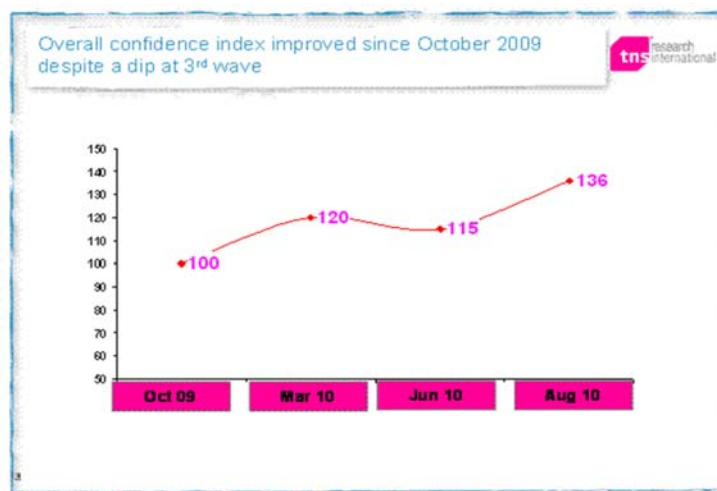
[4] This is from a national sample of 1,502 adults conducted in August. The first wave was conducted in October 2009 and was fixed at the benchmark of 100. The index is created through a combination of responses across a number of attributes that relate to how people see their own and the country's economic current situation and outlook.

The overall growth is built around improving future optimism rather than any fundamental improvement of people's current economic situation. The reports "In other countries, Consumer Confidence correlates with consumer spending, likelihood to borrow and other metrics, and these correlations are expected to be identified for Kenya over time."

In addition, Kenya's score on the World Bank's Ease of Doing Business ranking is better than many similar regional and developing countries, as shown in Figure 3.

Figure 3: Ease of doing business ranking (lowest to highest)
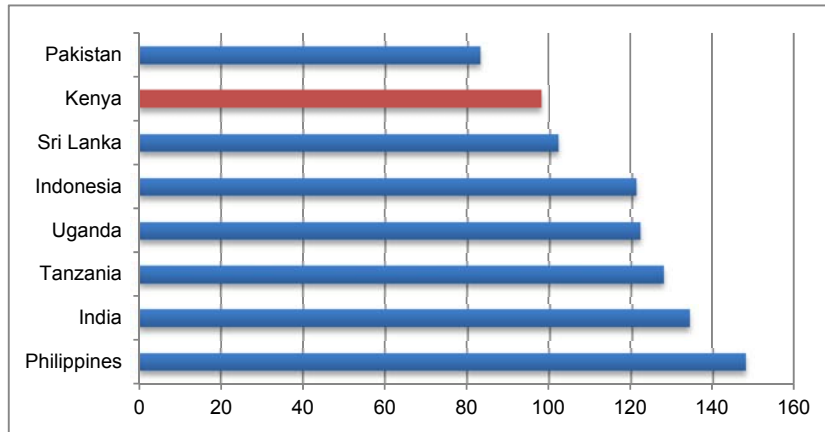
In fact, the most recent economic report is extremely encouraging and shows the economy to have grown at an annual rate of 5.4% in Q2/2010. This has been lead by significant gains in agriculture, with production increasing and 70% and 38% in the first two quarters of 2010, and 16% growth in the Financial Sector fuelled by a drop in lending rates of up to 3.5% and general expansion by leading banks into the "Bottom of the Pyramid" market.

1.2.4   Fertile Ground for Mobile Applications

Both the financial and agricultural sectors are being impacted by mobile applications. In the financial sector, Safaricom's m-Pesa has become a pervasive feature of Kenyan life, moving over 13% of the GDP annually in 2009 and expanding since then and, as noted above, being used as the payment engine that makes applications in other sectors such as agriculture, employment and resource management possible. In the agricultural sector, at least seven applications providing agricultural market information and helping to facilitate crucial linkages between players in the value chain have had their role in assisting growth and raising expectations.

As one of the most dynamic and energetic populations in Africa, combined with an increasingly open society and creative business and NGO community, and a sizeable and well-educated cadre in ICT software development, there are plenty of capable young people developing new mobile applications. Several have won awards for excellence, which further feeds their enterprises.

2 Rationale for selection of the M-App Case Studies

The Kenya country visit uncovered several applications which had not been discovered in the desk research. New applications are coming frequently. For example, two m-apps being developed by one entrepreneur, who is also an organic farmer, are only just being unwrapped. One of these, iCow, an application that will provide critical husbandry information and guidance to cow owners using USSD and IVR based voice messaging, to has just been awarded the Apps4Africa award (http://apps4africa.org/), announced on 4th October 2010.

A further family of applications developed by one local company, Virtual City, providing information, traceability and/or transactional services linking players in the value chain for four agricultural sectors (coffee, milk, cotton and tea), horticultural pest control and a major soft drinks distributor network, have been rolled out without "donor fanfare" because they were developed from the beginning on commercial principles, albeit leveraging several entrepreneurship and commercial awards in the process. This company has recently won the Nokia USD 1 million Growth Economy Venture Challenge Award, to roll out a distribution application for FMCG distributors.

Finally, some m-apps are still at the pilot stage and are protected by confidentiality until they become more publicly announced. One such application is Jipange KuSave, a savings product targeted at the unbanked population, leveraging and adding value to the m-Pesa model.

Table 3 provides summary notes on all of the applications which were known at the time of writing. Seven which were selected, including one which has less detail, are shaded.

Table 3: List of Applications

Application	Rationale
1. KACE SMS Sokoni, SMS Soko Leo, Soko Hewani	This set of agricultural information and market linkage applications has been in development and operation since 2005 and are part (60%) commercially viable. It is scalable and, with investment targeted on expansion, could become viable and replicable.
2. DrumNet	Well developed pilots linking all players in the value chain of two horticultural and oilseed sectors, financed by donors, proved the potential viability of the application. With the planned additional of a ICT and commercial investment partner, the application appears to be viable, scalable and replicable with targeted further investment.
3. Farmers' Helpline (KenCall)	Successful but limited scale application is in the process of commercializing
4. National Farmers' Information System (NAFIS)	Technologically advanced and piloted IVR application with Kenyan English and local language capability, but managed by a Government organization. The application appears to have less potential for scale-up and replication without conversion to commercial basis and adoption of a commercial partnership.
5. Grundfos LIFELINK	Groundbreaking well water supply project with innovative use of m-Pesa for operation cost and loan repayment offers a model that can be scaled up and replicated under the right population / financial conditions, which can be demonstrated.
6. Mobile4Good /Kazi560	Job matching applications which has been used only in urban areas has specific hurdles to overcome for scale-up into rural areas.
7. TxtEagle	This very innovative service to sign up and use urban and rural subscribers to provide "bite sized" BPO services and receive incomes was designed in Kenya but has new expanded to 80 countries and is being presented to the WBG via a different route.
8. Ushahidi Crisis Information, Crowdsourcing	Groundbreaking, innovative and award winning platform for reporting disturbances or other events on Google map has been used beneficially in Kenya, Haiti and elsewhere, licensed to many other locations and has clear commercial potential to be presented in the Case Study.
9. UAP/Syngenta Kilimo Salama	Groundbreaking and innovative application to pilot and roll out index-based agricultural insurance to small scale farmers is only the tip of the iceberg in terms of potential impact-creating enhanced financial and insurance services.
10. Green Dream M-Kulima Fish & iCow	Applications, including an award winner, are in the early stage of piloting and roll-out, using a USSD and IVR platform similar to that of NAFIS but more likely to succeed because of their commercially oriented sponsor.
11. Mobile Ventures Jipange KuSave	New and innovative m-application that is in the pilot stage, representing a nascent m-banking service which has received approval from the Central Bank of Kenya as a pilot. The application's likely penetration of rural clients is uncertain at present, though potentially large.
12. Virtualcity AgriManagr, Distributr services	• *AgriManagr* is a service very close in concept to DrumNet's, using VDN and GSM linked mobile data devices. It has been used in the Coffee, Dairy, Cotton and Tea sectors. • *Distributr, Tracr* and *Haulr* are applications that have been deployed in the distribution, Agro extension / pest control and transportation sectors. • VirtualCity has won the Nokia *Growth Economy Venture Challenge* $1million award that will be applied to create a GSM based m-money solution to organize and provide financial and strategic management to FMCG distributors across Kenya. Rural content is unknown at present.

3 M-Apps in Rural Development and issues arising

As noted in Section 1.2, Kenya is a fertile ground for mobile applications. However, the majority of applications identified in the Agricultural segments in particular have hurdles to overcome in moving from pilot, or semi-commercial limited scale operation, into a highly penetrated, fully scaled up and commercially viable operation. DrumNet, KACE, Kazi560 and KenCall Farmers' Helpline are all in this position. All have been financed to date by donors, whose support has been shorter-lived and at a lower level than each application needed to take it into commercial viability. However, all could possibly become successful with the right structure and more commercially oriented investment with greater stamina for a longer range horizon for platform development and roll-out. In most cases, these companies need an additional injection of approximately USD 300,000 to take their current business experience and platforms into commercial viability over a further 3 year period. Due to unavailability of sufficiently detailed financial information to report on refinancing potential, Kazi560 and Farmers' helpline were not reported here.

On the other hand, while the NAFIS farmers' information service most likely has had the most comprehensive repository of extension service information available to it, as well as its operations manager (a highly qualified technical expert) having a good grasp of the required technical structure, it is unlikely to reach maturity and become viable and replicable unless it is converted from Government to private ownership, and its leadership diversified to incorporate a commercially oriented director.

A key issue in Kenya is that players who have approached ICT/Mobile applications from the rural development perspective and who have attempted to create a fully integrated market information and trading platform, have "run aground" after their pilot phase, despite haven proven the concept on a limited, single sector basis (e.g., DrumNet), or limber from one year to the next dependent on the next round of donor finance (e.g., KACE's Market (Information and Linkage System).

On the other hand, the most technological savvy firm – Virtual City – has successfully rolled out several applications, one partial sector at a time, in the form of turn-key automation contracts paid for by a leading player in each sector (e.g., a Cooperative or national tea development agency). These solutions have not attempted to bring together all players in the value chain - such as farmers, banks, buyers, shippers and processor - but have merely automated the pone part of the value chain of interest to the main player.

VirtualCity creates success since it has a workable business model and can create business plans which have recently won two highly lucrative commercial awards (African Enterprise Challenge Fund and Nokia). It will also be announced as the winner of a World Summit Award for "best application" in the Africa and Middle East Region in December 2010. We believe that this company should be observed. However, it is also possible that this company could be encouraged to play a role in the scaling up and roll-out of one or more of the other existing ventures, such as DrumNet, KACE or one of the extension service applications. These have more specific rural development expertise which could be leveraged and dynamically merged with Virtual City's technological and business acumen, to created more integrated solutions than they have done to the present.

In addition to its recent Apps4Africa award, Green Dreams had been hoping to secure a USD 300,000 grant from the Rockefeller Foundation to roll out its Agricultural Information application, MKulima Farmers' Information Service. Green Dreams assembled an impressive array of agricultural research institutional expertise to back its application. It promises to be able to leverage this expertise and investment to roll out a viable service. However, its grant application was recently turned down. The design specifications for this applications were provided to the consultant, however further work would be necessary to flesh out the business model information and business plan. It is recommended that further interest in several applications be shown, in order to leverage the commercial energy evident and agricultural knowledge in this company. Perhaps the expertise and energy from several applications could be combined to develop a viable national roll-out.

In Kenya, it is clear that selective and carefully structured investment could scale-up and bring a few applications into successful and viable territory. However, it is vital that they must have commercial ownership or partnership to guarantee this path. It is also clear that the scale of investment injection required is of limited scale (USD 300,000 to 1 million), thus the financial sources have to be suited to this scale, either through individual contributors whose target is of this magnitude, or through a venture capital development fund which is designed to handle this scale.

4 The Case Studies

4.1 Grundfos LIFELINK

4.1.1 Description

This project, created by GrundFos Group, a leading manufacturer of water pumps based in Denmark, brings together water supply and mobile money (m-Pesa). A LIFELINK System is a single-point water supply, using a submersible pump that is powered by solar panels. Water is pumped to an elevated, tower-mounted 10,000 litre storage tank, whereupon it is fed by gravity to a multiple tap water supply unit in a small building, from which villagers draw water. The tap unit also serves as the payment facility; villagers turn the water taps on and off with an electronic key. The electronic key stores their own personal "water account" which can be topped up, in minimum Kshs 100 amounts, from their m-Pesa accounts.

4.1.2 Application Objectives and Rationale

The project provides reliable, safe and automatically pumped ground water for village communities within a catchment area where villagers have to date typically had to walk several kilometres to collect water from a hand pumped well or impure surface water source (lake or river). The project is designed to convert existing hand-pumped or unused boreholes, which often have operating problems, to automatic supply, with a 20+ year usable life.

There are approximately 19,000 boreholes country-wide, the vast majority of which use hand-pumps and many are either inefficient or have fallen into disrepair. LIFELINK plans each installation, upon request from a local community or authority, after carrying out a demand and socio-economic study to determine need, benefits and commercial viability, as well as an inspection of the nearest borehole to determine its suitability for installation of the system. Unsuitability could be due to low volume yield, the water table at too great a depth for practical purpose, or the borehole itself being too old or in poor condition. LIFELINK's experience to date is that approximately 50% of existing boreholes can be converted to house the system, thus the potential for the LIFELINK solution is up to 10,000 wells.

4.1.3 Features

The operating objective is to establish the LIFELINK system in collaboration with local water authorities and/or local village water committees. Management of the system is undertaken by commercial entities or community based organizations on a commercially viable or self-sustaining basis. The capital cost of the system is conceived to be financed by a bank or donor, while the operating cost is essentially a maintenance contract with Grundfos LIFELINK and one watchman or local on-site manager.

Whereas the system is essentially a single point supply, there is great potential for the local water committee or operating entity to extend pipes from the LIFELINK system to the local school, clinic, houses, or to various public service points.

Since the pumping system runs on solar power and daily supply is gravity fed from a large tank with capacity to hold several days' supply, the system is very reliable and all components have an expected operating life of over 20 years. Groundfos LIFELINK undertakes to provide online

monitoring (via a Safaricom data channel) and to provide preventive and as-required maintenance for a set annual fee, to ensure continuous operation.

The m-application innovation is that the water is paid for using a cashless, electronic system via the m-Pesa mobile money service. Villagers purchase their electronic key (a one-time start-up cost) from the local water committee or local operating entity, and load up the key using their m-Pesa private accounts. Access is virtually universal, since there are 10 million m-Pesa account holders in Kenya and virtually no households in Kenya are without at least one mobile handset - now available from Kshs 1,600 (USD 20) – or without an m-Pesa account. On the other hand, even if some households were without m-Pesa, there would be local means to exchange cash with citizens who have m-Pesa accounts. Safaricom has facilitated a special low (flat) m-Pesa transaction fee of Kshs155 for the LIFELINK project to reduce the added cost to villages of making payments, which are often as low as Kshs 100, the lowest permitted top-up payment on the system.

Villagers are able to fill their jerrycans as they would at any other communal commercial source of water, while using their electronic key to control the tap. The price of the water, at Kshs 2-5 per 20L jerrycan is compatible with the other sources.

The system has the huge advantage of offering a cashless system, whereby the payments accruing to the local community are directed to the bank supplying the loan and to Grundfos LIFELINK to pay for the maintenance contract. The only cash dealings required are:

- Initial payment for the electronic key;

- Payment to a watchman or on-site water manager; and

- Use or distribution of year-end revenue surplus, if applicable.

4.1.4   User Benefits

The water system has significantly improved the lives of the community by the following:

- Access to clean and safe water. Rural communities in many cases lack access to safe and clean water. They draw water from impure water sources (rivers and lakes), which exposes them to waterborne diseases. In the two areas visited where the water system has been set, vilages experienced numerous cases of dysentery and typhoid every month. These have since ceased with the availability of the Grundfos LIFELINK system.

- Income-generating Opportunities. Some systems are supporting irrigation of crops through the greenhouse system, vegetable patches and watering their animals. This form of agriculture provides more sustainability for agri-business due to lack of reliance on the seasonal rains. Communities are able to provide for their family and sell their produce. Also, some villagers are selling water to communities that are much further from the water-point, this has provided an extra source of income with good returns. A villager buying a 20litre jerrican at Kshs 2-5 sells it for Kshs 15-20; in some locations water vendors with the Grundfos 'water key' are able to sell more due to its trusted source.

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[5] The m-Pesa standard transaction fee schedule commences at KES25, and rises to KES35. The service is geared to much higher payments (average is KES2,500). Safaricom has recognized that the existing schedule is not geared to small payments and has thus offered the reduction to KES15 to enable encourage the system's success.

- Closed payment system. The closed payment system thru m-Pesa provides a reliable and cash-free solution that avoids issues related to mismanagement of funds in community projects, which have been a major obstacle for community projects to become successful.

- Monotoring and transparency of the water systems: The constant monitoring via Grundfos remote management system provides insurance to both community and investor or donor that technical failures will be reported automatically to either Grundfos or a local service provider for prompt action. This is part of the service and maintenance agreement. The monitoring of water consumption and income generated can also be displayed at any given time and reported to both community and investor/donor.

4.1.5   Business Case Analysis

The key financial and operational business parameters are the following:

- **Capital cost –** The one-point system, including initial study and design, complete with all components and building, fully installed and commissioned is in the range Kshs 2-3 million (maximum USD 40,000);

- **Cost of the water –** The price paid by villagers for water elsewhere it is available communally or commercially is in the range Kshs 2-5 per 20L jerrycan.

- **Capacity and daily volume –** In order to repay a bank loan (e.g.,) at 15% interest rate for the *full capital cost*, and to cover the essential maintenance contract (KES 200,000 per year) and local watchman/manager, it would be necessary to sell an average of 12,000 litres per day (600 jerrycans) at a price of Kshs 5 per 20L.

Detailed spreadsheet analysis indicates that a village or catchment area of 1,800 population (300 households) drawing 40L per day would meet this objective. Larger populations could theoretically afford to reduce the price of the water and still meet the objective.

There are several challenges or obstacles (and opportunities) in the business model, which are as follows:

- **Seasonal fluctuations in rainfall –** create an inconsistent revenue stream for the system. Villagers collect surface or run-off water, even for household use during the rainy season, which drastically reduces their demand for the LIFELINK output. This situation means bank loans cannot be scheduled on an equal monthly payment basis and banks thus consider the investment risky.

- **Alternative financiers –** predominantly donors interested in water supply projects – are reported to favour low cost solutions such as hand-pumps, even though these are often short-lived and inferior solutions. Their budget cycle form of internal funding tends mitigate against higher cost but superior long-term solutions.

- **Local development needs –** the means to overcome seasonal fluctuations typically lie in opportunities requiring investment in additional piping to extend the well's supply to the local school, agricultural and horticultural projects, and private households, where constant and/or safe, healthier ground water is valued. This requires strong local organization or entrepreneurial innovation, which can be time-consuming to organize and secure approvals for. However, most villages have a community committee or water committee. There is no

doubt that the benefits of the development approach would be immense, justifying effort by Grundfos LIFELINK to replicate these solutions also on a national scale. However, Grundfos would need a financial partner to help promote and create these opportunities. The financial return for this could be significant, though a long term (5 years or more) time horizon will be required.

As a means to make each project more "bankable", it is also necessary to use a commercial or cooperative model, whereby a single investor or all villagers make an up-front equity investment in order to reduce the size of bank loan. The business model indicates that a per-household investment of just Kshs 2,000 (at USD25, less than the cost of most mobile phones), would do the following:

- Reduce the loan size (and monthly payment) by 20% and also reduce the required price of water to Kshs 4 per 20L; or

- Create a surplus of over Kshs 20,000 per month which could be used to smooth out risk of bank default or invest in additional piping to increase the overall water demand and create more stability.

An Excel model is available to demonstrate scenarios based on various parameters.

4.1.6 Issues, Risks and Hurdles

The following summarizes the LIFELINK models business analysis:

Table 4: SWORB Analysis

Strengths	Opportunities
• Unique and beneficial application of mobile money to help leverage pumping and solar technologies to make clean water available to rural populations • Use of m-Pesa merely takes a commonly accepted method of payment, and normal price for clean water, and creates a cashless and relatively interference-free means to pay for the water. • Constantly monitored and managed water supply provides a very reliable system for the long term.	• With a sustainable business model could be scaled up and replicated on a grand scale. • Can also be replicated based on donor support, with few risks attached.
Weaknesses	**Risks & Barriers**
• The mobile application itself does not overcome the developmental issues to create value which villages are willing to pay for, when a less desirable but "free" source of water is available during the rainy season. • Needs education, local organization, and overcoming of inertia.	Risks – • If bank or other commercial financing is used for the pumping station, possible failure due to unstainable year-round demand and revenue. Barriers – • Population – cannot be implemented commercially if population is not large enough to sustain demand. • Local politics, lack of will to overcome the challenges of creating a viable business model, even where the figures could make sense.

4.1.7 Scalability and Replicability

The LIFELINK solution is inherently scalable, on the basis of a commercial or cooperate style investment with equity contribution and bank finance, to population catchment areas above 2,500 population, where demand is sufficient to create cumulatively safe year-round revenue flows.

It is also scalable if the project sponsors, with suitable partnership(s), develop the systems locally to extend and diversify the water supply to local institutions, agricultural/horticultural projects and private users.

It appears that the solution can roll out with a combination of financing models, namely:

- Commercial, with at least 30% equity investment;

- Cooperative with suggested Kshs 2000 per household investment, in locations above 2,500;

- Donor supported (requiring less than 100% capital contribution, depending on community size and demand profile).

The Kenyan solutions can also be replicated in other countries, provided the business model concerns are addressed. The Excel model demonstrates scenarios based on various parameters and has been used to develop the above three investment scenarios.

4.1.8 Collaborations

The bank initially negotiating to finance the LIFELINK system roll-out (K-Rep) withdrew its support, leaving LIFELINK dependent on donors with interest in water supply. Red Cross initially agreed to support installation of 100 systems over 5 years have supported only one to date, in the first year of operation.

The first eleven installations have been financed by local water boards (and one by a Constituency Development Fund). Grundfos LIFELINK is approaching several donors interested in water supply.

4.2   Kilimo Salama

4.2.1   Description

Kilimo Salama is a weather index based insurance product protecting farmers' investment in farm inputs (seed, fertilizer and chemicals) against extreme weather risk (drought or excess rainfall) using solar powered weather stations to monitor rainfall and mobile payment technology to collect premiums and payout to farmers.

The product is an initiative of the Syngenta Foundation for Sustainable Agriculture in cooperation with Kenyan Insurer UAP Insurance and mobile telecom operator Safaricom. Other key ecosystem partners, in addition to smallholder farmers are: the agribusinesses MEA Limited, Seed Co and Syngenta East Africa (as agro input partners), an increasing number of "Agro-vets" (local agricultural input stocks), and the NGO CNFA/AGMARK who provides training and selection of stockists.

The initiative is a three year project to develop agricultural insurance products in Kenya and build the smallholder farmers into a sustainable market for the Kenyan insurance industry, with significant benefits in terms of increased output and income security. The initiative develops insurance products with agri-businesses committed to working with smallholder farmers.

The project offers farmers who plant on as little as one acre insurance policies to shield them from financial losses when drought or excess rain is expected to wreak havoc on their harvests. Since such products have not been available before, it is potentially revolutionary to small-holder farmers' livelihood.

4.2.2   Application Objectives and Rationale

Farmers in Kenya generally do not have access to insurance for their farms since traditional agricultural insurance relies on on-farm monitoring of losses, evaluated through farm inspections. And since the transaction costs to insure one acre are similar to insuring a 200 acre farm, the premiums from the one acre farm would never cover the related transaction costs.

Weather index based insurance offers a method to insure farms as small as one acre as well as larger farms by replacing costly farm visits with measurements from weather stations as the indicator of drought conditions. The weather stations measure the rainfall and these measurements are compared to a predetermined agronomic model specifying crops' rainfall needs. If the pre determined needs are not met, all farmers insured in the vicinity of that station receive a payout. If the needs are met, none of the farmers receive a payout.

Kilimo Salama's current design is based on the lessons learned from a pilot in Laikipia district, where 200 maize farmers insured their farm inputs against drought in the long rains season of 2009. Following the drought that season, both weather stations showed that there was a payout and all farmers were compensated depending on the extent of the drought as measured at their weather station. The first major payouts were 30 percent and 80 percent respectively. The coverage has since extended to 5 more regions across Kenya: Bungoma-Busia, Oyugis-Homa Bay, Nanyuki-Timau, Embu and Eldoret.

Reflecting Kenyan farmers' cash flow, where farmers invest in their farm as they plant, the farmers with this product can insure as little as 1 kg of maize seed, fertilizer or chemical (pest control). This 'pay as you plant' type of insurance allows farmers to 'try out' insurance, a product they have never bought before and which has a negative reputation in Kenya. Experience shows that as farmers learn to trust insurance, they expand their coverage and are comfortable investing more in their farm, raising their productivity and increasing their food security. The pilot began with 200 farmers and has since grown to 12,000.

4.2.3   Features

The Kilimo Salama product is distributed in a new way that is relevant to farmers, through local agro-vets, who are small trading businesses (stockists) who sell inputs, and often offer advice on farm management, spraying services and credit. Since the agro-vets' clientele is geographically close to their stores, they cultivate close relationships with the farmers. The product is now available from 54 stockists distributing Kilimo Salama in the five regions in Kenya. This distribution channel is a first for agricultural micro insurance.

The local stockists register a policy with UAP by using a camera-phone with software modified to scan & record a bar code on each bag of inputs (seed, fertilizer of chemicals) sold. A SMS message confirming the policy is then sent to the farmer's handset. The policy is referenced to the farmer's nearest weather station, which transmits its data over the mobile network. If weather conditions deteriorate, the reported index system is used to determine if crops will no longer be viable. At that point payouts are made directly to the handsets of farmers in the affected areas using Safaricom's M-PESA mobile-money service.

The technology used allows the basic data transmission and transaction costs to be as little more than the cost of an SMS (1 Ksh). The registration data is transmitted to the system platform designed for Syngenta via a very low cost GPRS data transmission. The premiums collected are transferred in bundles through M-PESA to the insurance company UAP.

This cost of the insurance is made affordable to the farmers through partnerships with the agri-businesses input suppliers in the project - Seed Co (certified seeds), MEA (fertilizer) and Syntgenta East Africa (chemicals). These each pay half of the premium's price on their respective product sold, leaving the farmers to pay 5% on top of the cost of the inputs. The farmer receives a policy card as well as the SMS informing him of his policy number.

Purchase	**Registration**	**Measurement**	**Compensation**
Farmers buy inputs and pay 5% extra to insure the inputs at selected stockists.	Farmers receive a card from the stockist on which they fill their details received by SMS.	During the season the weather station measures the rainfall.	In case of a payout farmers receive compensation via MPESA.

Information and Value-Added Services

Kilimo Salama offers farmers more than just insurance: insured farmers receive tailored extension SMS messages using the local weather information from the nearby automated weather stations. This enables farmers to improve their productivity and make the best of the rains in years when these are sufficient to grow a crop.

The Kilimo Salama contracts are adapted to the Kenyan climatic characteristics and planting practices by the Syngenta Foundation's maize and wheat experts. Setting up of a contract relies on historical data sets, generally consisting of between 20 to 30 years of weather data. The historic data sets are combined with agronomical data on crop development, and the risks are priced by international reinsurers by combining these two. The agronomical models used to simulate crop development vary and can be increasingly complex depending on the availability of weather data[6]. The crop model defining the index is location specific and has to be adapted to the local climatic circumstances.

The insurance uses automated weather stations to monitor the rainfall. Based on the stations' measurements and a predefined formula of crop rainfall needs, payouts are made. This method enables farmers as small as one acre to be insured. The method of using weather stations' measurement in combination with a predefined crop growth formula is often referred to as 'index based insurance'. If the weather stations' measurement and related rainfall formula shows that there is a payout, these are sent to individual farmers using M-PESA.

4.2.4 User Benefits

The Syngenta Foundation led product initiative is to develop agricultural insurance products in Kenya and build them to become a sustainable product group for the Kenyan insurance industry. It also greatly benefits the smallholder farmers, the following are the ways in which this initiatives is benefiting its users.

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[6] The standard drought index, developed by Columbia University's Earth Institute and described in detail by the World Bank's Commodity Risks Management Group, uses the FAO Water Requirement Satisfaction Index (WRSI) as an agronomical model to quantify rainfall deficiency.

Smallholder Farmers

Kilimo Salama offers farmers an insurance that protects them from weather risks as against their farm produce. By insuring their farm inputs, they are more confident that they can plant the following season even after a bad season due to the payout.

The insured farmers also receive tailored extension messages by SMS using the local weather information from the nearby automated weather stations. They can also make use of a free-call voice helpline service manned to seek answers to specific question. This enables farmers to improve their practices and productivity and make the best of the rains in years when the conditions are suitable to crop growth.

The high quality weather stations mean that up–to-date full climate data is available to farmers. This full set of weather data (rainfall, temperature, windspeed, sunlight) allows for prediction of incidence of diseases, such as blight or aflatoxin, and other potential risks. The information, in combination with the knowledge about farmers' proximity and mobile numbers, enables farmers in Kilimo Salama to receive up-to-date text messages that enables farmers improve their practices, consequent productivity, and food security in years when rains are good. Kilimo Salama thus offers a comprehensive package to farmers by helping them to become better farmers, as well as protecting them in case of weather risks.

The experience of the initial pilot indicates that farmers who only insured 10-20% of their input purchase in the first, increased their insurance to 50% of inputs in the next year, after the indexed insurance had made major payouts (80% of purchase value) to the farmers. In addition to providing the farmers with greater confidence in their purchases, it has tended to attract more farmers to purchase the higher grade seeds, fertilizer and chemicals. While carrying greater risks if uninsured, these create higher yields in normal years, and thus farmers are more confident to increase their proportion of higher yield inputs, thus providing them with more outputs and higher income. While the absolute value of the insurance benefit, on inputs only, is relatively small in monetary payout terms, the fact of the insurance availability leverages the higher yield and higher income for the farmers.

The order of magnitude of the benefit of planting 1 acre with higher yield maize seeds compared to lower yield seeds could amount to production of several (e.g., 5-10) additional 90KG bags of maize. The monetary value of a 50%+ improvement in production – minimum 5 additional bags of crop harvest - due to this improved practice leveraged by the insurance costing a few hundred KSh could be 6000 KSh (around USD 75) per growing season x2, i.e., up to USD 150 in the year[7]. As he/she learns to use the high yield inputs more effectively through the extension information services and advice provided alongside the insurance, this benefit could possibly be increased further in subsequent years, but is also dependent on what proportion of their land they adopt the improved techniques and what portion of their crop they retain for food. In addition to crop improvements, by insuring the inputs the farmers have the benefit of a payback for the inputs purchased in a bad year, which allows them to purchase inputs in the following year.

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[7] Most smallholder farmers plant maize on 1 acre, with the second acre having a mixture of other vegetable crops. Current wholesale market price for Maize, is KSh 1200 per 90 Kg bag. Production improvement due to adoption of high yield seeds for the whole 1 acre could be to increase output from 10 bags to 15-25 bags per growing season, depending on their success in the correct use of the combination of seed, fertilizer and pest-control chemicals. In a good year, where the rains are suitable, farmers have two growing seasons per year.

However, the complex interaction between rains, new information, correct application of the information and insurance indicates the critical importance of education and extension services alongside the sale of the insurance product and adoption of new, more productive techniques.

Agro-Commodities Suppliers

For a stockist, distributing insurance makes sense as well: their revenue and turnover is closely related to climatic circumstances, as their clients only buy products when it rains. Without rain, a stockist's turnover simply halts. When stockists are the ones providing credit to farmers, they find that when rains fail, their businesses are quickly in danger of bankruptcy. Kilimo Salama provides more secure revenue for stockists, since farmers can buy inputs even in seasons following adverse weather conditions.

Moreover, Kilimo Salama is only offered by selected, certified and trusted stockists, and this can increase the loyalty of the customer base of the stockists and again increase sales to these businesses.

Insurance Industry

The use of an index based insurance product, with automated weather stations that ensure timely collection and reporting of weather data, makes it possible/feasible for insurance company to roll-out an insurance product into an otherwise untapped and practically unreachable market. Having these fully automated weather stations means that both the insurer and the international reinsurers can feel comfortable with the measurements being taken and can have the assurance that the data is available in time. The existing manual rain gauges cannot be used, as they are easily manipulated and time delays in reporting are common.

4.2.5   Business Case Analysis

As described above, the smallholder farmer is investing in an insurance product, which costs him only half of the real cost since the input suppliers are sharing the cost, and which leverages extensive potential income benefits in an average year, through his/her confidence in upgrading of practice, while repaying the investment in a poor year.

The input suppliers are making an investment of 5% of their sales price in order to increase their market share by attracting the small-holder farmers to their up-scale product.

The insurance industry is making a large investment in marketing, technology and M-PESA transaction costs to develop a product which would otherwise by virtually impossible to reach. Safaricom for its part has offered discounted GPRS data transmission rates to Syngenta and UAP based on bulk purchases, even though the individual transactions may be small and would otherwise attract a higher transaction cost to the project sponsors.

Syngenta Foundation has led the project to date and has made capital investments in the development of the IT systems - i.e., the server platform, the weather stations, mobile phones with scanner adapted cameras - as well as setting up the helpline, training and information services.

Syngenta Foundation's objective is to develop an insurance product and marketing system that is to the benefit of small-holder farmers, improving their productivity and livelihood, while offering a sustainable and commercially profitable business model for the insurance industry at large (to UAP and eventually beyond) to maintain, scale up and replicate.

UAP's role has of course been to develop a viable insurance product from the information it receives. The company's investment has been in terms of providing management support to the venture, developing its own new product documentation and deployment, and in hosting the team at its offices.

4.2.6   Issues, Risks and Hurdles

Table 5: SWORB Analysis

Strengths	Opportunity
• Strategic combination of sound distribution, automated weather monitoring and mobile technology, • Benefits of increased income to users • Can increase service usage by partnering with other mobile apps like KACE, DrumNet and Farmers' helpline for extension services.	• Transformation of smallholder farmers' perceptions of the risks associated with higher yield techniques. • Proof of concept of the benefits to smallholders of index-linked insurance, and growth of insurance through the agricultural sector • Provides confidence to farmers on being able to farm in the next season even after a bad harvest • Can increase usage of other insurance products, e.g., funeral coverage, personal accident, as suspicion of insurance decreases; current insurance penetration is just 6%
Weaknesses	**Risks & Barriers**
• Currently few high quality weather stations in the country, which can be trusted as reliable data providers • High training costs. Agro-dealers must be effectively trained to be able to deliver such a high technology system. This will be evident when they expand their distributor channels	Risk • High yield techniques can backfire on the farmers without critical information and education Barriers • Smallholder suspicion of insurance • Smallholder lack of knowledge re best seeds to plant regionally, how to apply fertilizer and chemicals, etc. • Cost and effectiveness of the information and education / extension services • The premium is high and currently sponsored; the farmers pay 5% and input suppliers pay 5%. It could therefore take awhile to be sustainable and one has to always seek partners to sponsor premiums

Syngenta have identified one of the largest hurdles to be financial education and agricultural extension. The application of insurance to higher yield inputs needs accompanying education and support, as evidenced by the scale of response to its voice helpline service and knowledge of the risks and issues involved with all aspects of agricultural and in particular high yield techniques. For training (and selection of stockists), the initiative has partnered with the NGO CNFA AGMARK. However, negotiations are currently underway for IFC to finance development and scaling up of the education and extension services in support of Kilimo Salama.

The following are issues raised by UAP:

• **Limited number of trustworthy weather stations with suitable data outputs –** This is being mitigated mainly by installing more purpose bought stations, at a cost of USD 3,000 per

site. The inherent conservatism / risk aversion of the farmers, and their suspicion of insurance and those who sell insurance. This is being mitigated by the successful piloting, payouts made, and also by the agro-vet distribution channel, which is close generally trusted and geographically close to where the farmers live.

- **Affordability of the product –** In simple terms, the price of agricultural insurance is determined by the frequency of the risk covered: if one loses all (100 percent) of his crop once every 10 years, an insurer will ask a premium of 10 percent at the start of each year for ten years so he can cover the 100 percent loss at the end of the tenth year when disaster strikes. Furthermore, this price does not yet include any transaction and distribution related costs, which could quickly add another 2 to 5 percent. While this may be a 'reasonable' price to pay for full coverage, the context in which farming is done in developing countries makes this an unaffordable price. There are many demands on the farm wallet, particularly at the start of the season when inputs are bought and labour is hired to prepare the land. Unfortunately, this is exactly the time the premium would need to be paid. Insurance products need to be affordable for farmers, without reverting to subsidies for the product to be sustainable. Crop insurance is expensive with the average premium cost being 10% of the sum insured (Farm inputs or inclusive of expected yield). If not subsidized as in the case of Kilimo Salama, the price is thus expensive for initial uptake or forces farmers to insure only part of their farm inputs.

- **Distribution channels –** The Kilimo Salama channel is relevant to smallholder farmers. In other cases, the best channels need to be identified and developed. The convenience of location is key in distributing the product, it must link with already existing activities or purchases that a farmer is engaged in to be effective. Locating such partnerships takes time to establish.

4.2.7   Scalability and Replicability

For the product to be scaled up, several items must be considered. The main issues to be addressed are i) affordability of the product, and ii) farmer education and extension service (see above.

There are various possible solutions to the affordability issue. The first and simplest one is to lower the premium price, either through premium sharing between recipient and input marketer, as in the Kilimo Salama case, or in absolute terms. Reducing the product cost in absolute terms would have a direct and negative impact on the scope and value of the insurance coverage. Without appropriate training to communicate the reduced coverage to all farmers, farmers could easily feel cheated in years of total crop loss when they do not receive a matching payout. The goal should therefore be to structure insurance offers with comprehensive coverage, affordable premiums, and appropriate training. Costs of premiums could also be lowered by subsidizing agricultural insurance externally, either by government or by a donor agency.

Another form of subsidy could be from the COP15 (PROTECT THE POOREST), which will provide at least $150 billion a year by 2020 to help the world's poorest and most vulnerable people deal with the impact of climate change and develop in a low carbon manner, where funds can go to subsidizing premium payments of farmers.

On the education front, the Syngenta and UAP experience is that the product cannot be safely scaled up without major expenditures on financial and agricultural education of the farmers. It is understood that IFC intends to invest significantly in this for Kenya. The education will include the following elements:

- Field days (barasa's) with agricultural partners – essentially extension service;
- Radio shows in conjunction with the Helpline and SMS based information service;
- Training of distributors (the agri-business input stockists thus far).

As regards replicability, since the concept of weather index insurance for farmers was developed, several pilots have been launched around the world (Mexico, Morocco, India, Malawi, Rwanda, Tanzania, etc.).

However, in order to create an impact similar to that of microfinance, the foremost challenge is to reach sustainable scale, and to accompany scaling up with a commensurately large-scale, specially tailored extension service. Only in India has a commercial insurer, ICICILombard, reached some scale, selling some 40-50,000 policies per season. But even they consider that after five years they are still very much in the early stages of product development.

4.3   Kenya Agricultural Commodities Exchange (KACE)

4.3.1   Description

The KACE application has developed a market information and linkage system (MILS) which is designed to improve the operation and efficiency of Kenyan agricultural markets, targeting small scale farmers and agribusinesses, through the following:

- Provision of timely (daily) market information on 20 commodity prices;

- Facilitation of offers and bids to match farm outputs with demand from wholesale dealers in the main markets; and

- Provision of assistance to facilitate the linkages (e.g., negotiation of contracts and commodity transportation) between the farmers and buyers.

The MILS system consists of several important and integrated ICT enhanced components, which are:

- **Rural based Market Resource Centres (MRCs)** – franchised liaison offices which are connected to markets and the KACE Nairobi Hub and provide the communications and physical meeting points which support farmers in their geographical area. There are currently eight MRCs around the country.

- **Mobile SMS service** – using premier access codes with both Safaricom and Zain where farmers are able to secure the daily wholesale prices for 20 commodities in seven main urban market centres, i.e., Nairobi, Mombasa, Nukuru, Eldoret, Machakos, Kitale and Chwele.

- **Interactive Voice Response (IVR) service** – uses voice mail for delivery of important information by dialing into a premium number and accessing the information though simple menu steps.

- **Internet database system** – where information is disseminated to users by email from KACE's database and via its website www.kacekenya.co.ke.

- **FM radio broadcasts** – market information is provided through an interactive weekly broadcast program of the West FM Radio Station[8], branded as *Soko Hewani* (Supermarket on Air) providing a virtual trading floor for transactions to take place.

4.3.2   Application Rationale and Objectives

The KACE system's rationale is to provide an integrated set of applications, in which Mobiles play a critical *but not exclusive* role. The system is built on the researched understanding that besides the essential ingredient of good information on commodity pricing that is required to empower small farmers in dealings with wholesalers and to eliminate predatory brokers / middlemen, market linkage mechanisms are also needed to enable farmers to actually sell their produce and get it to market. Assistance is also needed to be able to find out about and purchase the most suitable inputs – seeds, fertilizer and chemical in a timely manner and at competitive prices. Thus KACE has incorporated all of these components in their system.

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[8] The West FM Radio Station is located in Bungoma Town in Western Province, covering parts of Western, Nyanza and Rift Valley Provinces, with a population of 5 million inhabitants.

In addition to the SMS based pricing information, KACE's franchised MRCs help establish the linkages for farmers, at a modest fee recognizing the value added. The MRC staff personnel are also the ones who gather the daily market pricing information and supply it to the KACE Hub for uploading to the KACE database, thus supporting the SMS service. The daily pricing information is displayed on local trading boards at their own premises to assist farmers and SMEs who attend the location physically.

As a further integrating mechanism, the Soko Hewani radio service provides the trading platform to facilitate some of the MRC's activities, though to date this is only via one radio station in one particular region. This, as well as the other services can be expanded to bring about the same level of integration on a broader scale and larger geographic area.

4.3.3   Features

The mobile SMS services are as follows:

- *SMS Sokoni* on Safaricom - the required commodity name (e.g., "Maize", "Sorghum", "Beans", "Tomatoes", "Maize Seeds", "DAP Fertilizer") is sent to 411 to receive immediate pricing information on 20 products from six markets:

- *SMS Soko Leo* on Zain – send similar requests to 247.

The MRCs are envisaged as, and are growing into, one-stop shops for smallholder farmers and SMEs providing information and stocking inputs and catalyzing e-commerce, thus helping to bridge the technological gap between urban and rural areas in the agricultural sector. These centres are also piloting the provision of training, ICT and cyber access (to date only in one location), thus evolving their role into a wide range of services.

The Soko Hewani "virtual trading floor" offers from farmers and bids by SME purchasers are verified and compiled by MRC staff and provided to a KACE Soko Hewani programme announcer for broadcast at the appointed programme time. Farmers and purchasers (SMEs) are then able to send in their bids and offers matching those announced on the program, by phone, SMS, email or fax to the station. The KACE soko Hewani staff match up the bids and offers, and verify back to the MRCs, producers and bidders as necessary, in order to bring deals together.

4.3.4   User Benefits

In addition to the provision of timely, market pricing, which is universally recognized only as a foundation for farmers to participate in the market system, KACE is developing a set of services through the MRCs which are also essential components to enable farmers to overcome their economic hurdles. These are:

- Collection and weighing
- Transport
- Warehousing
- Quality Control, such as moisture testing for grain
- Advice and stocking of farm inputs (quality seeds, fertilizer and agro-chemicals)
- Facilitation of cashless payment (e.g., M-PESA and Zap).

The services which KACE's MRCs are developing are in response to previous studies in which farmers already benefiting from the market information expressed a demand and willingness to pay for these value-added services.

A recent study of the impact of the KACE MILS concluded that the proportion of farmers and traders that say their income has improved as a result of the KACE services is very high (75% of farmers and 60% of commodity traders). The study also concluded that *market integration* had improved for two of the commodities – maize and beans.

4.3.5 Business Case Analysis

Each application within the KACE system has its own business model. Currently, KACE covers only 60% of its operating costs through revenue generation. The balance is made up through donor contributions.

- Currently, KACE covers only 5% of its operating costs from SMS revenue. The SMS based market information messages are paid for by the "callers" to the telecom operators. The revenue share between the main telecom operator Safaricom and KACE is on a sliding scale, in which KACE receives a higher proportion as the number of messages per month increases. Current expectations, based on around 37,000 messages per month are around 47,000 KShs per month (i.e., approx. 1.3 KShs per message.)

- Income from MRC operations and trade linkages covers 40% of KACE's operating costs. KACE's financial objective for the MRCs is for them to be self-sustaining after two years of operation, through the provision of standardized, needed, appropriate and affordable services to local smallholder farmers and SMEs in the area. The MRCs charge a placement fee of USD 1.50 – 15.00 (depending on the volume concerned) to farmers and buyers for submitting a bid or offer onto the *Soko Hewani* radio programme. They also charge a commission of between 0.5% to 5% on successful deals to manage the negotiation, contract and transportation. Total volume of business transacted through *Soko Hewani* is KShs 8 million per week.

- KACE income from consulting fees and other commercial sources is 15%.

KACE clearly needs to get out of the Donor supported "rut". Although the breadth of its integrated family of applications is impressive, which makes it a leader in Kenya, the scale of its reach is still very small compared to the 4 million smallholder farmers who exist in the country. KACE needs to scale up both its SMS service by several orders of magnitude and also to multiply the reach of its broadcasting based virtual trading floor in order to become self-reliant and commercially viable.

4.3.6 Issues, Risks and Hurdles

Table 6: SWORB Analysis

Strengths	Opportunity
• Proven and strategic combination of information and market linkage facilitation covering 20 products and market linkages throughout the country	• Scaling up and increasing the integration of its components to reach a much broader population of farmers in several sectors • KACE currently has a lead and therefore it has a window of opportunity to develop a much wider

	reach before the market becomes too fragmented. • Replicating the KACE model to four other countries in the East African Community region (Tanzania, Uganda, Rwanda & Burundi)
Weaknesses • Limited reach as a percentage of the total number of smallholder farmers in Kenya. • Weak links with cooperatives, farmers organisations which could be leverages to publicize KACE's services to a much wider population of farmers	**Risks & Barriers** • Other competitive market information and/or linkage solutions being developed, often copied from KACE, will eat into KACE's market • Any move by government towards central price control could reduce the need for market information, though the trend seems to be in the reverse direction. • Significant first year finance is required for the upscaling activities

4.3.7   Scalability and Replicability

KACE's has presented a business plan to Intelecon that calls for a scaling up of both its information and virtual market activities (SMS platform and Soko Hewani) to cover the whole of Kenya. It has determined that scaling up to service 1 million messages per month (from the current average of 37,000) and the addition of an SMS based trading platform, *plus* the migration of Soko Hewani to a radio station with full national coverage would require an investment of USD 1.75 million over three years. Development and operating costs for Year 1 are estimated at USD 743,000. The following Table 7 and

Table 8 are the cost and revenue projections.

Table 7: Costs of Upscaling to 1 million SMS per month

Activity	Year 1	Year 2	Year 3	Total
Collection, processing, updating & dissemination of market information through 5 MILS	3,210,000	3,370,500	3,539,025	10,119,525
Hub Operation Costs	2,391,400	2,510,970	2,636,519	7,538,889
Promotion of Soko Hewani and SMS Trading platform – radio & tv, workshops, field days, networking with farmer organizations, etc.	17,002,000	8,998,500	2,304,225	28,304,725
Production and broadcasting of Soko Hewani programs on market information.	10,140,000	10,647,000	11,179,350	31,966,350
Monitoring , Maintenance and evaluation of SMS Trading Platform and Soko Hewani programe	1,688,000	1,772,400	1,530,270	4,990,670
Additional Equipment	6,370,000	0	0	6,370,000
Trade platform Development consulting	928,000	0	0	928,000
Staff Costs	16,540,000	17,262,000	18,125,100	51,927,100
Miscellaneous & contingency, 2%	1,165,388	891,227	786,290	2,842,905
Total Ksh	**59,434,788**	**45,452,597**	**40,100,778**	**144,988,164**
Total USD	**742,935**	**568,157**	**501,260**	**1,812,352**

Table 8: Revenues from Upscaled Services

	Year 1	Year 2	Year 3	Total
Revenue from Offer and bids placement on SMS Platform	17,115,397	19,682,707	22,635,113	59,433,216
SMS Revenue	5,562,504	6,396,880	7,356,412	19,315,795
Offers and bids income from Soko Hewani platform	29,001,667	33,351,917	38,354,705	100,708,290
Commission on trade	7,525,402	8,654,212	9,952,344	26,131,959
Total Ksh	**59,204,971**	**68,085,716**	**78,298,574**	**205,589,260**
Total USD	**740,062**	**851,071**	**978,732**	**2,569,866**

Although revenues of USD 740,000 are projected for year 1, growing to almost USD 1 Million by Year 3, KACE requires external working capital of *up to* the full first year's development and operating costs (USD742,000) to meet front-end costs and smooth over the cash flow shortfalls in the early months and cover short term risks. Since the project would be self-sustaining and profitable from year 2 onwards, the contribution can be received as equity, loan or grant and retained in KACE's accounts as working capital to finance further growth if necessary. If the contribution were considered as equity, the IRR considering only the first three years as projected by KACE would be 57%, and would still be 14% if KACE failed to meet its first year targets by one third. This is a reasonably robust plan, considering that increasing profitability in years 4, 5 and beyond would increase the project's rate of return.

A detailed Business Plan was provided to Intelecon and is available for review.

One advantage of KACE's structure is that the MRCs are established on a franchise model. It is therefore planned that they can be scaled up and replicated to a greater number of places, to some extent without burdening KACE's operating budget. KACE arranged start-up credit though a micro-finance institution and also equipped the MRCs during their start-up phase by providing training and skills mentoring to enable them to provide the required assistance to farmers and SMEs.

4.4   DrumNet

4.4.1   Description

DrumNet is an ICT platform with heavy use of mobile SMS, specifically tailored to creating processes that address the needs of actors in the agricultural sector. The application has a holistic view, bringing together and enabling the key actors in the value-chain to create the strong and reliable links necessary for reaping optimal benefit, and especially for agricultural producers.

PRIDE AFRICA operated (piloted) the DrumNet Project from 2003 to 2009 in two different segments of Kenya's agricultural sector – the horticultural sector and the oilseed sector. It was first launched in Central Province from 2003 to 2006. There, DrumNet collaborated with Kenya Horticultural Exporters (KHE) and approximately 1500 smallholder farmers cultivating baby corn, French beans, passion fruit, as well as other horticultural products. DrumNet worked with Bidco Oil Refineries (Bidco) and 2000+ smallholder farmers growing sunflower oilseed from 2007 to 2009. Activities took place in Eastern, Nyanza, Rift Valley and Western Provinces during that time. In each case, Equity Bank and several farm input retailers were also involved with the project[9].

4.4.2   Application Objectives and Rationale

The project's main objective was the creation and piloting of a replicable, easy-to-scale model that facilitated cooperation between all the agricultural supply-chain partners – including producers, buyers and processing plant, transportation, banks, and input retailers. DrumNet utilized an integrated finance, production, delivery and payment process to drive its model, as well as an innovative ICT platform. The process promoted a set of procedures and standards that helped partners to form unique, value-adding relationships. The ICT platform provided the interactive tools to support the process, plus it tracked and reported on ongoing activities. DrumNet generated revenue from services offered through its model.

Oilseed farmers' who were members of DrumNet were able to gain full benefit from the eco-system and they saw up to 32% increase of income, based on receiving a higher percentage of the processing plant entry gate price, due to the replacement of middlemen with the DrumNet model.

4.4.3   Features

The DrumNet model uses a comprehensive finance; production, delivery and payment process that helps unite supply-chain partners. The process involves a fixed price purchase contract offered by a buyer, signed by producers and managed by a master contract establishing the roles, rights and responsibilities of all chain partners. Subcontracts between parties were created as necessary to define specific actor obligations.

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[9] This paragraph and several of the following descriptive paragraphs, as well as discussion of the Business Model, including all diagrams, were originally prepared by DrumNet and are quotations from its document entitled "The DrumNet Story", April 2010 and from DrumNet's "Team Gaia Limited: Business Plan", July 2010 (see also Section 4.4.8). Please seek DrumNet permission if reprinting text.

The contractual agreement allowed producers to access credit (first directly from DrumNet and later from partner banks) and purchase farming inputs from certified input retailers[10]. At harvest, contracted produce was aggregated and graded at designated collection points, then sold to the buyer. DrumNet facilitated and tracked payment following a successful buyer-seller transaction, ensuring credit was repaid and payment to producers was both secure and accurate.

Figure 4: Diagram of the Piloted DrumNet Model
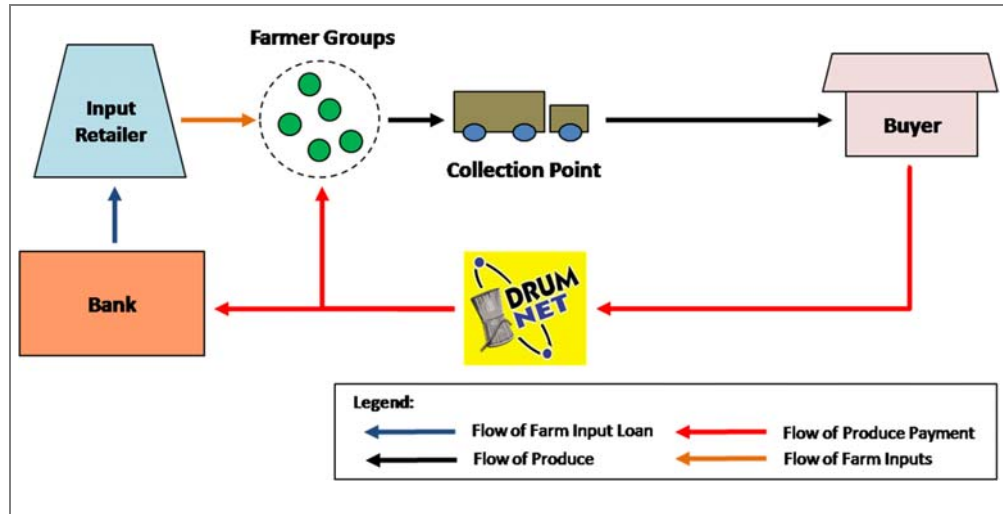
In addition, DrumNet facilitated information flow up and down the supply-chain; predominately via SMS and its ICT platform. Buyers were informed about what was planted, so they could estimate production and plan accordingly. Buyers were also able to monitor progress during crop cycles and pass on important extension information to growers. Agro-dealers were updated on which products to stock at what time and producers were informed of collection dates and locations long before harvest. In the end, all players benefited from DrumNet's timeliness, transparency and oversight.

DrumNet's ICT platform provided the internal controls to track contract compliance and report on all activity within the supply-chain. The platform can best be summarized as four components that make a whole:

- **Comprehensive Business Processes.** Over its five years of working within Kenya's agricultural sector PRIDE has identified a set of "best business processes" through which producers, buyers, financiers, and others can work together. Those processes form the platform's foundation, providing a tried and tested roadmap for clients.

- **Firm Rules of Engagement.** The platform promotes rules of engagement between partners, thus encouraging standardization and predictability across the supply-chain. Further, the platform will identifies non-performing actors enabling partners to incentivize or penalize them as appropriate. PRIDE has found that agricultural actors – particularly farmers – tend to perform more reliably when such monitoring is in place.

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[10] In the model piloted, this involved in-kind loans and a cashless payment process. Farmers applied for and received credit from the bank. Instead of providing farmers with cash, however, the bank paid the input retailer directly following the collection of inputs from the retailer's location. Farmers repaid credit after the sale of their produce to a buyer.

- **Targeted ICT.** The platform ICT technologies such as SMS that enhance supply-chain unity and process realization. ICT makes possible an important platform for reporting services and audit trails.

- **Interactive Portal**. For those actors with internet access, a web-based portal provides several applications through which users can engage partners. The portal also provides access to relevant information and comprehensive reports regarding supply-chain activities. The portal will be compatible with mobile technology, as well, so those in the lower levels of the supply-chain can link into and participate via the portal too.

In total, the platform delivers the risk mitigation and networking mechanisms needed to drive a host of interlinked, unique partnerships that help actors move beyond broker-based channels of interaction and unlock service bundles not previously available in East Africa. In particular, financial deepening becomes increasingly possible in the agricultural sector, as well as the creation of a reputable and comprehensive performance rating database. This ultimately benefits actors at both the top and bottom of the supply-chain.

4.4.4 User Benefits

The DrumNet platform establishes a bridge between producers, buyers, farm input retailers and banks that facilitates and incentivises co-operation thus creating efficiency. The key actors in the supply chain are able to enjoy the various benefits, these are;

Producers (Smallhoder Farmers)

They are afforded reliable and profitable link to markets instead of selling produce adhoc at farm gate or local market. Farmers with the platform grow under structured agreements (contract farming) with buyers. An example of such contract financing is the oilseed (sunflower farmers') partnership with Bidco. This partnership has seen farmers' increase their income by 32%. Where farmers used brokers, they were only able to get 65% of the Bidco entry gate price, with the broker's intermediary charge, including transportation costs, amounting to approximately 35%. Farmers' in the DrumNet based eco-system received up to 86% of the entry gate price, with Bidco organizing the transportation for just 9% and a commission of 5% charged by DrumNet.

Suppliers/Farm Input Retailers

Farm input suppliers through the SMS alert on producers' input requirement can stock with an assured market through the season thus enjoying economies of scale. This increases demand for products without an added credit burden which can result in loss of working capital and high default risk.

Financial Services Institutions

The Agriculture sector is referred to as a high-risk sector for financing especially for smallholder farmers. Financing smallholder farmers is riddled with high transaction costs making the market undesirable and underserved for financial products. With the DrumNet platform, Financial Institutions and Insurance companies are able to reduce the transactions costs due to a channelled payment system. They are also shielded from the complexity of managing large numbers of farm input loans. Also, the structured and strong links to the value-chain enabled by

the DrumNet platform reduces repayment risks with connection to produce agreements/payments. This can provide for affordable loans for smallholder farmers.

Buyers

Buyers face numerous challenges in a value-chain that is not structured and introduces cumbersome scouting for farm produce and even more complex financial administration. Partnership with a partner such as DrumNet allows the buyer (e.g., leading vegetable oil company Bidco) to concentrate on their core business thus reducing costs that are not related their core business. A weakly linked value-chain is costly and has heavy reliance to brokers/trader networks that are not always able to deliver predictable quantities or qualities of produce in a traceable manner. Unreliable quantities lead to chronic supply shortfalls that increase costs of production which can inadvertently lead costly finished goods which can make them uncompetitive regionally.

4.4.5 Business case analysis – the Pilots[11]

DrumNet 2003-2005: Horticulture Pilot with Individual Farmers

The project was active in Kenya's Central Province, specifically Kerugoya, Nkubu and Othaya, from 2003 to 2005. DrumNet's clients included KHE – a leading exporter of fruits and vegetables in Kenya – and smallholder farmers growing contracted produce for KHE. Target crops included baby corn, French beans and passion fruit. DrumNet established several regional offices and supported farmers through extension services and in-kind farm input loans (to individuals). Proceeds from produce sold via DrumNet were paid into farmers' Equity Bank accounts following a successful transaction.

DrumNet earned income through several revenue streams, including:

- **Membership Fee:** Farmers paid an annual membership of Ksh 300 which provided them access to DrumNet services. They paid an additional, one-time fee of Ksh 200 for a membership card.

- **Interest on Farm Input Loan:** Farmers received loans to purchase seed, fertilizer and agro-chemicals. A 10% interest rate was levied against the loan.

- **Produce Transaction Fee:** A 10% commission was charged on all produce contracted and sold through the DrumNet model.

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[11] This analysis is referenced entirely from DrumNet's document entitled "The DrumNet Story", April 2010

Figure 5: DrumNet Statistics, 2003-05
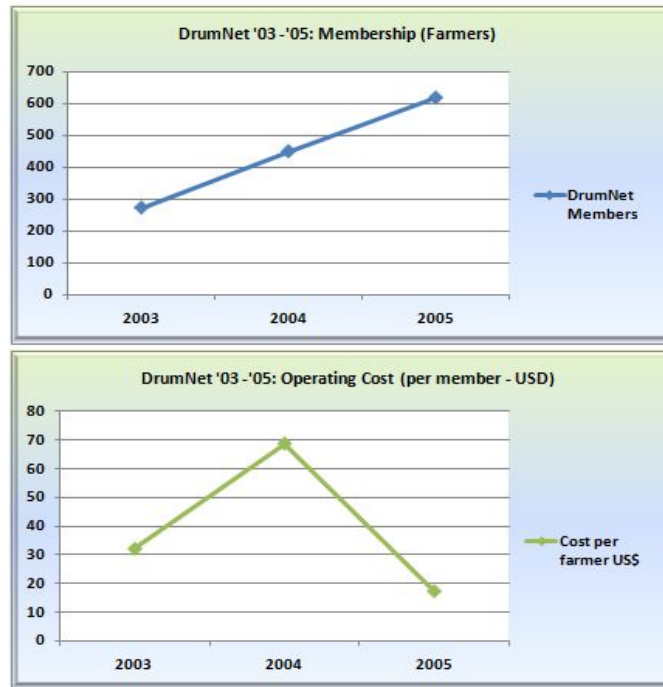
Income generated from these revenue streams during the pilot, when measured against farmer growth rates and field expenditure[12], showed a positive trend toward financial break-even. DrumNet membership increased from 53 farmers in 2003 to 618 farmers in 2005. This enabled DrumNet earnings to grow from zero to approximately $8,400 during the same time period. When subtracting key field costs, DrumNet's operating cost per member was 17 in 2005, a 400% decrease from the previous year. Had DrumNet had the resources to continue its pilot, conservative projections assume the project could have achieved break-even against field expenses by 2007, following the recruitment of 350 additional members[13].

DrumNet 2006: Horticulture Pilot with Farming Groups

The project continued to work with KHE and smallholder farmers in Kerugoya in 2006. Smallholder farmers in Meru (Eastern Province) were also included. DrumNet's approach was modified in 2006 in three key ways. First, DrumNet altered its membership structure from individuals to groups. Second, DrumNet centralized its organizational structure. Lastly, DrumNet stopped loaning to farmers, instead opting to facilitate loans between member groups and Equity Bank – the largest microfinance bank in Kenya. These modifications reduced DrumNet's field expenses, strengthened anti-corruption mechanisms, and mitigated risk in terms of farmer loan default.

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[12] Field expenditure, for the purposes of this brief, takes into consideration the primary costs incurred by DrumNet in the field. This includes field staff salaries, travel/accommodation costs, and communication costs. For the horticultural pilots, it also includes the cost of DrumNet's regional offices.
[13] DrumNet membership grew by an average of 175 members per year between 2003 and 2005. It is likely, that, at minimum, a similar amount could have been achieved in 2006-07, had DrumNet continued using the same model. However, DrumNet's primary funding ended in 2005, leaving it without the resources to continue its pilot.

Under the revised approach, DrumNet revenue streams included:

- **Membership Fee:** Groups paid an annual membership of Ksh 300 which provided them access to DrumNet services. They paid an additional, one-time fee of Ksh 200 for a membership card.

- **Seed Handling Fee:** Seed was purchased from KHE and delivered to near-by agro-dealers for onsale to farmers. A small fee was charged to agro-dealers for this service.

- **Produce Transaction Fee:** A 10% commission was charged on all produce contracted and sold through the DrumNet model.

DrumNet only operated this approach for a short period of time, due to lack of headquarter resources and changes to KHE's buying patterns based on new EuroGap standards[14]. However, the financials reveal extreme promise. By the year's second growing season, DrumNet nearly covered its field expenses, earning $36 per farmer against an expenditure of $38 per farmer. Given that trend, the addition of one to two farmer groups[15] would have enabled DrumNet to reach breakeven.

DrumNet 2007-2009: Sunflower Pilot with Farming Groups

The DrumNet project was implemented across a much greater area of Kenya between 2007 and 2009. This pilot included Bidco – the largest processor of oilseed in East Africa – Equity Bank, several entrepreneurial farm input retailers and smallholder growers initially located in Western Province and, later on, also in Eastern, Nyanza, and Rift Valley Provinces. As per the 2006 pilot, DrumNet worked only with groups, maintained a centralized operations structure and outsourced lending to Equity Bank.

DrumNet captured the following revenue streams during this pilot:

- **Membership Fee:** Groups paid a membership fee of Ksh 500 per produce contract.

- **Farm Input Fee:** Agro-dealers paid a 2.5% commission against input sales to farmers facilitated by DrumNet.

- **Produce Transaction Fee:** A 5% commission was charged on all produce contracted and sold through the DrumNet model.

Adapting the DrumNet model to the sunflower supply-chain and a much larger geographical area resulted in very high start-up costs for the pilot. Field expenditure per farmer reached as high as $48 in 2008. However, as the project achieved increased scale and farmers yields improved in 2009, the number dropped to $11. At the same time, the amount of produce sold through DrumNet increased from an average of approximately 12,000kg in 2008 to 76,000kg in 2009. If the pilot had resources to continue and that growth percentage held constant over the following year and fell by 50% the year after[16], the pilot would have exceeded estimated field costs by roughly 30%.

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[14] DrumNet's donor funding expired during 2006. Additionally, new EuroGap standards were established which required alterations to the model. DrumNet did not have the resources to implement those changes at the time.
[15] A farmer group typically consists of between 10 to 20 farmers.
[16] This scenario was entirely possible and, in many ways, conservative. For example, it could have been achieved had: a) farmers' average yield improved to 500kg/acre by Year 2 and b) existing membership grew from 1365 to 3000 during the

Figure 6: DrumNet Statistics
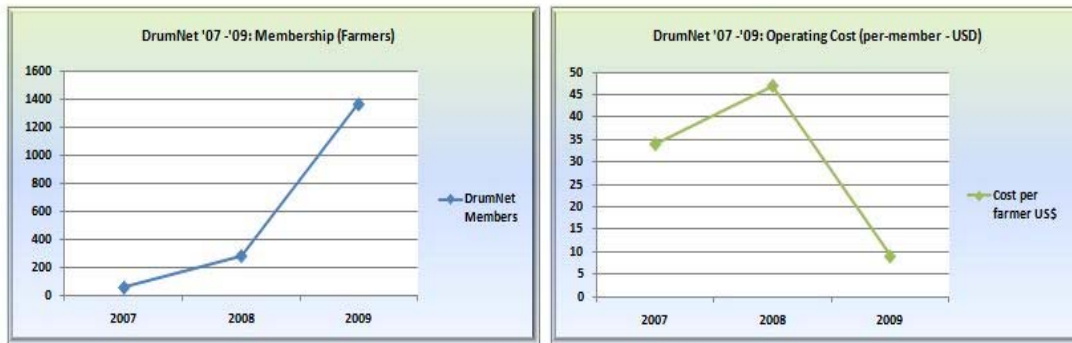
4.4.6   Issues, Risks and Hurdles

According to DrumNet, through the pilots, several issues became evident about the model. First, agricultural actors at the higher links of the supply-chain (e.g. buyers, agro-dealers etc) are keen to participate and actors at the lower links (e.g. farmers) can be quickly mobilized to form a large and exponentially growing producer base. Second, field costs can be kept relatively low after initial marketing and training exercises are complete. And third, although supply-chains will differ between different crops, they share general processes (e.g. input collection, produce collection, etc) that can be made more efficient through increased predictability and ICT-driven processes[17].

The business issues of the DrumNet model can be characterized as follows:

Table 9: SWORB Analysis

Strengths	Opportunity
• *Experience* - Well-versed in Kenya's agricultural sector and nuanced in agri supply-chain integration • *Existing Relationships* - Has gained confidence in the market as a good partner in agri supply-chain. Has existing relationships with large key actors(Banks, Buyers)	• *Supply-chain gap* - The customer needs analysis above indicates a dire need for an integrated agri supply-chain • *Government* – With the new constitution, the decentralisation of central administrative roles provides a good environment for localising partnerships for localised products(crops that can only be grown in specific regions) • *All-Inclusive platform* - DrumNet is the only mobile application provider engaging supply-chain players from end-to-end. • *Mobile Payment systems and banking* – Rapid developments that have taken place in Kenya's financial infrastructure (i.e. mobile banking and agency banking, including mobile/banking partnership services such as – M-Kesho, etc.,) are making the distribution of smallholder loans and smallholder payments increasingly cheap and efficient. This creates opportunity for m-applications in agriculture such as DrumNet to be even more effective and transformative.

same time period. Some farmers were yielding as high as 750kg/acre by the pilot's end. Furthermore, DrumNet experienced membership growth rate of ~500% in both 2008 and 2009, a rate that would have increased membership well above 3000 had there been resources to continue an additional 2 years.
[17] Ibid

Weaknesses	Risks & Barriers
• *Donor Reliance* - Due to lack of donor funds, DrumNet may not be able to continue with the program.	• *Risk* – Numerous mobile applications coming into the market which is likely to dilute projected revenue. • *Barriers* – Long process of engaging partners. Due to the numerous players in the supply-chain, negotiations are likely to take long periods before they are finalised.

DrumNet also reported that it became clear, however, that operating DrumNet as a donor-funded entity left it prone to inconsistent cash flow and conditionality that pushed and pulled its operations in a manner incompatible with commercial development. Furthermore, DrumNet's headquarters costs remained too high throughout the pilots due to the primitive nature of its platform. For example, too much time and resources were wasted on personnel hauling paper forms from the field and then manually entering data into the DrumNet database. Costs were also high due to regular platform breakdown.

To remedy both issues, DrumNet approached several IT firms in Nairobi to discuss its commercialization through the formation of a new company. Software Technologies Ltd. (STL) was initially selected as the firm of choice. The company embarked on software development, however several hurdles were encountered and progress was halted. Reasons for the lack of success appear to have been related to the company not committing sufficient resources relative to other more lucrative opportunities it had.

DrumNet eventually formed a new corporate entity called Team Gaia Limited (TGL), which was to be a joint venture between PRIDE AFRICA and STL, and prepared a detailed Business Plan which has sought to present its opportunity going forward, to attract commercial investment. The DrumNet sponsor (PRIDE AFRICA) wishes to attract equity investment which would allow them to retain a significant share in the business going forward.

4.4.7   Scalability and Replicability

DrumNet has a strong model based on agro-expertise which can be transformational to the sector. However, as noted in Section 3, DrumNet had currently stagnated due to having run out of finance. It thus concluded that it should seek commercial partner. Whereas it was initially successful at making an agreement with STL, this relationship has not flourished and thus DrumNet still seeks for an IT partner and additional capital investment. The company's business plan, with some required adjustments to reflect the current need for an IT partner, is still a sound basis on which to go forward and is presented in summary form below to demonstrate the vision for both upscaling in Kenya and transplanting its model to neighbouring markets in Africa.

Securing the required revenue streams are dependent on the company entering several different agricultural supply-chains and achieving a critical mass of users. To do so, TGL would take an approach similar to DrumNet and focus its marketing activities on key buyers within the sector.

Which Segments?

In its earlier documentation, DrumNet has identified several supply-chains and key buyers in Kenya as targets. They are as follows:

- **Cotton** – As part of the cotton sector revival currently ongoing in Kenya, **Rift Valley Products (RVP)** has recently started working with farmers in Rift Valley and Western Provinces to cultivate cotton on a mass scale. RVP contracted 5,000 outgrowers last year and hopes to expand that number to 40,000 in a few years time. RVP has already held discussions with NuCo over potential collaboration.

- **Horticulture (Baby Corn, French Beans, Snow Peas, etc)** – Kenya is an epi-center for the cultivation of horticultural crops in East Africa; predominately for the purposes of export to Europe. The sector employs 4.5 million Kenyans and contributes 23% the country's GDP. Large buyers such as East African Growers (EAG) have held meetings with and expressed interest in NuCo. Kenya Horticultural Exporters (KHE) is also a logical target due to its familiarity with DrumNet.

- **Maize** – One out of two acres planted in Kenya is dedicated to maize. Both public (e.g. Kenya's National Cereals and Produce Board etc) and private (e.g. Export Trading Company, Unga, United Millers, etc) buyers are looking for solutions to the cut-throat, costly and highly-variable nature of the maize trade in Kenya. Outfits like the Kenya Maize Development Program have been able to enlist and organize a large number of maize farmers in a short period of time (i.e. 50,000 farmers in two years), illustrating that reaching scale quickly in the maize sector is possible.

- **Sorghum** – Sorghum has become a viable substitute for barley, leading East African Breweries (EAB) to buy in great quantities from local growers. EAB is now contracting thousands of smallholders in Ukambani with the expectation the number will grow larger in the short-term.

- **Sunflower** – TeamGaia has been approached by Bidco Oil Refineries to continue where DrumNet stopped in 2009. Bidco's aim is to source at least 3000 tons of sunflower oilseed annually in Kenya, and 36,000 tons overall.

4.4.8 The TGL Business Plan Overview

TGL / DrumNet has prepared a fairly comprehensive Business Plan including vision, market strategy, competition assessment, implementation strategy, staffing, costs and financials. While the document still needs some additional inputs (especially re financials) to make it investor-ready, it provides a useful starting point for reviewing the company's expansion / re-financing proposal.

The following provides an abbreviated summary of TGL's Business Plan, which is available as an annex on request, in its current form, including an Excel Financial Spreadsheet.

Objectives

There are four main objectives to the Business Plan:

- To find and document a common vision for TGL between shareholders PRIDE AFRICA and STL.

- To establish a well-defined strategy for the development and further roll-out of the DrumNet platform within six months.

- To raise capital of USD 750,000[18] for two years of TGL operational expenses and utilize that capital to hire a management team within six months.

- To achieve profitability and brand name recognition as the supply-chain facilitator of choice among key agricultural actors in East Africa by year three of operation.

Company Summary

TLG is a joint venture of PA, a non-governmental organization based in Washington DC, and STL, a commercial software company headquartered in Nairobi, Kenya. TGL is incorporated as a company limited by shares in Kenya and will initially focus on the implementation of DrumNet – an agri supply-chain platform that improves cooperation between dedicated partners. TGL is now operating from the offices of PA and STL, but will relocate after obtaining additional capital.

Company Ownership

TGL is a private company limited by shares and owned by PA and STL as the prospective IT partner. TGL was established with 100 shares; 51 issued to PA and 49 issued to the IT partner. The share capital of the company is KES 100,000 divided into 10,000 ordinary shares of KES 100 each. A percentage of stock may be sold to other investors to raise additional capital.

TGL Services Strategy

It is anticipated that TGL will expand its service offering in three areas:

- TGL will **upgrade its DrumNet platform** over time, adding services in the following key areas:

  - The power of mobile money solutions is apparent in East Africa, with MPESA in Kenya, Zain ZAP in Tanzania, and MTN Mobile Money in Uganda. These and other innovations (e.g. Obopay, Pesa Point, POS terminals etc) will be incorporated into the TGL platform as appropriate to increase the payment options available to users.

  - Index-based weather/crop insurance is currently under pilot in the region. This insurance product, if proven commercial viable, will be a key addition to TGL's service offer.

  - An interactive mapping tool that allows users to define what information they would like to see on a local, real-time map has also been identified as an in-demand service that will, at some point, be included in the TGL platform[19].

  - Warehouse receipting and the establishment of commodity exchanges are other innovations in the agricultural field that, if shown to be viable, will be accommodated by the platform.

- **Consulting and training services** - Once a critical mass of information is available, TGL will provide these services to organizations with either a profit or social incentive to know more about their client base within the agricultural sector. For example, this could apply to a farm input company looking to increase sales or an NGO trying to receive better statistics on

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[18] Since DrumNet does not currently have an IT partner who would have brought software development resources to the enterprise, the total amount required if software needs to be paid for, would likely be in the neighbourhood of USD 1 million.
[19] The Ushaidi platform could have relevance here.

farmers' welfare. These services will also be of interest to government entities, such as the Ministry of Agriculture.

- **Cross-over products and services to capture opportunities in different sectors**, like the health sector. This could relate to information services as discussed above or more direct involvement in supply-chain logistics. For instance, the DrumNet platform's tool kit will allow it to track the movement of products in nearly any industry with rural distribution points.

TGL's market for its DrumNet platform includes players at each link in the supply-chain, as well as service providers that cater to those players. The market also includes public donors and non-governmental organizations that aim to resolve problems affecting Kenya's agricultural sector.

Market Segmentation

The potential market for TGL, and the DrumNet service specifically, can be broken down into six main segments: Agro-processors/buyers, farming groups/organizations, commercial banks, farm-input dealers, farm-input suppliers and non-governmental organizations/donors. All segments will be important to the long-term growth and profitability of TGL.

Table 10 below discusses each segment within the Kenyan context, which will be the initial country of focus for TGL.

Table 10: Customer Segment Focuses for TGL

Customer Segment	Needs
1) Agro-Processors/Buyers Kenya boasts the largest presence of agro-processors in East Africa. This includes 12 major grain processors and 100+ processors of fruits and vegetables, such as Del Monte (K), Premier Foods Industries and Kevian (K). Kenya is also home to more than 50 horticultural exporters and four substantial supermarket chains. The World Food Program is active in Kenya and is buying directly from farmers through its Purchase for Progress initiative. Interviews with a sample of these entities showed ample demand for innovations that improve their current procurement practices.	• Source more and higher quality product without increased field presence; • Have increased visibility, predictability and traceability re product inflows; • Have an improved way of identifying and communicating with farmers/farmer groups; • Reduce the time and cost associated with post-transaction payment to producers/ brokers; and • Make obsolete their reliance on unreliable broker networks.
2) Farmer Groups/Organizations Two out of three Kenyans are engaged in agriculture as their primary livelihood. Of those, a vast majority are smallholder farmers with less than five acres of land and little or no access to formal marketing opportunities. That group, however, cultivated produce worth KES 100 billion in 2007. The most active and business-minded farmers in Kenya have formed groups to increase negotiating power and reduce transaction costs. Collaborating directly with individual smallholder farmers is not a viable option for most businesses.	• Timely and accurate market information; • More stable and streamlined contact with end-buyers (i.e. the ability to bypass brokers); and • The opportunity to upgrade production practices through access to finance.
3) Commercial Banks There are 44 licensed commercial banks operating in Kenya, many of which have products specifically designed for agricultural actors and are already financing the sector. Leaders in this area include Equity Bank, Kenya Commercial Bank, Co-operative Bank of Kenya, and K-Rep Bank. These	• Reduce the time, risk and transaction costs associated with agricultural lending; • Receive information on farmer groups under contract and/or interested in loan products; and • The ability to sell other financial products, such

banks, and presumably others in time, view the unbanked agricultural community as an essential area of growth for their businesses.	as savings accounts, to agricultural actors in order to grow their overall portfolios.
4) Farm-Input retailers An estimated 8,000 farm-input dealers (aka agro-dealers) dot Kenya's landscape, ranging in size from lightly inventoried, small-time businesses to advanced operations with annual turnovers exceeding KES 75 million. According to AGMARK, a local NGO, approximately 50 agro-dealers fit the latter category. These "key dealers" intermediate the flow of goods from Nairobi to the rest of Kenya and are operating successful rural-based businesses with a wide network of clients.	• Tools and services that provide an edge against competitors; • Means of communicating with customer base and monitoring field activities; and • Strategies that improve profitability of near-by farmers, enabling farmers to purchase more farm inputs and related services.
5) Farm-Input Suppliers There are 62 registered farm input suppliers in Kenya, including several large, international companies such as Syngenta, Bayer, Osho, Kel Chemicals and Mea. Many of these input suppliers are already actively piloting new ways to connect with producers in the agri sector, such as through insurance products and credit schemes.	• Stronger distribution hubs for their product and improved means of communicating with those hubs; • More effective and targeted advertising mechanisms to reach the most active and productive areas of Kenya; and • Strategies that improve the macro profitability of farmers, thus growing demand for products.
6) NGOs/Donors Kenya is a regional hub for international donor agencies and donor-sponsored NGOs. In fact, a whopping 6,424 NGOs are currently registered in Kenya. The NGO/donor community has become increasingly interested in and focused on the agricultural sector, particularly re comprehensive value-chain solutions that address food security issues and/or enhance the welfare of small-scale farmers. For example, Technoserve is working in the coffee, dairy and banana sectors. This interest has been accompanied by financial support, as evidenced by the coloTGLl funding received by the Alliance for a Green Revolution in Africa and other like organizations.	• NGOs with agricultural initiatives in Kenya are keen to find collaborating partners that can help them achieve objectives; and • Donors are looking to finance new and innovative agricultural interventions that forward their agendas and assist in the realization of their targets/missions.

It should be noted that while the specific needs of the segments differ, they are undoubtedly connected and ultimately boil down to the same requirement – an organization that intermediates relationships so each player can focus on their core competencies. By building and promoting an effective networking solution with related support, TGL will address the requirements of many in a better and more comprehensive fashion than any current product/service in the market.

Target Market Segment Strategy

During the company's start-up phase, marketing and sales strategies will focus primarily on large agro-processors/buyers, commercial banks and NGOs/donors. This strategy is based on the following rationales:

• **Key Supply Chain Buyers & NGOs** - The fastest way to enter the market will be through existing supply-chains with some degree of organization and support infrastructure – i.e., situations where key segment actors already have a relationship and wish to improve their linkages. Supply-chain organization and the drive to streamline partnerships is generally triggered by buyers with the necessary resources and foresight to do so. To a lesser degree, some NGOs are active in this space and work to rationalize supply-chains through donor-funded projects.

- ○ The uptake and installation of DrumNet product/services in a new, young or mature supply-chain requires a certain level of commitment and investment by all chain actors. But in East Africa at least, buyers usually influence partners and dictate their mode of interaction/transaction. Further, NGOs/donors can provide subsidies to facilitate sensitization, training and other costs crucial to platform establishment.

- **Banks** - The buy-in of commercial banks is critical to TGL's service offer since agric finance and financial mediation will at least partially drive buyers' and producers' desire to operate on the platform. In certain supply-chains, bank buy-in (i.e. their willingness to lend against a buyer-seller agreement) is the catalyst of partnership formation.

- **Donors & Social Venture Capitalists** - Initial investment in TGL will likely come via donor-infused support or a socially-minded venture capitalist. The former is self-explanatory – marketing to donors will be necessary to garner their support. As for the latter, strong relations with a large buyer or a large bank will add credibility to the commercial possibilities of TGL and increase the company's overall appeal.

PA's past experience in the agricultural sector means TGL has a good understanding of which organizations to pursue first. For example, buyers such as Bidco Oil Refineries, East African Growers, Export Trading Company, Incas, Premier Foods, World Food Program and Unga have all previously expressed interest in TGL's platform. The same can be said for the following banks – Barclays, Cooperative Bank of Kenya, Commercial Bank of Kenya, Equity Bank, and Kenya Commercial Bank – and donors – Alliance for a Green Revolution in Africa, Food and Agriculture Organization, Financial Sector Deepening (Kenya), International Fund for Agricultural Development, USAID (COMPETE) and World Bank. The Eastern Africa Grain Council and Kenya National Cereals Board also will be key targets for TGL.

Since TGL will be a service-oriented company, marketing should become easier once the company's platform is in use and has a satisfied customer base who can "sing" for TGL. This is why the immediate roll-out of portions of the platform will be important, as will good customer support. Public relations will always be an important component of TGL marketing, since word-of-mouth and personal recommendations are critical in the agricultural field.

Advertising

Once marketing activities move downstream to agro-dealers, farmers, and other rural-based actors, radio will be an essential recruitment medium. PA had great success with radio recruitment while implementing the DrumNet Project; advertising opportunities during on-air agricultural programs and leaving a number for actors to SMS if interested. SMSs were then followed up with phone calls and/or field visits.

Sales Strategy

TGL will earn the bulk of its income via DrumNet from commissions on different transactions that occur through the platform and, in particular, produce transactions between producers and buyers. Therefore, achieving a critical mass of registered platform users is the key to TGL's profitability. The primary goal for TGL will be to build its user base and ensure traffic runs through its platform. That means getting the company's platform involved with as many supply-chains in East Africa as possible.

To achieve critical mass, TGL will utilize a Software as a Service (SaaS) approach, in which users do not purchase TGL software but, rather, pay for it as a service. This means users will be able to register for, implement, and access TGL's web-portal nearly free-of-charge. It also means users do not incur software maintenance costs, nor do they have to pay for platform upgrades. The SaaS approach will be combined with a "complementary basic package" approach, where users have unlimited, no-cost access to a simple set of tools and services provided by TGL. Only after users complete transactions and/or make use of premium services (e.g. customization, credit reporting, advertising etc) will they incur a fee. Together, these two strategies will enable TGL to capture market share and realize economies of scale. It will also allow TGL to collect more user requirements, so it can adapt the TGL service offer accordingly.

Management and Staffing Summary

TGL will operate under a small management team during the company's start-up period. The team will consist of two professionals whose time and costs will be initially financed by shareholder investment. The team's top priorities will be to oversee the build of TGL's software and raise operational capital to fund additional staffing requirements and company roll out. It is anticipated that operational capital will be acquired within approximately four to six months.

With capital in hand, the Board of Directors will hire additional management team members. The management team will consist of five professionals with demonstrated expertise in areas vital to TGL's core business. Management will hire staff as per the personnel plan detailed below. An Advisory Board will be created to provide sound guidance to management and the Board of Directors.

TGL will have a Board of Directors selected by the company shareholders, an Advisory Board and four operating divisions: Finance and Administration, Marketing and Sales, Technology and Operations. A Chief Technical Officer will oversee the technology division and report to the Chief Executive Officer. The Business Plan includes a full corporate Organization Chart and description of reporting duties.

A full description of the proposed management team and personnel hiring strategy is included in the Business Plan. TGL is designed as a technology company with high operating leverage. Our personnel plan reflects this; despite an estimated 500% growth in revenues from Year 1 to Year 3, required staffing should only increase from 13 to 20 positions. TGL will compensate employees at or above industry averages to ensure staff retention and motivation.

Milestones

The three most important company milestones are the following[20]:

- **Software Build** – The software element of the platform is crucial to platform roll-out. The build of that software must commence in March 2011. "Teasers" of the software will be

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[20] These milestones were based on the assumption of an existing partnership with STL. Thus as they are stated here, the dates have been put back by one year from the original plan. They thus reflect the expectation for financing to scale up, and predicated by actual field implementation if capital can be injected within Q1/2011.

available by April 2011 and a partially functioning (i.e. certain modules), field-ready software is anticipated by August 2011.

- **Capital Investment** –. Capital is needed to fund full staffing of TGL and operational expenses. Approximately $215,000 is required by September 2011 at the latest.

- **Platform Implementation** – The implementation of the TGL software will occur this year, involving at least one supply-chain in Kenya. If the supply-chain involves rain-fed crops, implementation must start prior to September 2011.

In terms of sales, little incoming cash flow is anticipated during 2011. However, it is expected that TGL should generate $200,000 in revenue in 2012 and become profitable by the end of 2013.

Financial Plan

TGL's financial plan is based on the major cash infusion taking place during Year 1 of operation. That infusion will result from a combination of IT partnership and either public donor grant or third-party investment (debt or equity). The cash will cover two years of operational expenses, during which time TGL will build and upgrade its platform, hire an experienced staff and establish a robust customer base.

The company structure of TGL will magnify its prospects of profitability. TGL will act as a technology company that has high operating leverage. This means most of TGL's costs will be fixed and/or non-reoccurring expenses. Few of its expenses will be variable as TGL transactions will be performed digitally through its software. The significance of the operating leverage is that once TGL achieves breakeven – the point where operating revenue covers fixed costs – every fee transaction in excess of breakeven creates profits TGL can reinvest in its growth. It is believed that, given TGL's growth plan and high leverage business model, the company will achieve operational break-even by Year 3.

A detailed Excel Business Plan spreadsheet is attached to the Business Plan.

4.5   Virtual City Agri Manager

4.5.1   Description

Virtual City has successfully rolled out several applications, one partial sector at a time, in the form of turn-key automation contracts paid for by a leading player in each sector (e.g., a Cooperative or main industry buyer). These solutions have not necessarily attempted to bring together all players in the value chain but have merely automated the one part of the value chain of interest to the main player sponsoring the automation as a means to use ICT to lower costs, create efficiency and increase productivity.

Amongst its other lines of business, Virtual City has thus developed a number of value chain automation solutions for its clients, which have been designed and rolled out in various specific sectors. Each solution represents at least one case where Virtual City designed an automation solution for its client. The solutions are:

- **AgriManagr** – automates produce purchasing transactions and reduce your costs while improving relationships with your customers and suppliers

- **Auditr** – provides real-time, accurate market information from the field and disperses it along the supply chain for factual market based management decisions.

- **Distributr** – improves productivity, reduces sales cycle turn-around time and manages sales processes while reducing costs.

- **Enginr** – provides field engineers with the tools to work more efficiently and effectively by allowing them to independently input, view and act on information in line with their.

- **Haulr** – manages and streamlines dispatch and delivery processes along the distribution channel.

- **Membr** – provides personalised services by accessing cardholder information.

- **Plannr** – is for managing and marketing events.

- **Routr** – streamlines a distribution system by managing and optimizing distribution routes.

- **Tracr** – tracks, monitors and records a product history from source to destination, giving complete visibility while in compliance with international traceability requirements.

- **Warehousr** – manages and supports the requirements of warehouse processes.

Victual City's AgriManagr solution has been used in the Dairy, Tea, Coffee and Cotton industries. The tea industry case is the one which is best documented based on the material received from the company.

4.5.2   Application Objectives and Rationale

In the tea industry, Kenta Tea Development Agency (KTDA), one of Kenya's major private tea management agencies that currently manages up to 60 tea factories in the small scale tea sub-sector, needed an accurate method of collecting, recording and accounting for tea leaves from the small-scale farmers at the field level.

Through this automation, the agency wished to increase productivity at the field level by streamlining field processes. The issues to be addressed were to include the following:

- On Site Data Capture with the use of PDAs,
- On Site Transaction Processing,
- Onsite Electronic Weighing,
- Data Reconciliation,
- Data Transfer (via VPN over the GSM network), and
- Electronic Data Backup.

4.5.3   Features

Based on the problem statement the recommended solution was to automate field activities using Virtual City's Produce Purchasing solution, branded AgriManagr.

The tea industry solution, which is still in the pilot implementation stage, is a simple three-module system that is used to accurately capture and deliver the growers' green leaf weights from the buying centre up until delivery to the factory.

- Module 1 involves the actual capture of individual grower's weights at the buying centre;
- Module 2 involves the delivery and count of the total number of green leaf bought at a particular buying centre;
- Both modules 1 and 2 are captured on the PDA; and
- Module 3 is the part of the system that captures the weights delivered by the truck to the factory; this module runs on a PC connected to the weighing scale at the off-loading. The system also generates some web reports that show a summary of the various weights collected at the various stages of the system.

4.5.4   User benefits

The overall initial reaction to the technology solution and the benefits from the system was extremely positive and proved to be valuable to the organisation, the Tea factories and the farmers through improvements in efficiency, accuracy and bottom line through exact collection of weights delivered and their value. It is understood that on the basis of this, the system will be more widely deployed in KTDA's territory.

The benefits include the following:

- Increased efficiencies at the collection centre leading to increased productivity
    - Transaction time reduced from 3 minutes with the manual system to 22 seconds using *AgriMnr.*
    - Reduced time in manual data entry and reconciliations.
    - Reduced fraud at collection points due to electronic weight data collection and records of grower's leaf at the Buying Centres. No adding, editing or deleting of records without proper authority.

- ○ Upscaled personnel due to training and knowledge on new technologies.

- ○ Continuous sending of data to the HQ for reconciliation reduces time and other resources on manual reconciliations.

- ○ The application is very flexible & easy to use thus suits the different users.

- Reduced administrative costs;

  - ○ Automated goods received notes and growers copies virtually eliminate paper documents.

  - ○ The average annual factory cost for paper, data entry reconciliation, communication and fraud was approximately Kshs. 60 million. This has reduced due to elimination of paper documents and fraud, and their replacement by electronic data entry and reconciliation.

  - ○ The cost of delivery has also been reduced by 75%.

- Reduced incidences of fraud;

  - ○ No manipulation of data; use of automated balance reconciliation will mean that there is no tampering of transactions, as these figures will be directly transferred from the database system to the handheld devices.

  - ○ No cases of "ghost farmers"; farmer information is electronically put into the system. Leaf is weighed one grower at a time, unlike previously where the bags were standardized before they were loaded onto the lorry.

  - ○ The process is fully automated, i.e., all the data is captured in the PDA and a summary of the transaction is sent to the printer (via Bluetooth) and it's from here that the grower or the clerk can swipe the grower's smart card and automatically update the day's transaction. The grower's receipt shows the days' collection and the cumulative weight for the month.

- Increased revenues for the farmers

  - ○ The use of handheld electronic technology in automating the produce purchase to increase efficiency while reducing fraud has proven very successful where the average weight per transaction per farmer has increased by about 9%. This transforms directly into 9% (USD 300) additional income for the typical small scale grower[21].

- Increased productivity

  - ○ The volume of tea delivered to the factories has increased as the electronic weighing scale has a higher weight as it calculates to the decimal point as opposed to the manual system where the weight was rounded off, tare weights are standard and deducted from the weight so the reading is more accurate and the cases of fraud have been reduced.

- Improved relationships between the growers, green leaf buyers and the factory;

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[21] Independent research with smallholder tea growers indicated that a 3 acre farm has yielded income of approximately KS265,000 in 2010. Thus a 9% additional income due to the *AgriManagr* product translates to KS 24,000 (USD 300 per annum per farmer).

      ○   The introduction of new technology and control systems has led to an increase in efficiency and simplified business processes; this has led to improved relations between the growers, green leaf buyers and the factories and generally increased productivity.

4.5.5   Business case analysis

As the solution provider, Virtual City's business model was to be paid in full for turn-key delivery of the system. It plays no role in the value chain transactions and has no share in that. Thus any details on cost of the system, cost saving and benefits would need to be secured from the owner – KTDA that currently manages up to 60 tea factories in the small scale tea sub-sector.

Intelecon has been able to verify the benefits from the tea producer perspective through interviews with two independent small-scale (3 acre) tea producers.

4.5.6   Issues, Risks and Hurdles

The following summarizes AgriManagr's business model on a qualitative basis only:

Table 11: SWORB Analysis

Strengths	Opportunities
• Design based on a clearcut commercial objective which included requirements for benefits to both the owner and other players in the value chain (the latter to create harmony and loyalty).	• The principles behind the *AgriManagr* solution could be expanded and/or transferred to other value chains and sectors.
Weaknesses	**Risks & Barriers**
• The Solution serves primarily the interests of the owner and is limited in terms of the number of players to date. • There could be other players who could benefit from inclusion, e.g., banks, and the growers could possibly benefit from their inclusion. However, they are already benefitting from the increased stability and revenues created by the solution.	Risks – • The involvement of Virtual City working for a system owner with the financial resources to pay for the solution actually reduces roll-out risks since, as an accomplished and technologically savvy commercial player, they seem able to roll out solutions efficiently. • However, there is possibly a developmental risk in organizing only part of the sub-sector, in the interest of one leading player. Barriers – • A barrier to use of Virtual City's solutions is currently the cost and financial arrangements

4.5.7   Scalability and Replicability

The principles behind the AgriManagr, the Distributr and other solutions could be expanded and/or transferred to other value chains and sectors, especially those with a well resourced leading player.

As noted above, a potential weakness of the Virtual City cases, *from the rural development perspective*, is that they link only a part of any one sub-sector, typically a single value chain controlled by one main player. Valuable players like banks, who could be strengthening the position of farmers for fertilizer loans, etc., (as in the case of the DrumNet pilots), have not been involved in any of the Virtual City cases. However, it is also possible that Virtual City could be

encouraged to play a role in the scaling up and roll-out of one or more of the other existing ventures, such as DrumNet, KACE or one of the extension service applications. These organizations have more specific rural development expertise which could be leveraged and dynamically merged with Virtual City's technological and business acumen, to created more integrated solutions than they have done to the present.

To date, Virtual City has not played a role in these other applications because the leading players of these (e.g., DrumNet and KACE) have had limited financial resources and could not meet Virtual City's business model demand for payment on an up-front turn-key basis. As well, both organizations have been under the financial thumbs of donors who may not have been interested in paying a commercial organization, even if the solution would have been well executed. In addition, donors often insist on open source software design, which may not be to the liking of a commercial player such as Virtual City. Purist thinking often results in slower, inefficiently designed solutions, as well as some donors having limited staying power and less appreciation for the challenges of creating a long term commercially viable solution.

In one case, it is understood that DrumNet asked Virtual City to take an equity interest in its model and thus to share the risk and effectively accept payment on a transaction basis. However, Virtual City was understandably not able or willing to un-focus itself or diversify away from its successful business model. In an interview, CEO John Waibochi admitted that even Virtual City's successful cases are largely still in proof-of-concept stages and that there are limits related to the challenge of migrating any one solution into a multi-product or more variable, less focused value chain application. Virtual City has been successful by containing its risks and thus owes its growth to rational and sensible business decision-making, as well as to good entrepreneurial acumen that has won it several significant financial awards. .

Virtual City has at least two well-funded product expansions and diversifications currently underway. These are as follows:

- **Dairy Industry** - A USD 0.75 million African Enterprise Challenge Fund (AECF) award will finance the migration of AgriManagr to the value chains of 15 Dairy Co-ops in three Kenyan provinces involving 90,000 small scale dairy producers. It will include complete value chain tracking and include Internet and Visa payment engines, as well as (for a first time in Virtual City's experience) the incorporation of M-PESA based payments to the producers. In this case, rather than being paid on a one-time Turn-Key delivery basis, Virtual City will migrate its business model to monthly payments, but still not to a transaction-based formula.

- **Fast Moving Consumer Goods (FMCG) Distributors** – Virtual City has won a USD 1 million Nokia Growth Economy Venture Challenge award for upscaling and adapting its *Distibutr* solution beyond the current soft drinks application into an application for distributors and retailers of FMCG in emerging markets. A feature of this is to contribute to the development of a strong mobile applications software developer community locally, which further establishes Kenya as a leading source of mobile applications. The application will be tailored to simple low-cost 2G handsets, using a USSD based menu system to automate stock counting, distribution orders and sales for FMCG product lines. The system will also offer all players in the value chain a balance sheet for the retailers' business. It is expected that the application could demonstrate a 30% improvement in Kiosk owners' net incomes from the improved

technology. This should make them more credit worthy as applicants for commercial expansion loans.

- **Street kiosks** – allied to the *Distributr* FMCG development, Virtual City is also participating in a pilot study which will utilize its solution to target 600 kiosk owners in Nairobi. The application will enable visibility and traceability of their stocks and sales transactions. The ultimate objective of the project is to demonstrate to these owners the benefits of the application, with a view to demonstrating the possibility of scaling it up to reach many of the 180,000 kiosk operators in the country.

4.5.8   Collaborations & Clients

In addition to the financial involvement of AECF and Nokia, other partners in the pilot **Distributr** FMCG kiosk project are MIT, Georgetown University and Equity Bank, with various interests in the project.

In its AgriManagr application for the Cotton industry, the project owner was RVP which controls 60 field agents. In this case, USAID provided financial support for the project.

Its initial deployment of the Distributr solution was paid for and financed completely by the commercial owner, Coca Cola. The success of this project was used to backstop Virtual City's successful application to Nokia for its FMCG project.

Two organizations playing various roles in rural development were the sponsors for two of Virtual City's other solutions, namely:

- The **Tracr** solution was developed for one of the world's leading specialized organisations in pest and disease monitoring and control advisory services. The organization required Virtual City to develop a solution to strengthen the time and cost efficiency of the pest and disease monitoring and advisory services provided by the consultancy company (a Kenyan based service provider) to horticultural growers in Kenya.

- The **Haulr** solution was developed for an international logistics company dealing with the shipment of flowers (among other things) from many Kenyan farms to the airport and facilitating logistics at the airport to ensure the shipments are loaded and forwarded to the various markets.

4.6   Ushahidi

4.6.1   Description

Ushahidi is an online mapping tool that can be used to do the following:

- Collect and plot reports coming in from officials or citizens via e-mail, SMS or even Twitter;

- Aggregate the data at a central point; and

- Provide a visualization of the data on a map, that is then made available online to mobile or Internet subscribers.

Its first use, in Kenya where it was created, was to track, display and visualize post-election violence, as well as to help manage peaceful democratization activities such as the recent Kenyan constitutional referendum and bi-elections. In Chile and Haiti it was used to coordinate post-earthquake relief efforts.

A volunteer team behind the original Ushahidi deployment rapidly developed a tool for Kenyans to report and map incidents of post-election violence that they saw via SMS, email or the web. Within a week Ushahidi had gone from idea to live deployment. The Ushahidi software, with a range of associated tools for handling the data is now available as an open source platform and is used in over a thousand live applications around the world.

In August 2010, Ushahidi launched a simplified service. Ushahidi's Crowdmap allows users to begin crowdsourcing reports without downloading the platform and setting up or tailoring their own hub, thus eliminating the need to for technological knowledge to install the service on a server or funds to pay for domain rights.

4.6.2   Application Objectives and rationale

Ushahidi now serves as a prototype and a lesson for what can be done by combining crisis or other rapidly emerging spread-out information from citizen-generated reports, media and NGOs with geographical mapping tools. The team behind Ushahidi became an organization that created a free and open source mapping and content management system which can be used by organizations worldwide in similar crisis-related situations. The main goal of the organization is to create a system that facilitates early warning systems and helps in data visualization for response and recovery.

The Ushahidi platform has been used to coordinate post-earthquake response in Haiti and Chile, and to monitor elections in India, Mexico, Lebanon and Afghanistan. It has been deployed in the DR Congo to track unrest; Zambia and elsewhere to monitor medicine stockouts; and the Philippines to track the mobile phone companies' sites. A key component of Ushahidi is the ability to use mobile phones as a primary means of both sending crisis incidents and receiving live updates. The Internet can be difficult to access or completely unavailable in some parts of the world, so the platform was created with the mobile phone as a foundational element.

4.6.3   Features

The Ushahidi platform can be downloaded to any organization providing a crisis response ort with an application for the platform. The whole application comprises the following:

- The Mapping tool created, updated and made active by the licensee at an operations control centre;

- Information being sent in by SMS, e-mail or Twitter to report incidents, events and reports, arriving at the mapping tool hub;

- SMS reports coming into the hub can be automatically pin-pointed through USSD which is able to locate the approximate source of the report (through base station triangulation), or via geo-information data inherent in mobiles and SMS's (a function generally available only to the operators). However, participants reporting incidents (whether by SMS, email or Twitter) are typically asked to adhere to certain reporting structural disciplines as part of the process, to help the hub to verify location and veracity of the report;

- The reports can be sifted and their veracity checked through an Ushihidi developed software called SwiftRiver that is also a free and open source platform that enables the filtering and verification of real-time data from all channels such as Twitter, SMS, Email and RSS feeds[22]. This free tool is especially useful for organizations who need to sort their data by authority and accuracy, as opposed to popularity. These organizations include the media, emergency response groups, election monitors and more. This might include journalists and other media institutions, emergency response groups, election monitors and more.

- Location and dateline stamped labels containing the incident reports are then associated with geo-points on a map and can be pulled-up/displayed from their point indicators on the map, to enable viewing the nature of the incidents.

- The crisis map, with its associated information layer is then made accessible online over the mobile network / Internet via 3G handsets (or by computers) and is continually updated to show the latest situation. The individual incidents or reports can be displayed as simple labels displayed through point touch or click on the map, or may also be displayed as sequential events, and/or sorted by any suitable category.

The Ushahidi.com website enables a wide community of interest to share their experience, uses of the platform and general information.

The Crowdmap version of Ushahidi enables the above general functions to be implemented rapidly without having to download and set up or tailor a server based deployment. The platform is hosted centrally by Ushahidi's Florida office and is available as a cloud application under a license agreement which offers less freedom or ability to adapt, change or further develop the application autonomously.

4.6.4   User Benefits

The main use of the platform has been in the areas of official and citizen response to political instability, natural disasters and social and health issues. Ushahidi helps in data visualization for

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[22] The SwiftRiver platform was born out of the need to understand and act upon a wave of massive amounts of crisis data that tends to overwhelm in the first 24 hours of a disaster.

response and recovery. As such, the platform's impact in terms of helping to alleviate human suffering and aiding democratization has already been immense (though unmeasurable) and promises expansion on these themes.

According to a study by Harvard University scholars, Ushahidi has been the most comprehensive tool in gathering crisis-related information in Kenya. The platform, the report adds, performed better than mainstream media by reporting more cases of violence and covering a wider geographic area.

There are also potentially very significant benefits that could be realized in rural development applications to track natural resources, such as water, soil types and land fertility, agro-marketing, surveying, etc. These have not even begun to date. Ushahidi currently has an application for funding under consideration by Rockefeller Foundation for a first marketing style use of the system, targeted for the social good of farmers.

4.6.5   Business Model Analysis

The application was initially built in early 2008 by an ad hoc team of volunteers. By August 2008 seed funding from Humanity United in the amount of $200,000 allowed the team to get started rebuilding the platform. In 2009, the Omidyar Network provided USD 1.4 million in funding to Ushahidi. The organization has had a number of other sponsors, including Cisco Foundation, Hivos Foundation, John S. and James L. Knight Foundation, Macarthur Foundation and the Open Society Institute.

Ushahidi has a total of 11 full-time staff split between a non-profit organization in Florida and limited company in Kenya located at the –iHub in Nairobi.

Since the software is freely accessible, Ushahidi's team of 11 full-time staff are funded partially through the grants received and partially through consulting and development fees from organizations use the platform but need assistance to tailor application solutions.

There have been 5,400 downloads of the open-source stand-alone platforms, approximately 1,200 of which are currently using the platform in live applications. Under the terms of the General Public License (GPL), upgrades created by users have to be fed back into the source software for general benefit. The "acceptable use" policy includes commercial applications.

The Crowdmap software, as a cloud based platform, is under more direct control by Ushahidi. Although this will allow Ushahidi to develop a revenue strategy from the software, it also is currently free. To date, there are more than 1,820 Crowdmap sites, with 52,000 associated point location reports. Android and Java-based Mobile downloads are also available.

4.6.6   Issues, Risks and Hurdles

The issues for Ushahidi relate to how the organization will sustain itself if the relatively generous flow of donor and benefactor finance dries up. To the present, this appears not to have been a serious issue on account of the widely recognized benefits which the platform has generated. In particular, donors and interested sponsors have seen applications which they have an interest in.

As noted above, Ushahidi generates income through solutions consultancy, and could institute a price schedule for its users of its Crowdmap platform. This should likely be instituted as a basic fee, plus schedule of prices for specific application features development.

Table 12: SWORB Analysis

Strengths	Weakness
• Free, open source, relatively simple implementation, unique, and beneficial • Powerfully visual tool for response, reporting and strategic applications of many kinds	• Sustainability – appears to be dependent on grants from donor and interested agencies, though the impact of the application has also been its greatest strength to attract funding
Opportunity	**Risks and Barriers**
• The opportunities for Ushahidi to move into broader applications of a commercial and rural development nature are wide. • Simplifying the implementation for centralized hosting also creates an opportunity for direct involvement and revenue generation to sustain the operation and help to develop its potential further.	• Filtering and Quality-control of user-generated data on individual deployments

4.6.7   Scalability and Replicability

Since Ushahidi is a free and open source mapping and content management platform, it can be used by organizations worldwide in similar crisis-related or rapidly emerging strategic or tactical situations when a new use arises. There are no significant hurdles to expanding the use of Ushahidi. A very limited sample of the uses of Ushahidi beyond the initial 2008 crisis in Kenya is the following:

* **Haiti Crisis Map** – tracked the post-earthquake crisis response and recovery efforts in Haiti.

* **Chile Crisis Map** – tracked the post-earthquake crisis response and recovery efforts in Chile.

* **Open Foreste Italiane** – a project for information and knowledge sharing among the public and several institutional and volunteer organizations involved in risk prevention and activities surrounding forest fires.

* **Washington DC** – regional clean-up from an excessive snowfall in 2010.

* **Wildlife Trackers** – a citizen science project to track wildlife in Kenya.

* **Connection GeoMap** (Global application) – managed by Survivors Connect creating a space to share critical information about trafficking and anti-trafficking activity globally, promote transparency, engage communities and learn best practices, current challenges and needs in the organization's global effort.

* **Stop Stockouts** – an initiative to track near real-time stockouts of medical supplies at pharmacies (in a medical store or health facility) in Kenya, Uganda, Malawi and Zambia.

* **The Computer Professionals' Union in the Philippines** – created the initiative called TXTpower, an effort to keep an eye on the mobile phone companies by ordinary citizens.

* **The Cuidemos el Voto** – created a platform to help monitor the Mexican federal elections of July 2009.

- **H1N1 Swine Flu** – tracking of reports coming in from official and unofficial sources at Swineflu.Ushahidi.com.

- **Vote Report India** – citizen-driven election monitoring platform for the 2009 Indian general elections.

- **Al Jazeera** – uses Ushahidi in their "War on Gaza" website covering the activity happening in Gaza in Jan/09.

- **South Africa** – Used to map xenophobic attacks perpetrated against non-South Africans.

Ushahidi promised to provide a list of potential rural and/or commercial applications it is working on and will need financing for, with a view to developing a proposed financing model. This has not taken place to date.

5 Cases not studied in detail

5.1   Green Dreams - Mkulima Farmer Information Service

5.1.1   Description

Mkulima FIS is a farmer information resource and helpline available over mobile phones and the web. It is a mobile IVR (Interactive Voice Response), service that uses USSD (Unstructured Supplementary Services Data) to lead a farmer through a set of options as they seek information for a particular issue they need information on. The USSD options would lead up to a final call providing the farmer with a voice recording addressing the issue he/she will have specified by selecting the options according to the USSD tags. The software being used is USSD, IVR, SMS and Web applications, enabling farmers access information over a variety of devices from low end mobile phones to smart phones and computers that can carry content in video format.

5.1.2   Application Objective and Rationale

Currently information farmers need to make informed decisions leading to productive and profitable agriculture are available in technocratic institutions all around the world and online. The gap exists between the information the farmers need and the location of the information as well as the amount of information the farmer would have to go through to find the specific information they need. Simple information such as the type of Maize that would grow in the highlands of Kenya and that which would grow in the lowlands of Kenya is unavailable widely to farmers with many planting the wrong crop on their land leading to poor yields despite a considerable fertilize and labour investment.

5.1.3   Features

The Mkulima FIS system will consist of a database which will be contributed to by various agencies as shown below, through a web portal. Verified data will be added to the database created by Green Dreams. Farmers will be able to access the database through their mobile phones through a USSD/IVR interface, or via the web, for example from a Digital Village site.

Figure 7: Mkulima Farmer Information FlowChart

The users will also be able to interact with a Feedback mechanism that will enable the Information system to encompass user generated data thus capturing indigenous localized knowledge from farmers as well as information from the experts in the field of agriculture.

Main features of the delivery mechanism that are tailored to farmer needs are the following:

- **Voice** – The average age group of farmers in Africa is above 50 years and many have difficulty reading, especially from small mobile phone screens. Voice also allows for easier language customization where written language may be less developed in certain vernacular.

- **Availability** – The service will be available 24x7, day and night, allowing farmers the comfort of knowing they can access information when they choose to.

- **Language** – The service will be customized in a variety of local languages, allowing ease of use and wide outreach considering Kenya is a country with many different languages.

5.1.4   User Benefits

Mkulima FIS will enable farmers to do the following:

- Make informed decisions on their agricultural activities;
- Educate themselves on sustainable agricultural practices;
- Share their knowledge;
- Increase efficiencies in production by being able to access inputs and information cost effectively;
- Access markets;
- Advertise their crops or livestock;

- Improve their crop and livestock yields;
- Improve their soils thus the environment;
- Improve their family health; and
- Access expert advice when needed.

5.1.5   Business Model

The system has been developed for very little cost to date. As a purely educational and information dissemination application, the main costs will be in the creation and maintenance of the database and associated web portal. It is estimated that operating costs will be USD 20,000 per month for maintenance and promotion of the service. Green Dreams had applied to the Rockefeller Foundation for a grant of USD 300,000 to cover the initial development and first year of operating expenses, but was turned down.

Farmers will pay for calls to Safaricom to access the service and Green Dreams expects to receive approximately 1 Ksh per call minute. Break-even volume would need to be 1.2 million call minutes per month. Based on the experience of other applications, this will not be easy to achieve and the owner is staking a lot in the interest and motivation of Safaricom to advertise and promote the product since the comp-any will host the prime database and stands to gain the largest share of the revenue through the data traffic generated. Since Safaricom's voice traffic and voice traffic revenue have taken a large hit recently in the wake of the take-over of its nearest rival Zain by Airtel of India, and resulting drastic cuts in voice call tariffs, Safaricom should be well motivated to promote this service, or any other it deems to stand a good chance of succeeding, as a means to grown its alternative revenue streams.

5.1.6   Issues, Risks and Barriers

Table 13: SWORB Analysis

Strengths	Opportunity
• Advanced concept tailored to farmer needs and with best experts providing the information • Voice based service appropriate to the needs and educational level of most Kenyan farmers	• No existing information service appears to have yet secured a large part of the market, therefore the service could have a critical role • Could link up with existing services such as KACE to provide an important complementary service, which would help to market it. • Partnership with Safaricom could assist with advertisement and promotion
Weaknesses	**Risks & Barriers**
• No funding at present • Needs widespread adoption in order to be viable	• Other services have not made widespread inroads to the majority of farmers without major promotion and partnerships. This is a costly and time-consuming exercise

5.1.7   Collaborations

Strong collaborations with key agriculture stakeholders are at the centre of the Mkulima FIS system. The service will provide reciprocal access to both farmers and a wide variety of stakeholders in the agricultural sector. Working in partnership with Biovision Foundation Mkulima

FIS plans to aggregate information from a multitude of agricultural stakeholders and research institutions including ILRI, KARI, ICIPE, CGIAR and KenFap.

The responsibilities of these organizations will be to provide verified agricultural information or services to the farmers over the platform and to take part in the feedback system from the farmers.

Green Dreams had applied to the Rockefeller Foundation for a grant of USD 300,000 to cover the initial development and first year of operating expenses, but was turned down.

5.2 Green Dreams - iCow

5.2.1 Description

iCow is a voice based m-app developed for the dairy industry. iCow uses voice prompts to help farmers monitor their dairy cow fertility cycle from the time the cow is inseminated until she delivers. The app teaches farmers how to make appropriate feeds, reminds farmers to 'dry' off the cow two months before calving and prompts the farmer to take certain actions during the cycle. iCow helps the farmers get the best productivity out of his cow, whilst ensuring the cow and calf are healthy and treated well too.

[Project under pre-pilot development with a funding source application]

intelecon
research & consultancy ltd

submitted to

The World Bank

The Philippines

Case Study Report

Mobile Applications for Rural Development

March 2011

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1 Introduction

1.1   General

The World Bank commissioned Intelecon to conduct a study on Mobile Applications for Rural Development in the Philippines. Dr. Erwin A. Alampay, an associate of Intelecon, conducted the research into the Philippine cases.

This report summarizes findings from the Filipino case study research conducted during October 2010. Meetings were held with key stakeholders involved in each of the applications listed in Table 1.

Table 1: Interviews Held

Company/Organization	Application	Comment
B2BPricenow.com	Sending money via SMS m-commerce	TELCO agnostic m-commerce – (bank based)
Molave Development Foundation, Inc.	Project MIND (Mobile Initiatives for Non-formal Distance Education)	Distance Education support
Civil Service Commission	Farmers' Helpline	E-government
Philrice	Farmer Texting Center/OPAPA	Agric support using SMS and Internet
Ayala Foundation	Bridge IT/Text 2 Teach	Education

1.2   National Context

The Philippines is at the cutting edge of SMS use and was a pioneer in the development and use of mobile money (m-money). Filipinos have a large internal and external migrant workforce. This has led to greater use of ICTs to communicate between families that have been separated, and the need to coordinate financial transactions. The large pool of transactions has meant that the cost of service is much lower than in similar countries.

1.2.1   Mobile Penetration

Mobile penetration expanded quickly in the Philippines. According to the ITU, penetration is greater than 100%. In addition to mobile penetration, the Philippines has long been the text capital of the world. As mobile operators have competed for a higher share of the average revenue per user (ARPU), text prices have continued to fall – to the extent that free text packages are becoming commonplace.

Table 2: Mobile Penetration

Philippines	2009
Mobile operators	3

Mobile penetration	100.3
Number of mobile subscribers (million)	92.2

Source: ITU World Telecommunication/ICT Indicators - 2009 data

In comparison to mobile, broadband penetration has been slow. Competition is likely to spur growth in mobile broadband, though penetration greater than 20% is some years off.

Figure 1: Mobile Broadband Subscriptions

Mobile cellular subscriptions with access to data communication at broadband speed per 100 inhabitants
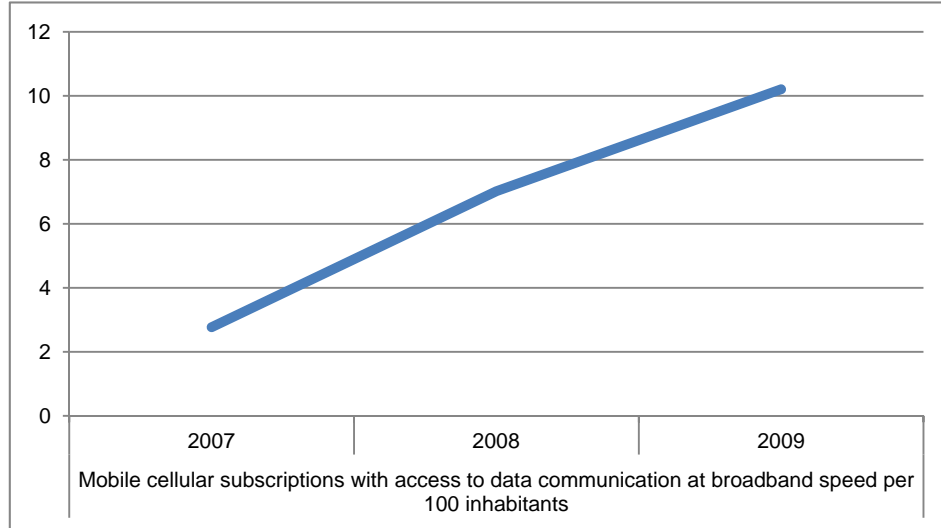
Handsets

Like all developing countries, smartphones have not penetrated the Filipino market to any real degree. The predominant phones are standard Nokia phones:

Table 3: Top Handsets

Rank	Top handsets for Jan 2011
1	Nokia 5130 XpressMusic
2	Nokia N70
3	Nokia C3
4	Nokia 2700c
5	Nokia 2330c
6	Nokia 2730c
7	Nokia 6630
8	Nokia 2690
9	Nokia N73
10	Nokia 6680

Nokia Life Tools (NLT) can be loaded onto phones such as the Nokia 2330c, but NLT is not yet available in the Philippines.

1.2.2   Ease of Doing Business

Opening up a business in the Philippines is not easy. In comparison to several similar countries, the Philippines scores worst of all in this category, ranking 148th in the world. Kenya and Sri Lanka score considerably better at 98th and 102nd, respectively.

Figure 2: Ease of doing business ranking (lowest to highest)
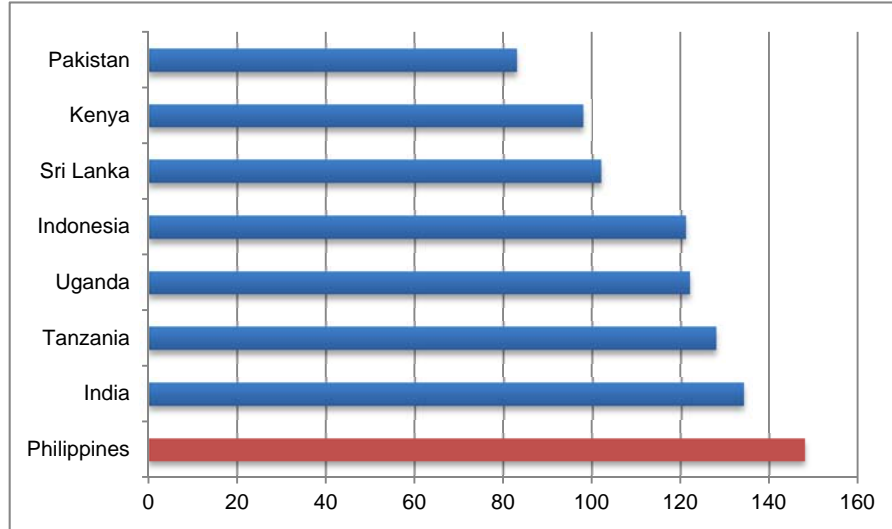
World Bank & IFC, 2011[1].

1.2.3   Role of Mobile Money

The Philippines was one of the first developers of mobile money, with SMART-Money, and then later, G-Cash. As of 2010, mobile money penetration stands at 10%.

Table 4: M-Money Penetration

M-money in Philippines	2010
Smart Money	8,500,000
Globe Gcash	1,000,000

The Philippine Central Bank has been comparatively quick in recognizing the importance of m-money and has been proactive in defining e-money (electronic money) and mobile money. This has helped to make the regulatory regime uniform and remove some of the obstacles to innovation and implementation of ICT for Development services. These different platforms encourage competition and supports innovation in related fields.

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[1] Available at http://www.doingbusiness.org/rankings

1.2.4   Fertile Ground for Mobile Applications

The Philippines has been at the forefront of many innovations in mobile applications, especially in the area of SMS and m-commerce. SMS-use amongst Filipino's was a key driver for the growth of the mobile industry in the mid-1990s. The Philippines was amongst the first countries to make use of SMS for services like complaints and feedback, and to some extent exchanging load credits for payment, a precursor to mobile money.

The Philippines is rated the top Business Process Outsourcing location in the world:

Figure 3: Top ranking destination countries by estimated jobs in BPO (2009)
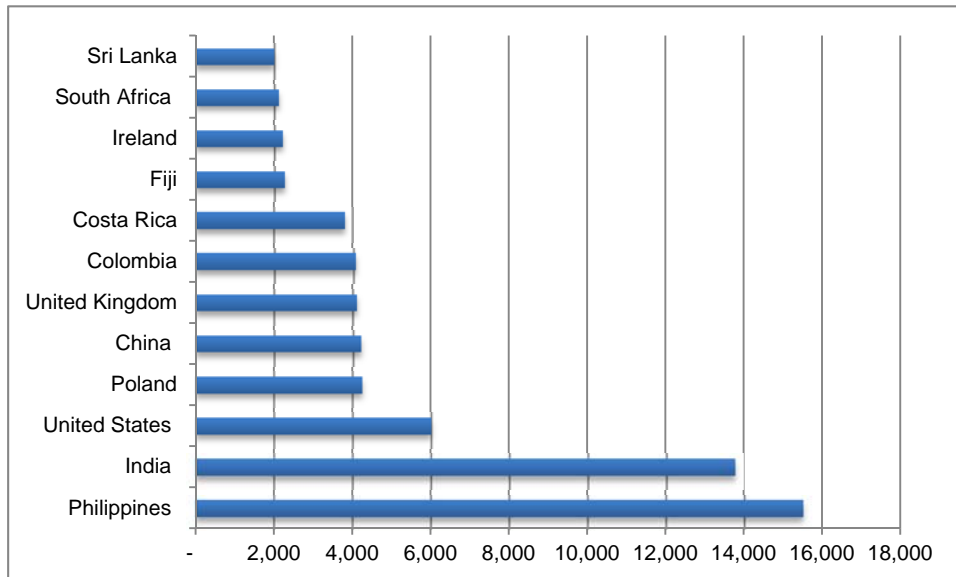
IBM, 2010[2].

A large and well-educated pool of ICT software specialists also drives innovation. For example, there are over 80 animation studios in the Philippines, generating revenues of over USD 150 million. The combination of high m-money penetration, software skills availability and a cultural affinity to texting means that the Philippines is fertile ground for innovative m-apps (mobile applications).

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[2] Available at http://public.dhe.ibm.com/common/ssi/ecm/en/gbl03012usen/GBL03012USEN.PDF

2 Rationale for Case Selection

Five case studies were identified through secondary research. These were B2BPricenow.com, Project MIND, Bridge IT/Text2Teach, Nutrient Manager, and Ushahidi. The cases covered different development areas, such as Education, Commerce, Agriculture and Governance.

Upon consultation with in-country experts, two cases – Nutrient Manager and Ushahidi – were replaced with projects that have been in place for longer time spans and have exhibited sustainable operations. The two cases are the Farmer's Texting Center (FTC) and the Text CSC program.

Table 5 provides summary notes on the applications; the five that were selected for this report are shaded in blue:

Table 5: Application Summaries

Application	Rationale
B2BPriceNow.com	B2Bpricenow.com provides an integrated e-commerce and m-commerce platform, ranging from agricultural prices to transaction fulfillment. It is a low cost solution to the problem of bringing buyers and sellers in one virtual location.
Project MIND	Project MIND, or Mobile Initiatives for Non-formal Distance Education was a pilot undertaking to test the feasibility and acceptability of using SMS to administer exams. It is an innovative mechanism to deliver exams quickly and efficiently.
Farmers' Texting Service (FTC)	The FTC provides technical assistance and promotes rice and rice-based technologies to farmers, extension workers and relevant stakeholders. It provides updates on rice and rice based production to farmers.
Text CSC	Text CSC is a support mechanism of the Mamamayan Muna flagship program of the Civil Service Commission (CSC). The purpose is to provide information on Government services to Filipino citizens.
Text2Teach	Text2Teach is an educational program that enables teachers and students to access over 900 multimedia educational materials like video, pictures, text or audio files via SMS. It is an innovative way to deliver high quality educational materials.
Nutrient Manager	The International Rice Research Institute developed a computer, Internet-based and mobile phone-based decision support software capable within 15 minutes of providing farmers with nutrient management guidelines for specific fields with minimized risk and high likelihood of increased profit. It is in pilot phase at the moment.
Ushahidi	Ushahidi is a crowd-sourcing platform developed in Kenya. Since the application is being studied in more detail in Kenya, it was decided to exclude it from the list of Filipino case studies.

3 Overview of m-Apps in Rural Development

In the past, universal access policies in the Philippines have had a technological bias toward access to landline telephones as a primary objective. However, as new technologies – particularly the cell phone – have demonstrated faster diffusion, the government identified broadband Internet access as a key target.

Despite the absence of government policy directions to support it, innovative initiatives that use mobiles for delivering government services have developed. The Philippines is arguably a world leader in providing m-government services. As early as 2004, half of the 26 Departments and Commissions of the national government surveyed by the Congressional Oversight Committee on e-Commerce had SMS-based services[3]. As of June 2010, the NCC reported that 56 of the 300 National Government Agencies (NGAs) have available SMS facilities[4]. Government departments use mobile applications to offer a broad range of services including the following: information access, inquiries, queries, verification, reporting, comments/feedback, suggestions, recommendations, complaints, assistance, police assistance, downloads, tax payment, and general concerns[5].

Beyond government services, there have been other innovations as well. SMS technology has been used for faith and religious purposes such as Text Mary (a prayer petition sent to Carmelite nuns for their daily masses), and for the arts (using SMS for poetry contests)[6]. SMS has also been used as a tool for sex education. One project called SET (Sex-Ed Text) provides a fast, easy, *anonymous* way to attain answers to questions about reproduction issues and sex[7]. The Philippines has also proven to be on the leading edge of m-commerce, particularly in the development of m-money platforms like G-Cash and Smart Money. Innovations such as these allow millions of people to conduct basic banking and financial tasks (e.g., funds transfers between individuals, small purchases, payment of certain fees, etc.) via mobile networks[8].

The following cases examine five projects developed on the premise that mobile phones have become universally accessible in the Philippines. This means that farmers, doctors, even out-of-school youth have access to mobile phones, and they have the ability to make use of these phones to send short-messages or texts.

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[3] Lallana, E.C. (2004) SMS in Business and Government in the Philippines. ICT4D Monograph Series No. 1. ICT4D.ph, Department of Science and Technology

[4] Sudario, J. (2010) E Government Statistics, PowerPoint presentation at the CICT 3 August 2010.

[5] Colobong, M.R, Galenzoga, G.M., Quintans A.R. and Sabalburo S.M. (2009-unpublished) Mobile Governance in the Philippines: An Assessment of its role in enhancing Participation and Responsiveness. Research report funded by the Phil-ICT Research Inc.

[6] Lallana, E.C. (2004) SMS in Business and Government in the Philippines. ICT4D Monograph Series No. 1. ICT4D.ph, Department of Science and Technology

[7] http://www.freewebs.com/sexedtext/index.htm

[8] Mendes, S. E. Alampay, E. Soriano and C. Soriano (2007) The innovative use of mobile applications in the Philippines-Lessons for Africa. Sida. Department for Infrastructure and Economic Development

4 Case Studies

4.1   B2Bpricenow.com

4.1.1   Description

B2Bpricenow.com provides integrated e-commerce and m-commerce platforms. It has an agriculture e-marketplace that provides the following:

- Up-to-the-minute price updates;
- Market information on agriculture, consumer and industrial manufacturers; and,
- Financial transactions through the integrated solution.

In addition, the service provides a technical financial platform for buyers and sellers who want to complete transactions. B2Bpricenow.com earns a percentage of the transaction cost, and this is deducted from the seller.

4.1.2   Application Objectives and Rationale

Farmers in the Philippines, particularly those in very remote areas, have long suffered from a lack of market price information and poor access to buyers. Consequently, because they have been forced to rely on traders to serve as intermediaries and as the sole providers of market information, farmers have struggled to attain the best value for their produce.

In the past, cooperatives and government agencies attempted to address these problems by taking a sample of prevailing market prices two or three times per week and disseminated the information by paper one or two days later if requested. By such time, however, the prices were out of date. A further fault of this previous system was its inability to provide comprehensive price information throughout the Philippines' 7,100 islands. Moreover, there was no mechanism to allow farmers and cooperatives to market their products and trade directly with distant buyers and sellers.

B2Bpricenow.com was created to cater to farmers and cooperatives with limited capacity to sell and to advertise their agricultural produce. With the recent introduction of an m-commerce service, B2Bpricenow.com's services have expanded to farmers without bank accounts and with limited Internet accessibility.

4.1.3   Features

B2Bpricenow.com's e-commerce platform was designed as a venue for transactions between buyers and sellers, which in its initial conceptualization were rural cooperatives. B2Bpricenow.com's e-commerce solution uses the Internet as a billboard for agri-products and as a virtual marketplace for buyers and sellers of agricultural produce; further, it offers payment security for online transactions.

B2Bpricenow.com's current m-commerce platform complements the earlier model by expanding the service to reach individual members who do not maintain accounts with B2Bpricenow.com's partner bank (Landbank). It uses cash cards and SMS-technology to create seamless transaction flows between farmers, and between farmers and buyers/suppliers. The integrated e-commerce/m-commerce solution connects cooperatives to their members, to banks and to suppliers. For instance, through cash cards they are able to transmit dividends without the complications of physically distributing them.

4.1.4   User Benefits

The primary users of the service are cooperatives, cooperative members and buyers.

The main advantages of the e-commerce service for buyers and sellers (cooperatives in particular) are access to real-time market information and a secure environment for transactions. In the e-commerce system, a 1% fee (shared equally between Landbank and B2Bpricenow.com) is obtained from the seller, so there is no downside for buyers to use the service. Alternatively, sellers are assured that buyers have the necessary credit to pay, since both buyers and sellers have accounts in the partner bank, and the online service simplifies any necessary documentation and paperwork. Aside from the small percentage it earns through the transaction fee, Landbank is also able to support its borrowers (i.e., cooperatives) with the repayment of loan obligations.

The central limitation of the e-commerce model is that it only allows those who have accounts with Landbank to make transactions. Ordinary farmers with funds of PHP 5000 or less are not likely to have accounts; however, this is where the newer m-commerce model is effective. Through the m-commerce model, farmers are able to attain cash cards that work in a similar manner to debit cards and that allow them to make transactions such as paying membership dues, received dividends, purchasing airtime, etc. Although the m-commerce model does not yet have the functionality of the e-commerce site, it is proving to be a telco-neutral model for delivering m-money services.

4.1.5   Business Case Analysis

The founder of B2Bpricenow.com invested an estimated USD 40,000 in initial capital for its operations. He eventually won a grant from the Development Market Place in 2003, worth USD 118,000 for the project. He was also able to get investment partners onboard. Unisys covered the site design, technology engine and its maintenance – contributions valued at USD 360,000 and that were made equivalent to 5% ownership of B2Bpricenow.com. A television agricultural host and producer contributed advertising and broadcasting time for the marketing of B2Bpricenow.com, which was valued at PHP 10 Million (approximately USD 200,000). In exchange, the television host/producer received a 5% share in B2Bpricenow.com. Finally, Landbank shouldered promotions, road shows and training among cooperatives (including technical assistance), which was valued at approximately USD 132,000.

According to the founder, B2Bpricenow.com had minimal expenses from 2000-2007 because it was essentially a two-person operation and the major costs (software development, advertising, roadshows) were completed as equity exchange deals with the investing partners.

Table 6: Number of Sessions by Registered Members

Year	Session by Registered Members	% change
2000	119	
2001	1014	752%
2002	1,533	51%
2003	1,387	-10%
2004	986	-29%
2005	2,052	108%
2006	25,930	1164%

Source: B2BPrice.com

However, as Table 6 above shows, the number of online transactions between 2000 and 2005 was initially minimal. They only picked up significantly in 2006, with close to 26,000 sessions made online by registered members in that year. Currently, B2Bpricenow.com estimates that approximately PHP 131B (USD 3 billion) in transactions have been posted online in their portal. Aside from the 1% fee paid by each seller, B2Bpricenow.com also earns revenue with each SMS transaction – the transaction cost is PHP 2.50/SMS (USD 0.06), with PHP 2.00 (USD 0.05) earned by the mobile operators (Smart or Globe) and PHP 0.50 (USD 0.01) earned by B2Bpricenow.com – as well as for each debit card issued. By operating as retailers of airtime, B2Bpricenow.com also earns revenues from the electronic loading of airtime top-ups to cellphones. Because the majority of revenues are earned through the airtime top-ups (with higher than 1% margins), the m-commerce side of the business is more profitable than the e-commerce component.

4.1.6   Issues, Risks and Hurdles

Table 7: SWORB Analysis

Strengths	Opportunities
• Postings are Free, although 1% fee is charged for transactions • Provides security to the financial transaction • Minimal overhead and maintenance costs • Accessibility to merchant farmers with limited Internet connectivity • M-commerce model is 'telco-neutral' which means people subscribed to different telecommunications carriers can still do m-commerce transactions with one another. • A first-mover and is now relatively well established, and the partnerships and networks it has nurtured over time would be	• Geographic expansion, interest in the service from other countries • Offers online payment security (V-Token) • Increase market penetration of the m-commerce services.

Weaknesses	Risks & Barriers
difficult to match.	
• Does not provide security in terms of commodity inspection and delivery	Risks – • There are other m-money services currently available, including some offered by Telcos • Competitive mobile market information services • Online service is easily replicable Barriers – • No feedback mechanism among buyers and sellers • Requires a bank as a partner. • Money transfer service may require some compliance to banking regulations, esp. with regard to system security.

Although the platform is relatively simple, B2Bpricenow.com is a first-mover in the market and is now relatively well-established. As a result, the partnerships and networks it has nurtured over time would be difficult to match. However, because it provides a money-transfer service, B2Bpricenow.com has come under some regulation from the Central Bank, especially in terms of compliance with security standards.

4.1.7   Scalability and Reliability

As far as the technology needed to replicate the project is concerned, B2Bpricenow.com is willing to share its services for a fee. As a solutions provider, B2Bpricenow.com actually owns the system that Unisys helped develop. If another company wants to use it in another country/context, they have valued the service at USD 420,000.00, which includes the software system and the training. However, no sales have been made to date.

What would be difficult, however, is the scaling of such a project once it is transplanted. Crucial, for instance, is having a partner agricultural bank. Also important, is having access to cooperative networks that will have to be trained, population of the system, as well as regular use. It took B2Bpricenow.com five to seven years to gain momentum, and as such, any entity replicating this project should bear in mind the costs to sustain operations in its start-up. Fortunately, beyond the initial investment in the system, overhead and manpower to maintain this is minimal

4.1.8   Collaborations

Collaboration was crucial to the success to B2Bpricenow.com. While initial investment by its founder was small, the company did gain significant grant support from the World Bank, from Unisys in terms of systems development, from Ating Alamin (a agriculturally focused TV program) in terms of marketing, and from Landbank in terms of training and marketing support.

4.2   Project MIND

4.2.1   Description

Project MIND (Mobile Initiatives for Non-formal Distance Education) was a pilot project in Manila to test the feasibility of using SMS technologies for delivering non-formal distance learning (DL) to different socio-economic, cultural and gender groups, as well as to determine the motivation of users for DL purposes.

In the Philippines, Project MIND was used to support the Department of Education's Bureau of Alternative Learning System (BALS) for out-of-school youth and other individuals who were yet to complete their primary and secondary studies.

4.2.2   Application Objectives and Rationale

BALS is designed to reach students outside of formal education settings. Teachers – who participate in this programme in addition to their regular teaching load – travel into communities and introduce the option of DL to individuals who have left the traditional school system without completing their education. The use of SMS to administer exams is helpful in easing the burden of both the students, many of whom are employed rather than attending school, and the educators, who face the challenges of teacher-shortages, time restraints, and the costs associated with travel throughout the communities.

4.2.3   Features

Once a student registers with BALS, they receive a personalized identification number and a set of instructions to guide them through the process of accessing a determined SMS server. Once the SMS server recognizes that a student is active, the student can proceed with one or both of the two available modules: English and Math. If a student fails to interact with the SMS server within three days of registration, an SMS reminder is sent to them.

In addition to a writing assignment evaluated in the traditional manner by a teacher, the *MIND Your English* module includes a test comprised of 18 multiple-choice questions that the students answer via SMS. At the time of the pilot, it cost the students PHP 2 per text message (or PHP 36 – approximately USD 0.8 – to complete the module).[9]. Today the cost would be even less because of the unlimited daily texting packages offered by telco providers. The *MIND Your Math* module also uses SMS technology to evaluate the students – it includes both pre- and post-tests consisting of ten multiple-choice questions to be answered via text messages sent to the BALS SMS server, which in turn sends a text reporting the test results to the teacher and the student. Completion of the math module costs PHP 20 (approximately USD 0.40).[10] Again, the cost would be less today due to the unlimited texting packages now available.

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[9] Ramos, et.al. 2007
[10] Ramos, et.al. 2007

4.2.4   User Benefits

The intended beneficiaries of this service are people who, for whatever reason – economic or social – have been unable to finish primary and/or secondary schooling. According to the Department of Education, for every 100 students who enter the first grade, only 66 finish primary school. Furthermore, only 43 finish high school. As such, the alternative learning system, which this project complements, targets the over 9 million children who drop-out.

Given the size of this population, the primary benefit of the service is the convenience it provides to users, which are the teachers and the students alike. Teachers do not have to travel to the communities as often, nor do the students have to attend the schools or community centers with any frequency (depending on the ALS model used). This saves on time and transportation costs. While there are additional costs incurred for SMS messages needed to use the service, these costs continue to decline with the advent of unlimited texting services, especially when contrasted with the Philippine's increasing transportation expenses.

4.2.5   Business Case Analysis

Initial funding for Project Mind was provided through an IDRC Pandora grant. Approximately USD 150,000, the grant covered the pilot projects in both the Philippines and Mongolia. Assuming an even split, the cost of the project in the Philippines would be approximately USD 75,000.

In the Philippines' component of the project, around USD 1,500 was spent on the development of the SMS software application. Hardware expenses in the project included: One desktop computer (approx. PHP 50,000 or USD 1150); a modem (PHP 13,000 or USD 298); and cellphones for the eight teachers (PHP 80,000 or USD 1,800 in total).

Other incidental expenses included the following:

- Prepaid airtime per teacher (assuming PHP 500 or 11 USD /teacher);
- Prepaid airtime for students (PHP 40 or USD 0.9/student x 146 students);
- Per diem for teachers (eight days); and
- Additional support/honoraria from the City of Manila.

Although the design of the project did not have a revenue component to it, the actual cost of the project may be less expensive in the future as communication costs decline.

Should the project be scaled up, the cost of much of the hardware is already less than it was during the pilot, and the software will be cheaper to develop. Further, there will be no need to distribute cellphones to teachers, since universal access to cellphones can almost be assumed.

4.2.6   Issues, Risks and Hurdles

Table 8: SWORB Analysis

Strengths	Opportunities
• Convenient • Affordable • Cell phone penetration in the Philippines is high, even among out-of school youth, especially in urban areas	• More schools and universities are experimenting on distance education using ICTs. Pilot experiences can be used to improve mobile distance learning techniques; • Cost of technology and texting is becoming cheaper, with new packages for unlimited texts per day that can bring the price of the service down. • Free and Open source programs are now available that can bring the cost of developing materials down (e.g., Frontline SMS).
Weaknesses	**Risks & Barriers**
• Requires students to have access to mobile phones • The use of mobile phones in the system is primarily for test administration and not for instruction. • Limitations in the number of characters per text message	Risks – • Assurance that those answering are the students themselves, especially for more difficult modules Barriers – • Institutional support is necessary for expansion and use among teachers

The central obstacle to scaling the project up is that it has been implemented only as a pilot, which means that the full costs of scaling are difficult to estimate. For example, in the pilot, students were also provided with SMS allowances. One cannot be sure when clients are not provided with an allowance, whether they will be willing to utilize texts on education. However, as prices for SMS decline (towards zero), this may not be a problem in the future.

Finally, a more important hurdle is institutional support. For BALS to be sustained there must be leaders in the institutions who are willing to adopt it in the medium-to-long term.

4.2.7   Scalability and Reliability

The project design, as implemented in the pilot was relatively simple. The basic equipment necessary is easily obtainable and the cost for SMSs is declining.

However, scalability has not been proven, especially since the project closed once the funding grant for it was completed.

4.2.8   Collaborations

Project Mind was implemented in two countries, the Philippines and Mongolia. In the Philippines, Molave Foundation, Inc. worked closely with BALS, more specifically its unit in Manila. Likewise, support from the City of Manila proved crucial in the pilot. Changes in the management of BALS and changes in leadership in the City of Manila were also reasons for the non-continuation of the program.

4.3   Farmer's Texting Center (FTC)

4.3.1   Description

The Farmer's Text Center (FTC) is an SMS-based service for answering agriculture related queries.

In general, the FTC provides technical assistance and promotes rice and rice-based technologies to farmers, extension workers and relevant stakeholders. Specifically, the FTC answers queries on rice and rice-based farm production through SMS. This includes technological updates on rice and rice-based production to farmers, information on demand for rice varietal characteristics and a forum for farmers and clients to meet.

4.3.2   Application Objectives and Rationale

The rationale behind the FTC is to provide rice production technology to farmers, and its objective is to improve rice productivity among farmers. The platform was designed to provide an information resource and market system for farmers to do the following:

- Make rice-related inquiries;
- Access information on rice varietal characteristics;
- Communicate with buyers; and
- Receive rice-based technological updates.

PhilRice, partner-agencies, state universities and colleges own the FTC. PhilRice, through the K-Agrinet Program, initially funded it, and further funding support for the seed stock inventory service was generated from a PAN-Asia grant. With the conclusion of the K-Agrinet program, FTC now receives its financial support mainly from PhilRice.

The FTC is as a combination of a transactional and an informational model. As a transactional model, every SMS sent to the FTC costs farmers PHP 1.00 or USD 0.02 unless they are enrolled in Smart's unlimited text scheme. Informational services (typhoon warnings, rice technology tips) are provided for free for the farmers who have registered their names and cell phone numbers.

Currently, Philrice is not earning a profit from the FTC. To rectify this, there were negotiations with a mobile operator (Smart) for a cut of SMS revenue, and this resulted in the launch of the FTC's helpdesk service (700RICE Text Center) in December 2005. According to SMART, when the FTC surpasses a minimum number of SMSs, it will begin to earn a percentage of each additional SMS. Unfortunately, the 700RICE initiative was not successful and has not yet broken the minimum number of SMSs necessary. Thus, the revenue requirements have to be balanced with the primary service objectives of the program. The consequence, at this stage, is that there is no planned payback period in the design of the project.

4.3.3   Features

The FTC was initially used by agricultural extension workers but is now also targeted towards farmers. Farmers can text their queries or requests for information pertaining to rice production problems to the FTC in Munoz, Nueva Ecija. Frequently asked questions (FAQs), for which there are ready answers, are replied to instantly with answers condensed to fit one SMS message of 160 characters. Highly technical or more complicated questions are forwarded to scientists or experts of the agency.

Since the questions are limited to the maximum capacity of one text message, the replies are limited to the same number. As such, queries and responses are usually in texting format (meaning spelled as it sounds, omitting the vowels if possible and often not following spelling conventions).

What such a system requires, however, are very knowledgeable and well-trained texting center operators who would serve as the first line of knowledge experts who can do one of the following:

- Answer common questions;
- Route specialized questions to designated experts; and
- Route special questions to other experts within the consortia.

**Figure 4: Texting Centre Flow Chart**
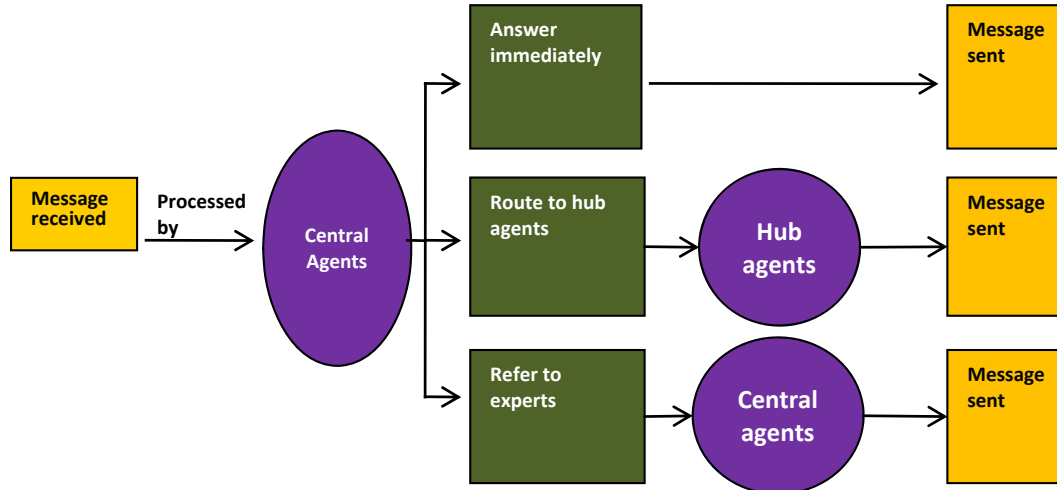
4.3.4   User Benefits

The volume of demand for the application determines the usefulness and value of the platform. In an ex-ante evaluation by Flor in 2006, a monthly volume of 163 messages per month was reported. Eighteen months later, the project was averaging four-times that amount; it received 3000 messages in 2006, more than 13,000 in 2007, and more than 25,000 in 2008. In 2009, the FTC received more than 2000 messages per month (see Figure 5), which represents

approximately 1,000 active text users. A 2010 report shows the FTC averaging 3,000 messages a month[11], which indicates the project is continuing to gain traction.

Figure 5: SMS Received from 2006 to 2009 for Rice-Related Queries
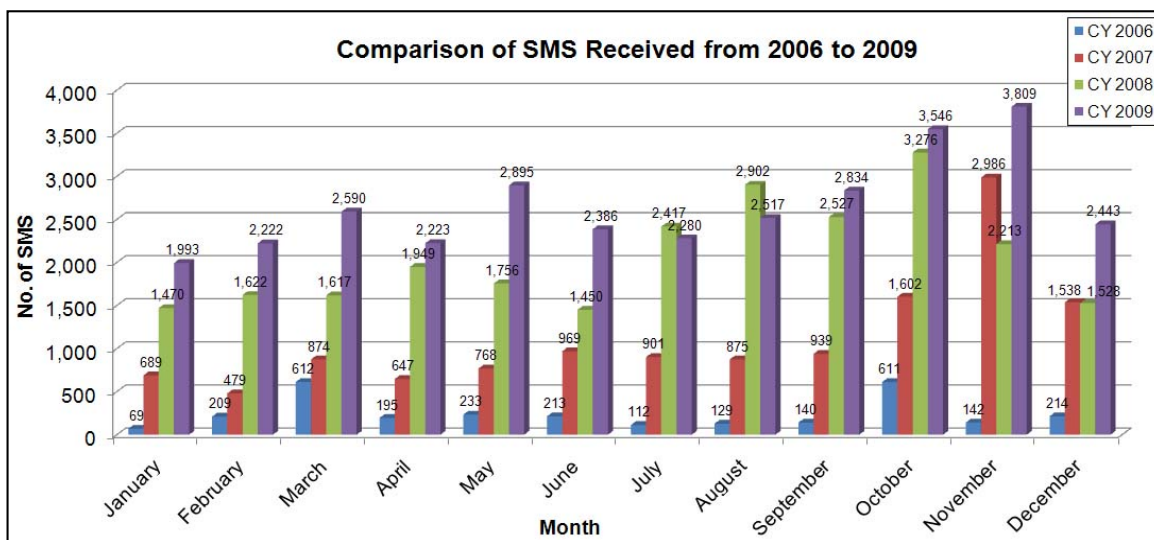
Source: Pascua, S.N. S., Zagado, R. G., Asis, O.R. M., Domingo, O. C., and Maloles, J. S. Enhancing Knowledge Networking through Short Messaging Service: The Farmers' Text Center Experience, Philippine Rice Research Institute

According to Philrice, of the messages received from January 2006 to March 2007, 48.8% were known to be queries from farmers. This suggests that the FTC is reaching the marginalized group for which it was intended, although this number still represents a very small fraction of the entire 1.2 million farmer population in the Philippines. In terms of distribution of SMSs in 2007, 1,071 messages came from Central Luzon farmers, 824 from the Ilocos, and 299 from Calabarzon (Cavite, Laguna, Batangas, Rizal and Quezon). Farmers in Northern Mindanao sent the lowest number of messages at 25[12].

Through access to expert knowledge via a cellphone, farmers and extension workers are able to save on transportation costs and time. Likewise, the government agency in charge of running the program is able to supply emergency alerts and breaking information to farmers who have enrolled as members. This is a major benefit to information and educational campaigns, using a more targeted and less costly approach.

4.3.5   Business Case Analysis

PhilRice financially sustains the FTC. The operational cost of the FTC includes the following:

- PHP 100,000 or USD 2,200 for the InfoTXT SMS platform;

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[11] Philstar 2010
[12] Roque 2007

- An annual fee of PHP 65,000 or USD 1,490 for the SIM and web hosting (there are plans to host FTC under PhilRice once the Internet connection has improved);

- PHP 116,000 or USD 2,600 monthly salary (in total) for the seven text agents; and

- PHP 0.50 or USSD 0.01/SMS fee charged by the mobile phone provider.

Additional monthly costs include the monthly average of 3,000 messages, which is estimated to be around PHP 1,500 or USD 34 per month.

4.3.6   Issues, Risks and Hurdles

Table 9: SWORB Analysis

Strengths	Opportunities
- Back-end support (ability to leverage existing networks of extension workers, farmers, technical experts/researchers and universities along with ICTs - Well-developed back-bone infrastructure (communication) - Well-trained and knowledgeable frontline agents (text agents) - Regular budget (since the FTC has no revenue) - Accessibility to users - Inexpensive/cost-effective for farmers and extension workers	- Expansion; Automation of FAQs; - Knowledge can be expanded to online/Internet and be used elsewhere. Hence, there's the possibility to gain more users through expansion of FTC to include emails and the Internet
Weaknesses	**Risks & Barriers**
- Marketing is still limited by geographic/social networks - While 3000 messages per month is relatively large compared to other SMS programs, this is still small if contextualized compared to the number of farmers in the country. - FTC operates from Monday to Friday, 8am to 5pm only (this would assume queries are not emergency in nature).	Risks – - Funding support to maintain operations has to be sustained - Huge expansion in users/demand may not be supported by current workforce - Possibility of wrong diagnosis and response because interaction is primarily based on farmer's SMS Barriers – - Language of experts vs. versus language of farmers - Technological constraints (i.e., SMS traffic, data/memory storage capacity) - Limitation on the users' side. They may not be able to describe what they see, or the problem accurately in a short SMS message. - Back-end support (requires technical experts) - Requires well-developed back-bone infrastructure (communication) and frontliners (text agents) - Continuous funding support to maintain operations - SMS limitations (i.e., number of characters allowed for SMS)

Crucial to the success of the FTC, is its ability to leverage the existing knowledge network of extension workers, farmers, researchers and universities through the use of information and communication technologies. For instance, between 2006 and 2009, the number of actual queries increased much faster than basic messages (such as greetings, registration, unrelated queries). Over the same period, the most common queries that the program received pertained to seed varieties, pest management and nutrient management (see Figure 6 below).

Figure 6: Categorization of SMS Received, Cropping Years 2006 to 2008
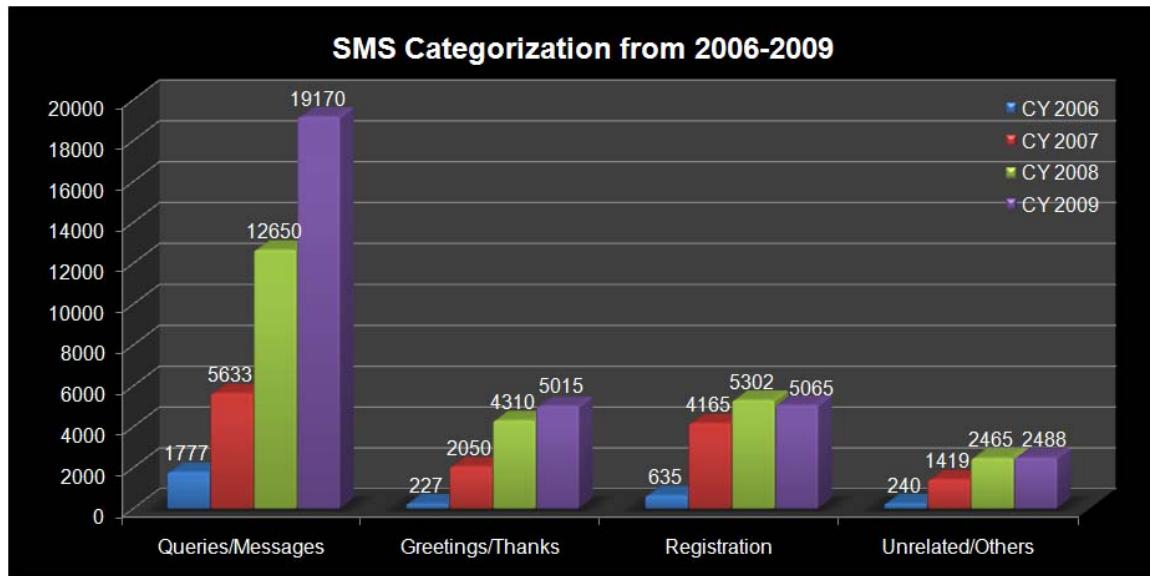
Pascua, et.al. 2010

Table 10: Top Three Most-Asked Topics by Farmers, Cropping Years 2006-2009

Classification	Rank	No. of SMS
Varieties and Seeds	1st	11,425
Integrated Pest Management	2nd	6,111
Integrated Nutrient Management	3rd	5,925

Pascua et.al. 2010

As such, critical to the FTC's success are the following elements:

• Back-end support (technical experts);

• Well-developed back-bone infrastructure (communication);

• Well-trained and knowledgeable frontline agents (text agents); and

• Continuous source of budget (since the FTC has no revenue)

4.3.7   Scalability and Reliability

Replicating the FTC is viable but the possibility for expansion or scalability must be determined by the capacity to acquire and sustain the technical, financial and hardware requirements of a more sophisticated text center. While current operations can manage 130 messages a day, the FTC has to scale exponentially if it is to support the over 1.2 million farmers nation-wide. Expansion will also be complicated by the different dialects or languages spoken in different parts of the country.

4.3.8   Collaboration

The FTC was initially granted some support from the government and a grant from IDRC. It is part of the OPAPA, which is a consortium of various research institutions and state colleges and universities.

4.4   Text CSC

Text CSC[13] has been cited in a number of studies as one of the better uses of SMS to deliver services.[14] The model is relatively simple; it simply requires a cell phone, a computer and dedicated staff. Even the computer is optional, as messages can be replied directly via the cell phone.

4.4.1   Description

The Text CSC service is a support function to the *Mamamayan Muna* flagship program of the Civil Service Commission (CSC) under the Public Assistance and Information Office (PAIO). It seeks to improve government frontline services through the use of a text number (0917-TEXTCSC) by acting on requests, recommendations, complaints and other concerns of the citizen in an upfront, courteous, and efficient manner. Once a text message is received, the Civil Service reacts to the message, and if necessary, forwards or investigates the complaint by contacting the agency concerned in writing.

4.4.2   Application Objectives and Rationale

The rationale behind Text CSC was to encourage citizens to provide feedback to government regarding its services and performance. Historically, feedback was received via drop boxes and a telephone line. Using SMSs takes advantage of the ubiquity of mobile phones, the Filipinos' propensity to send text messages, and the anonymity of sending SMS messages.

4.4.3   Features

Text CSC is run from within the Civil Service Commission on a limited budget, with an equivalent of one full-time staff member using one mobile phone, attached to a personal computer with a database. This is hosted in its Public Assistance and Information Office.

Responses to text messages are customised to the complaint or query, and as a matter of policy the CSC must respond to queries and complaints within one day – a timeline that may be possible because of pre-existing relationships with a wide variety of government agencies, and because the CSC has supervisory power over all government employees. Nonetheless, the CSC is not always able to meet the one-day deadline because of the complexities of interacting with other agencies, and its response time would improve if its workers had online access to other public agencies.[15]

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[13] CSC (2003) Improved Service Delivery through Short Messaging System (SMS): The Philippine Experience. Paper presented during the meeting of the ASEAN Conference on Civil Service Matters held Oct 29-Nov. 2 in Ho Chi Minh City, Vietnam. CSC Executive Letter Vol. 13, No.1
[14] Lallana, E.C. (2004) SMS in Business and Government in the Philippines. ICT4D Monograph Series No. 1. ICT4D.ph, Department of Science and Technology
[15] Lallana, E.C. (2004) SMS in Business and Government in the Philippines. ICT4D Monograph Series No. 1. ICT4D.ph, Department of Science and Technology

The text service uses a mobile phone attached to the computer to receive and store messages. The CSC maintains its own database, and stores and handles all messages in their computers for the program. However, this database is not directly linked to the workers' cell phones, so each message must be manually re-typed by the staff assigned. When staff are not in the office, they can also reply directly to requests through the mobile handset.

4.4.4   User Benefits

When it was launched, and in spite of minimal public announcements and promotions, Text CSC received an average of 1,000 to 1,500 messages per month[16]. This traffic was amongst the highest of the government's various SMS-based information/complaint services. An m-governance study by Colobong et.al. reported in 2009 that this monthly average was maintained; the program received a total of 12,054 messages in 2008.

Figure 7: Number of Messages Received, 2008
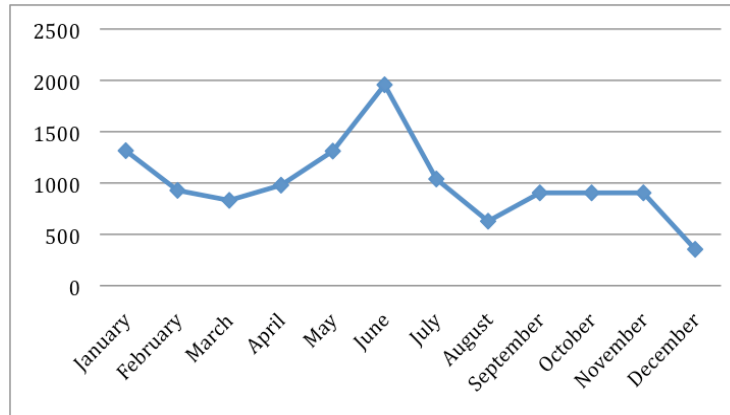
The service saves citizens time and money, and provides a convenient arena for queries about CSC testing schedules and results, and complaints about graft and corruption, government systems and procedures and unofficial use of government vehicles. The anonymity of the system encourages people to complain and report bad practices and corrupt officials. Further, Text CSC has been a mechanism for systemic reviews, and signalled improvements in service delivery and employee discipline.

Of the SMSs received in 2008, 49% were requests for assistance in transactions with other government agencies and 39% resulted from further interaction through SMS with the action officer (See Figure 8).

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[16] Ibid

Figure 8: Distribution of Messages Received, According to their Nature
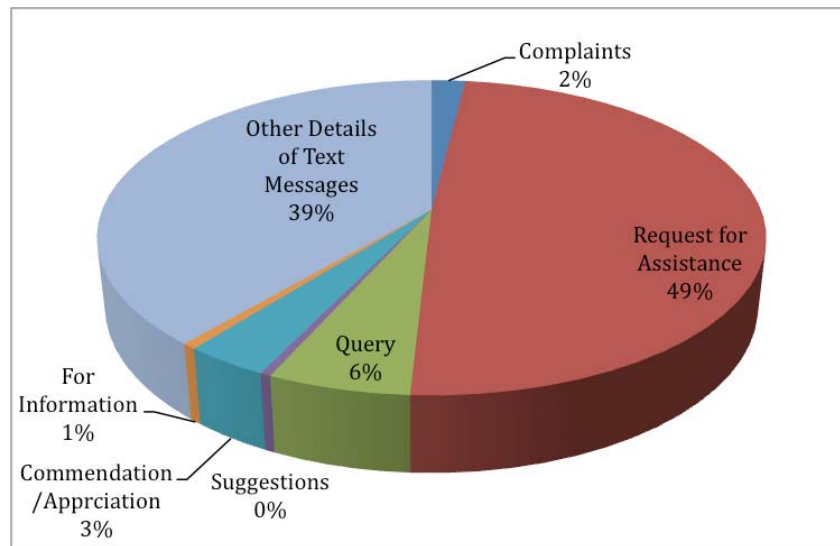
Complaints and requests that were funnelled through Mamayan Muna (of which Text CSC is part of) were acted upon within three working days; the agency reports that all 4,236 requests were addressed in 2009, and at present 5125 of the 5446 complaints lodged in 2010 have been addressed.

Within the context of other modes of feedback (walk-in, phone-in, written, email), text messages comprised 62.5% of the sources of reports (323 out of 516 in total) received from January – June 2010. The majority of these complaints pertained to office systems and procedures (272 of 516).

According to PAIO Director Agamata, the CSC has the advantage of being a highly trusted institution in government; therefore, letters from its offices are acted upon with urgency by other government departments and units.

4.4.5   Business Case Analysis

The number for Text CSC is 0917-TEXTCSC (or 0917-8398272). The service charge for sending an SMS to Text CSC is PHP 1.00 or USD 0.02 per text message, although with unlimited texting packages, this could now be lower.

The cost of setting up the system were minimal – a basic cellphone now costs around PHP 5,000 (approximately USD 100), and a desktop computer is approximately USD 1,000. Further, overhead costs remain small since it operates in the existing offices of the CSC.

As far as recurring costs, the mobile operator service provider is Globe Telecom, which waives the PHP 1,200 or USD 27 monthly post-paid subscription fee and provided the mobile phone unit.

The CSC originally spent about PHP 400 or USD 9 monthly[17] as maintenance for texting outside the Globe Telecom network, and have since upgraded this plan to approximately PHP 700 or 16 USD per month,[18] and also pay the amount used in excess of their subscription plan. Because it is part of the Mamamayan Muna Program, the money used in maintaining the system comes from regular funds appropriated to the PAIO. No new personnel were hired for Text CSC since one existing employee from PAIO was given the responsibility of responding to Text CSC SMSs.[19]

The CSC has resisted suggestions from Globe Telecom to adopt a fee-sharing arrangement because it does not believe Text CSC would generate enough traffic to make fee-sharing work. Further, the CSC wanted the lowest possible cost of the service. The CSC has also rejected a menu-driven system proposed by the service provider because they see it as too complicated; they believe that the public would want the quickest way to send their message to the CSC without having to spend time navigating through menus[20].

4.4.6   Issues, Risks and Hurdles

Table 11: SWORB Analysis

Strengths	Opportunities
• Cheap for both citizens and government provider; cell phones are accessible to almost everyone, everywhere. • Anonymity/non-use of voice encourages reporting. • High trust enjoyed by the implementing agency (CSC) among citizens and government units. It can compel other government agencies to answer its requests.	• Other agencies can set-up their own text messaging facility • System integration with other agencies that already have their own texting complaints/queries systems
Weaknesses	**Risks & Barriers**
• Not well marketed, or marketing is not sustained; no budget for marketing; Number not easy to recall • System is not fully automated. Hence reporting and analysis of data is still manually done. • Also, their system is not integrated with systems in other government agencies. Hence reporting and follow-up with other agencies is still paper based.	Risks – • New technologies such as Twitter and Facebook have sexier appeal and may get more support from other agencies as a medium. • Anonymity can lead to harassment of good bureaucrats through false/made-up/unsubstantiated complaints. Barriers – • Support from other agencies • Fear of reprisal may prevent sender from providing needed information to resolve the complaint

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[17] Colobong, M.R, Galenzoga, G.M., Quintans A.R. and Sabalburo S.M. (2009-unpublished) Mobile Governance in the Philippines: An Assessment of its role in enhancing Participation and Responsiveness. Research report funded by the Phil-ICT Research Inc.

[18] Agamata 2010

[19] Colobong, M.R, Galenzoga, G.M., Quintans A.R. and Sabalburo S.M. (2009-unpublished) Mobile Governance in the Philippines: An Assessment of its role in enhancing Participation and Responsiveness. Research report funded by the Phil-ICT Research Inc.

[20] Lallana, E.C. (2004) SMS in Business and Government in the Philippines. ICT4D Monograph Series No. 1. ICT4D.ph, Department of Science and Technology

Marketing: Text CSC's primary marketing strategy is to take advantage of radio and TV guesting to promote its initiative.

Scaling up/ Proposed Call center and System Automation: The current set-up may not be manageable if traffic increases. In the short to medium term, the CSC has received PHP 54M (approximately USD 1.25M) in government funding to pilot a call center operation in partnership with five critical agencies, namely the Department of Health, PhilHealth, the Bureau of Internal Revenue and the National Computer Center. The call centers will only be operational, however, during working days. It should be noted however, that unlike SMS, voice calls may be more expensive for citizens to make, and they may be more uncomfortable placing calls/talking compared to simply sending SMS'. (One would assume, however, that the Civil Service would still be open to keeping the SMS/Texting option given the low overhead cost in maintaining it).

4.4.7   Scalability and Reliability

The system that is used for Text CSC is relatively simple and there are actually many similar services in other Philippines Government departments (i.e., the President's Text GMA). Its basic design is easily replicable; all that is needed is a cell phone, and a computer. What is not easily replicable is the trust citizens have in the CSC, and its capacity to make other agencies/people comply with their queries.

4.4.8   Collaborations

The CSC was elevated to a constitutional body in the 1973 Constitution, and it is constitutionally mandated to promote morale, efficiency, integrity, responsiveness, progressiveness, and courtesy in the Civil Service. As such, the commission performs all functions in government that are associated with human resources. Given this, all of the government agencies must technically, and in principle, work with the CSC. As such, in the Text CSC program, all government administrators are easily compelled to answer formal inquiries made by the CSC as a result of messages it receives through the text center.

4.5   Text2Teach

Text2Teach is an educational program that aims to provide teachers and students with access to over 900 multimedia educational materials – like videos, pictures, texts or audio files – via SMS. It is a project of the Department of Education (DepEd), initiated by BridgeIT (a global program developed jointly with Nokia Philippines), the International Youth Foundation, and the United Nations Development Program (UNDP). The program is headed by the Ayala Foundation Inc., the Department of Education, Southeast Asian Ministries of Education Organization-Innotech (SEAMEO-Innotech) and Globe Telecommunications.

4.5.1   Description

Text2Teach is part of the DepEd's ICT4E (Information Communication Technology for Education) program that uses ICTs to improve education in the country.

4.5.2   Application Objectives and Rationale

The Text2teach program narrows the digital divide by creating a sustainable, scalable and replicable platform for delivering digitized education content to in-classroom TV sets through mobile technology. The introduction of the platform was intended to enhance the method of teaching basic education in public elementary schools. The program's mission is to do the following:

- Create a sustainable, scalable and replicable platform for delivering digitized education content to in-classroom TV sets through mobile technology; and

- Empower local teachers with new teaching tools and train them to deliver the content in ways that add substantial value to a child's learning experience.

Text2Teach combines technology, content and fast delivery of content to public elementary schools. One rationale of the programme is that lessons via video are an effective way to reach a large number of students in a cost-effective manner. Other rationales are that it improves learning gains amongst students and teaching methodologies in the classroom. Further, the use of mobile phones allows for the on-going dissemination of new content because the coordinators can be in touch with teachers and schools throughout the country continuously.

Text2Teach was also designed as part of the syllabus of the Basic Education Curriculum (BEC) of the DepEd. Therefore, teachers are not burdened to find ways on how to schedule and integrate the program with their day-to-day lesson plans.

4.5.3   Features

The DepEd began the project in 2003, involving more than 700,000 public elementary students from 203 schools using Text2Teach technology. It provided fifth and sixth grade science teachers with content-rich educational resources, including up to 120 science videos. Selected videos are

downloaded via satellite to a digital video recorder connected to a television set in the classroom. The videos focus on subjects such as space, ecology, geology or human anatomy as part of a Text2Teach lesson plan.

In the Philippines, the program makes use of mobile technology and Nokia Education Delivery (NED) software. The NED platform makes use of already existing technology that is easy to procure – TV, mobile phones, and SIM cards. It then taps Globe's network, allowing schools in even very remote areas –as long as they have Globe signal, whether 2G or 3G – to download education videos.

4.5.4   User Benefits

According to the Ayala Foundation, the intended beneficiary of the project is effectively the 39,000 public elementary schools in the country. Through the program, the public schools' teachers have access to a library of over 100 KnowledgeBox and 270 locally produced Science, Math and English videos, and 480 lesson plans to support these video packages.

How many teachers actually make use of the platform needs to be empirically validated. However, the program has had third party evaluations in the past, and the impact of the program has been measured in terms of the following:

- Third party evaluation of the UP National Institute for Math and Science Education (Pilot phase: 2003-2004) and UP Demographic Research and Development Foundation (ELSA: 2005-2007);

- National Achievement tests (i.e., RAT, DAT and NAT) comparative results (NED phase);

- Compiled feedbacks and anecdotes received via SMS to the Text2Teach Help Desk; and

- Project-End Questionnaire answered by schools.

In previous evaluations, it has been reported that approximately 920 teachers have been trained to use the system, including the locally produced video and Teacher's Guide materials. Through this number of teachers, more than 120,000 fifth and sixth grade Science, Math and English students in more than 200 schools have potentially benefited from the project.

Another reported benefit has been a link between a Text2Teach and a reduction in absenteeism. There is also evidence of an increase in student performance (as seen in an increase in average scores in Science), a boost in teacher-pupil, pupil-pupil interactions, and more upbeat classroom environments.

Another third party evaluator will be invited to determine the impact of the Nokia Education Delivery (NED) phase (2009-2011) of the project.

4.5.5   Business Case Analysis

Text2Teach operates on a grant provided by Nokia. This grant covers the project management, implementation, cost of the mobile phones and majority of the operation costs. One of the central roles of the Ayala Foundation is to raise counterpart funds from the public sector to ensure project sustainability and impact. The counterpart strategy between the public and private sector enables the program to move on a larger scale in addressing education needs, not just for specific areas but for the entire public elementary school system.

All project funding goes through the Ayala Foundation, which handles the operations and transaction payments for the program. The costs of distribution are divided as follows:

- Local Government Unit (LGU) - 23%
- Schools and DepEd (local branches) - 3%
- Text2Teach Alliance - 74%

Text2Teach is a non-profit program. Sustained by grants, it does not charge its users, and as such, the program has no payback period.

4.5.6   Issues, Risks and Hurdles

Table 12: SWORB Analysis

Strengths	Opportunities
- Ease of updating educational content, improved contact with local teachers - In-line with DepEd's Basic Education Curriculum - Convenience of using mobile technology to reach rural areas - Capacity to impact performance on different subject areas - Tapping existing technological resources (TV, mobile phones, SIM cards) - Relevant educational content	- Inclusion and expansion of different subjects areas - Technological developments in wireless/mobile technology can allow more efficient and direct delivery of content (as what was done in Tanzania)
Weaknesses	**Risks & Barriers**
- Cost of telecommunications requires support - Limited number of videos, and limited primarily to Science, Math and English, hence may not be flexible - Dependent on one telco provider (Globe), and as such is also dependent on the presence and quality of its services in the areas.	Risks – Technological obsolescence - There are available teaching videos in the Internet that provide more variety and a direct access to content for teachers without having to go through an organizational intermediary Financial sustainability - Keeping content updated/relevant basic education curriculum Barriers – - Capacity of teachers to embrace technology and be able to understand and localize the content - Local community support

Technological obsolescence and creation of relevant content. One strength of the project is that it takes advantage of the existing technological infrastructure in the country to deliver content. That said, the pace of technological development could also lead to the project's irrelevance. At present, the Internet already provides rich content in video format for teachers to use, without the need for an intermediary. However, the databank of videos that are tailor-fit to the elementary curriculum of the public educational system is a great advantage to teachers.

Infrastructure. At present, access to the service is dependent upon the quality of the service provided by its partner, Globe. There are many areas in the Philippines where public telecentres have been found to be infeasible, and finding reliable signals was problematic in almost a third of the precincts (which generally are public schools) in the last election. If the project is to be expanded, it must consider using other telco partners.

Financial Sustainability. The project is largely donor/grant driven and does not have a sustainable business model at present.

4.5.7   Scalability and Reliability

The platform used in the Philippines has already been replicated and is operating in Tanzania and Chile. There are plans to replicate the model in other countries.

However, the technology that worked in the Philippines was not easily adapted in Tanzania. According to Bridge IT Manager Kate Place, the Tanzanian project initially assumed that they would utilize the technology used in the Philippines, which was with a satellite-mobile-SMS system – a satellite download to a master set-top box in the classroom. However, they realized that it was not feasible in the Tanzanian context, and the project had to shift gears to ensure the long-term sustainability of the project. The result was a decision to cut out the satellite server and to concentrate on a direct mobile-to-mobile delivery service. Thus, in the long term, developments in information technology can bring down the cost of the project, making roll-out more feasible both technically and financially.

4.5.8   Collaboration

Text2teach is a collaborative undertaking by various private and public sector groups. Nokia provides the grant to implement the project in 350 public elementary schools; the Ayala Foundation is the project manager; and, the DepEd is instrumental in developing content. Table 13 shows the composition of the main players and their roles in the project:

Table 13: The Text2Teach Implementation Team

Organization	Role
Nokia	Provided private sector funds to implement text2teach to 350 public elementary schools.

	Nokia is also behind the development and continuing enhancement of the Nokia Education Delivery (NED) software, which allows teachers to download and easily choose the educational audios and videos on Math, Science and English specifically created for the project.
Ayala Foundation, Inc.	In charge of project management and implementation; partner and resource mobilization; schools validation & coordination; technical support/help desk.
Globe Telecom	The sole mobile communications service provider; Globe is in charge of the development and exploration of new technologies for content delivery.
SEAMEO INNOTECH	Content development; Teacher training
Department of Education	Defines the curriculum-based objectives of the program; coordination with / introduction and use of T2T in selected schools; initial coordination with the LGu.

5 Conclusion & Integration

The case studies within this report highlight the relationships between the mobile applications and the networks on which they exist. While some of the programs and their ICTs augmented existing networks, others used existing platforms as leverage to reach their goals.

5.1   Leveraging Social Networks

The success of some of the mobile applications examined in this report was built on the previously existing networks of organizations and relationships.. For example, the CSC's long-standing reputation in the public sector ensured that Text CSC also had the trust and respect of the public and government institutions. Similarly, Philrice has long history of collaboration among the various research groups and institutions that were essential in establishing the FTC, and these institutions continue to play a crucial role in answering queries and disseminating useful agricultural knowledge.

Some cases, like B2Bpricenow.com, were not so quickly established; it took a long time to build the network of users among cooperatives. Creating a viable long-term and sustainable project required a large initial investment in order to sustain operations for enough years as it took for the application to prove its worth.

Other case studies revealed projects that only lasted through the pilot stage, as the sustainability of the mobile application required funding to sustain it and institutional support to adopt it. In the Text2Teach case, the institutional support of the Department of Education was crucial to its expansion, just as the absence of DepEd support in the Project Mind case was a barrier to its scalability.

5.2   Leveraging Mobile Technologies

While social networks help, the projects examined in this report also leveraged the assumption that mobile phones are becoming ubiquitous and that most Filipinos are adept at using SMS and are trusting of basic mobile financial transactions, such as airtime top-ups.[21]

That said, the beauty in the design of these projects is simplicity. The best mobile applications are built on existing SMS technologies, which are used by a majority of the population, regardless of demographic. Even as new technologies have been developed, SMS still remains popular.

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[21] Alampay, E.A. and Bala, G. (2010-forthcoming) Mobile 2.0: M-Money for the BOP in the Philippines. Information Technology and International Development (ITID

Appendix – Case not studied in detail

Nutrient Manager for Rice

The International Rice Research Institute (IRRI), which is based in Los Banos, Laguna in the Philippines, in partnership with organizations across Asia and in Africa developed an Internet-based and mobile phone-based decision support software called Nutrient Manager for Rice (Nutrient Manager). This mobile application is capable of providing farmers with nutrient management guidelines for specific fields with minimized risk and high likelihood of increased profit within 15 minutes.

Based on the site-specific nutrient management (SSNM) approach, it is a relatively knowledge-intensive ICT in which optimum fertilizer management is tailored to field-specific conditions for crop yield, crop residue management, historical fertilizer use, use of organic materials, nutrient inputs in irrigation water, and (in the case of rice) the growth duration of the variety. The knowledge intensity of SSNM has slowed the wide-scale uptake by farmers of best management practices based on SSNM principles. Limited use of the program by farmers can also be attributed to confusion that surrounds contrasting recommendations for nutrient management received from different organizations and technical experts. The widespread uptake by farmers of improved nutrient management requires transforming science-based information into locally adapted guidelines, which enable extension workers, crop advisors, and farmers to rapidly develop and implement nutrient best management practices for specific fields and growing conditions.

Nutrient Manager is tailored to local rice-growing conditions, and distinctive versions of the software are developed, verified, and released in differing rice-growing countries and. This decision software utilizes results from more than a decade of research on SSNM for rice, and acts as the basis for the development of additional locally-adapted tools that provide information on fertilizing rice through videos and quick guides.

Nutrient Manager has been released and is used with CD and Web-based applications in the Philippines. To reach more farmers, especially those without computers, the Philippines has been selected as the country to develop and provide, through a partnership with the public and private sector, a mobile phone–based IVR application that sends farmers text messages with field-specific fertilizer guidelines based on information they have previously provided about their rice field. Only released in mid-2010, this tool is yet to be evaluated.

Philrice, which runs the FTC, has begun promoting the Nutrient Manager application to its clients.

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World Bank

Sri Lanka Case Study Report

Mobile applications for Rural

Development

March 2011

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1 Introduction

1.1   General

This report summarizes findings from Sri Lankan case study research conducted during October 2010. Meetings were held with key stakeholders from each of the mobile applications listed in Table 1.

Table 1: Interviews Held

Application	Sub-Sector	Segment	Brief Description of the Service
1920	Agriculture, Animal husbandry, Fisheries & Forestry	Agro-support	"1920" (also known as "Govi Sahana Sarana") is a toll-free hotline service which provides agricultural advisory services to farmers in Sinhala or Tamil.
Tradenet	Agriculture, Animal husbandry, Fisheries & Forestry	Agro marketing	Tradenet provides real-time spot-market wholesale price alerts in agricultural commodities on mobile phones. Tradenet also facilitates trading between buyers and sellers for any type of services and/or good including non-agriculture related products and/or services.
e-Dairy	Agriculture, Animal husbandry, Fisheries & Forestry	Extension services	e-Dairy is a pilot that enables dairy farmers to request veterinarian services via SMS and touch screen computers.
1919	Governance / Political	e-government and m-government services	1919 is a hotline which provides access to information on government services in Sri Lanka. It is accessible on any telephone network and is offered in all three local languages, Sinhala, Tamil and English. Some of the services are also available via an SMS channel.

1.2   National Context

Sri Lanka has a relatively small population compared to countries in close proximity, such as India and Indonesia; it has a high bank account penetration (over 59%) and a highly competitive mobile sector. Sri Lanka has one of the region's largest government social welfare programs, called Samurdhi, which provides small payments to 1.6 million households. In an innovative step, the Sri Lankan Government created the ICT Agency of Sri Lanka (ICTA), which is the single apex body that directs ICT policy.

Sri Lanka lags in terms of mobile money adoption. Though Dialog has a mobile money product called eZPay, the number of subscribers is tiny.

In countries where mobile money has been quickly adopted, such as the Philippines and Kenya, mobile money is a trigger for the development of m-apps. Sri Lanka does not have the trigger of mobile money and has instead used ICTA to push the development of mobile applications – ICTA

has been instrumental in the development of several mobile applications and presents an alternative model for m-app support.
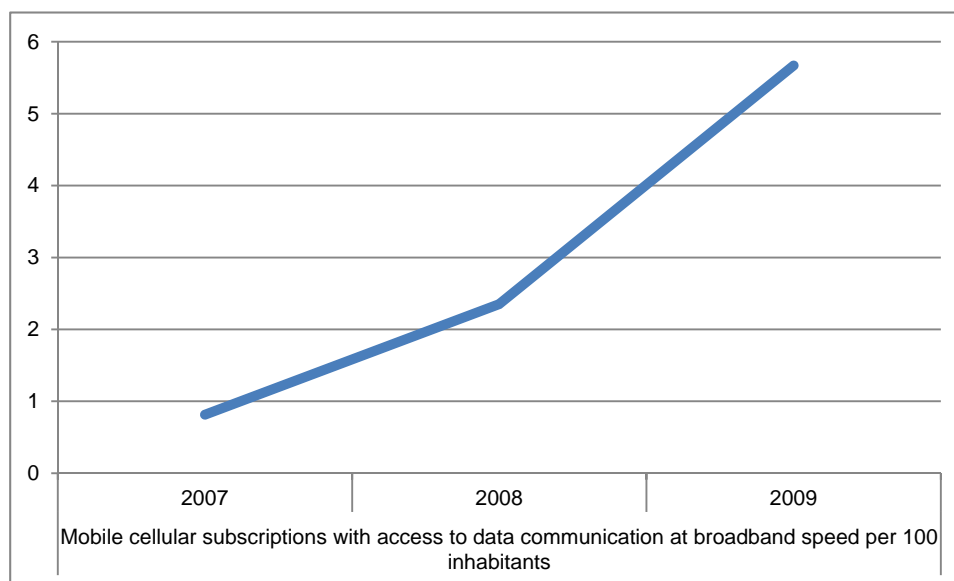
1.2.1   Mobile Penetration

The mobile phone sector in Sri Lanka is quite competitive. There are five mobile operators, though Dialog, Etisalat and Mobitel are the main ones. Airtel (owned by Bharti India) is increasing its subscriber base rapidly (though its market share currently remains quite low).

Table 2: Mobile Data

Mobile data	2010
Mobile operators	5
Mobile penetration	69.0%
Number of mobile subscribers (million)	14[1]

Mobile broadband penetration is growing quickly, though penetration is only just over 5% as of 2009.

Figure 1: Mobile Broadband Subscriptions

Mobile cellular subscriptions with access to data communication at broadband speed per 100 inhabitants

There is no data available on smartphone penetration in Sri Lanka, nor is data available on the most popular handsets.

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[1] Telecommunications Regulatory Commission of Sri Lanka, http://www.trc.gov.lk/information/statistics.html

1.2.2   Ease of Doing Business

Compared to other countries in the region, Sri Lanka scores well in terms of the ease of doing business. Since the end of the civil war in 2009, confidence in the Sri Lankan economy has been growing strongly.

Figure 2: Ease of Doing Business Ranking (Lowest to Highest)
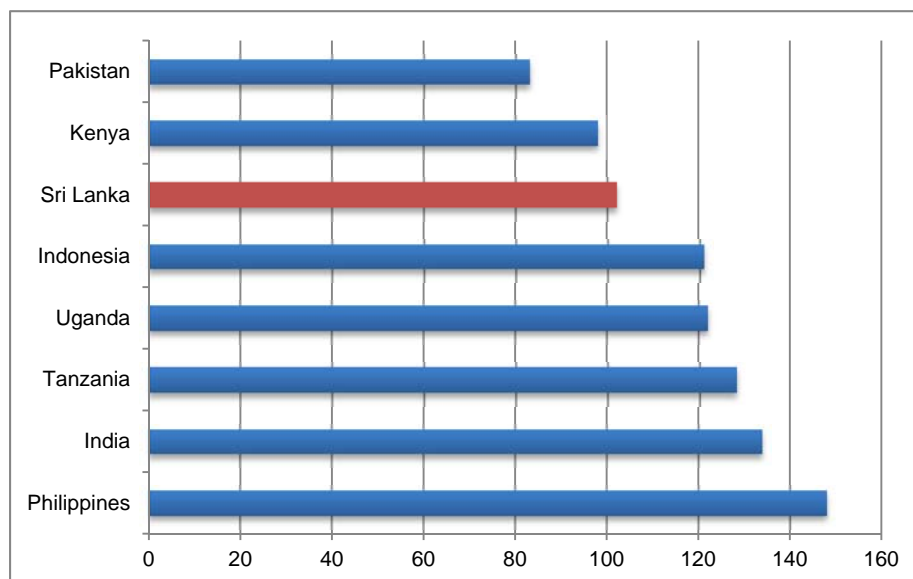
1.2.3   Role of Mobile Money

Whilst Sri Lanka has had a mobile money solution for some time (eZPay by Dialog Axiata PLC) usage is tiny and the Central Bank of Sri Lanka only released draft regulations for m-Money services in August 2010.

Thus an enabling environment for new applications is in the process of being put in place. Additional impetus to the development of m-apps is coming from the mobile operators, who have experienced declining voice revenues in the last two years.

With a population of a little over 21 million, there are several progressive ICT applications for development in Sri Lanka, ranging from telecentres to services such as booking doctor appointments using mobile phones (e-Channeling) as well as being able to get agricultural market prices via mobile phones (Tradenet).

1.2.4   Fertile Ground for Mobile Applications

As of the end of 2009, Sri Lanka has a high mobile penetration of 69 SIMs per hundred inhabitants. Furthermore, a 2008 survey by LIRNE*asia* of telecom users at the Bottom of the Pyramid (BOP), namely those from Socio-economic groups D & E, found that 52.5% of those from the BOP who owned a mobile phone in Sri Lanka were comfortable sending and receiving

SMSs. In comparison, only 32.6% of BOP mobile phone owners in India were comfortable sending and receiving SMSs[2]. In addition, the Information and Communication Technology Agency (ICTA) of Sri Lanka, which has been operational since 2003, has a mandate to increase access to ICTs for Sri Lankan citizens.

The ICTA is the single apex body involved in ICT policy and e-government in Sri Lanka. It is wholly owned by the Government of Sri Lanka and is the implementing organization of the e-Sri Lanka Initiative. Major donors include the World Bank.

The focus of the ICTA is on the interoperability between different government organizations. To enable the interoperability of government services, it has created a gateway or portal for electronic information and electronic interactions with government in Sri Lanka. This is generally referred to as the 'Lanka Gate' initiative.

Lanka Gate is a messaging platform and portal that provides a short code (1919) for all government-based information services, e.g., railway timetables. The vision is to integrate all the banks and government departments, as well as to include a mobile payment platform – linking to the national central switch.

The ICTA is involved in several other projects. For example, they are piloting a credit card payment system as part of the on line vehicle license registration process. It is supporting Samurdhi to modernise its back-office system and to integrate mobile payments to households. It has been instrumental in the creation of the e-Dairy initiative, one of the m-apps discussed in more detail in this report. Nevertheless, despite several innovative applications, the market is relatively young and m-apps are only beginning to penetrate the market.

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[2] Source: LIRNE*asia*. 2009. Teleuse@BOP 3.

2 Rationale for selection of mobile application Case Studies

Initial government priorities have been focused on building e-Government capacity in government ministries. However, this trend is changing, with ICTA partnering with some application developers and operators as recently as July 2010 to promote an app-store where anyone can develop and upload mobile applications that could be ported onto the telecom operator's networks.

The scope of this report is limited to mobile applications specifically targeting rural development. Within this scope there are only a limited number of applications in Sri Lanka. Of the 8 applications initially identified, which roughly fit the scope of this report, four were finally selected. With the exception of e-Dairy, which currently exists as a pilot project, the other three applications are national services that have been functioning for more than a few years. Table 2 provides summary notes on all of the applications. The chosen applications are shaded.

Table 2: List of applications

Application	Brief description of the service
• 1920	• "1920" (also known as "Govi Sahana Sarana") is a toll-free hotline service which provides agricultural advisory services to farmers in Sinhala or Tamil. The intention of the service was to expand knowledge about alternative crops available to farmers.
• Tradenet	• Tradenet provides real-time spot-market wholesale price alerts in agricultural commodities on mobile phones. Tradenet also facilitates trading between buyers and sellers for any type of services and/or goods including non-agriculture related products and services.
• e-Dairy	• e-Dairy is a pilot that enables dairy farmers to request veterinarian services via SMS and touch screen computers. It was developed in response to a specific problem, namely the fact that 55% of Sri Lanka's cow population wasn't pregnant. This is substantially lower than in other countries.
• 1919	• 1919 is a hotline that provides access to information on government services in Sri Lanka. It is accessible on any telephone network and is offered in all three local languages, Sinhala, Tamil and English. Some of the services are also available via an SMS channel.
• e-Channeling	• The service allows for people to book appointments with specific doctors in hospitals via mobile phones. Since health was not specifically mentioned under the typology it was initially considered for further study. Furthermore the service was also more commonly used in the cities rather than in rural areas.
• Disaster Early Warning Network	• Whilst the project was launched as a pilot to provide early warning information via mobile phones, it is currently only in limited use and was hence not considered for further study.
• FarmerNet	• This service provides subscribed farmers with daily average wholesale price updates on their phones as well as allows farmers to connect directly with buyers through an online platform. Given that the project was only in pilot stage and given that another similar but national level service (Tradenet) existed, this application was not studied further. Furthermore the application utilized price information from one of the partners involved in Tradenet and as a result was not considered further.
• Real-Time Biohazard Pilot (RTBP)	• This service allowed health officials to quickly detect potential outbreaks of diseases using information collected and transmitted through mobile phones by public health officials. The service was rejected for further consideration since the application was only in pilot form and there were no clear indications

| | at the time of this report as to how the project would be continued beyond the pilot phase, which was also concluding. Furthermore the application was for government health officials rather than for rural mobile subscribers. |

3 Mobile applications in rural development and issues arising

The majority of the successful mobile applications in Sri Lanka are in the domain of info-entertainment and as such no different from a majority of the other countries. Applications such as voting (for music reality shows), ring-tones, music and info-alerts, remain by and far the most successful. As of end 2009, Sri Lanka has a high mobile penetration of 69 SIMs per hundred inhabitants as compared to 44.72 SIMs per hundred inhabitants for India. However, unlike Sri Lanka, India has seen a higher proliferation of mobile applications that can be classified as having livelihood and development impacts. In this section, comparisons with India's much larger market are made to highlight and help to interpret issues in Sri Lanka.

Limited Empirical Evidence on Benefits

With the exception of **Tradenet**, there is limited quantitative evidence of the benefits of the Sri Lankan m-apps outlined in this report. The usage figures for each of the outlined services are impressive (within the intended scope of these projects) but it is difficult to conclusively state that these applications are consistently providing livelihood benefits. By contrast, a large majority of similar applications in India are backed by evidence-based research on the impacts of the respective services. This plays an important role in increasing service value since research is fed back into the design of the service.

Within the sector of "Agriculture, animal husbandry, fisheries and forestry" four applications were identified in Sri Lanka, though **FarmerNet** was not analyzed further since it was a pilot and a smaller version of **Tradenet**. India, by contrast, has numerous examples of mobile applications that cater to multiple segments within this sector. Furthermore, the Sri Lankan applications specialize in one or two (at most) segments of this sub-sector, unlike those in India where all three segments are covered. There is a complementary nature to these services that is currently not being fully capitalized in Sri Lanka. For example, the reduction of information asymmetry with respect to wholesale agricultural prices that is being brought about via Tradenet is increasing demand for crop advisory and extension services for crops outside of a farmer's usual crop-choice. However, Tradenet does not provide the agro-advisory services that are needed by farmers. Whilst part of this need is being met by the 1920 service, it is currently limited in scope. Operational hours and staff are not meeting the demand for such services. In India, however, applications such as Reuters Market Light (RML), IFFCO Kisan Sanchar Ltd (IKSL) and others provide a suite of services (market prices, weather and crop advisory services) under one roof. These cross-segment linkages need to be leveraged more in the Sri Lankan context, possibly through partnerships. 1920, for example, is dependent on voice calls to the hotline and a partnership with Tradenet would enable it to leverage the additional multiple interfaces that Tradenet uses, such as USSD, SMS, WAP and Internet.

Role of Partnerships

The demonstrated success of Tradenet also reveals the importance of appropriate partners and incentives. The agriculture related aspect of Tradenet is supported by **Govi Gnana Seva** (**GGS**),

a non-profit organization involved in the collection and dissemination of wholesale agricultural produce trade information. Whilst GGS, as a content provider for this service, specializes in the agro-marketing space, Dialog specializes in the service delivery and technology. A study[3] of Indian services showed the relative value brought by specialized content providers. In a survey of farmers using RML and IKSL, the study found that farmers placed higher value on the information provided by RML rather than IKSL. The former (i.e., RML) is a specialized content provider, whilst in the latter case IKSL was a partnership between a fertilizer cooperative and a mobile operator. The lower valuation for information via the IKSL service was reflective also of the incentives of operators in the region with respect to such value added services. Primarily these services are used as sweeteners to increase an operator's subscriber base[4]. However, given that revenue from voice is decreasing in the region, it is expected that operators will look more closely at value provided by these services. Nevertheless, only specialized content providers are able to ensure that farmers:

- Trust the information provided via these services; and

- Derive livelihood benefits from these services.

Leveraging the mobile operators is of interest for the implementers of **e-Dairy** in Sri Lanka who strategically see operators as a means to increase service reach as well as a way to monetize their application in order to increase the sustainability of the initiative. By contrast, **1920** has no plans to make their service viable other than through government funding.

Non-Agricultural Applications

Outside of the agricultural sector, there is currently only a single mobile application in the governance/ political sector in Sri Lanka. **1919** is intended to be a portal to the entire range of government services. The success of the application / services has been difficult to gauge. Whilst call volumes, as reported by the project implementers, seems high, there is also anecdotal evidence to suggest that the service is not as well known amongst its target audience. The fact that the number of calls that originate from the capital Colombo is nearly triple the average number of calls for the service suggests that 1919 is not widely utilized in the rest of the country.

1919 currently serves only as an informational portal to government, providing callers with information on procedures, rules and regulations pertaining specific government departments. There is currently no mechanism to query the status of specific service requests at line ministries. Whilst this service is valuable it is still far behind other countries in utilizing mobiles to effectively deliver the government services. Several examples of successful m-governance applications exist in India. For example, the Bhoomi application in the state of Karnataka allows landowners to register with the service for a nominal fee to get SMS alerts whenever there is a transaction involving land. Similarly, SMSONE in the state of Maharastra allows citizens of the state to register for SMS alerts relevant to their daily lives, from scheduled health camps, interruptions to

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[3] Mittal, S., & Gandhi, S. & Tripathi, G. (2010), Socio-Economic Impact of Mobile Phones on Indian Agriculture, ICRIER Working Paper No. 246

[4] Lokanathan, S., & De Silva, H. (2010). Leveraging Mobile 2.0 in India for Agricultural Market Access. LIRNE*asia*

the water or electricity supply, to traffic congestion and to bill payment reminders. Similarly, the Zero Mass Foundation (ZMF) project in the state of Andhra Pradesh uses special mobile phones and accessories to provide financial services (opening of accounts, deposits and withdrawal of cash) for financial inclusion of the rural poor.

Competition in Rural Mobile Applications

The rural market for specialized services is increasingly competitive. The case of Nokia Life Tools with 6.3 million subscribers in China, India and Indonesia and IKSL in India are two such examples. The biggest obstacle for specialized content providers, such as RML in India, is distribution. Operators, which have built their business on prepaid, have proven distribution and sales channels for their products that RML has to build from scratch. A partnership model seems the most viable option in such a scenario, with specialized content providers focusing on creating premium content that is valuable for customers, while operators focus on sales and distribution. Another issue is that there is as yet no clear consensus on what the revenue-share model should be in such scenarios. Some operators in Pakistan, for example, have been willing to give as much as 90% of revenues to application developers provided that they take care of sales and marketing, compared to 40% if operators are responsible for marketing, distribution and sales. The exact revenue shares vary from application to application.

Pricing

Another difficulty when considering charging for these services is designing the appropriate price points. RML, for example, has various price points depending on the state where its scratch cards are sold. The price points need to reflect the circumstances of the demographic that the service is attempting to reach. The least cost package on RML (a one month subscription with limited info alerts) of USD 1.55) is still considered expensive by the poorest farmers. Services in Sri Lanka, given its smaller geographic size (and more uniform socio-economic context), would be more suited to having a single price point based on the level of services rather than geographic price differentials. As a result, Tradenet intends to have uniform pricing for its service, though it remains to be seen what the final price points are once the service fully transforms to a paid service.

Appropriate Strategies

It is clear from the Sri Lankan examples that there are a variety of strategies at play with respect to making the initiatives sustainable. Making users pay (Tradenet and possibly e-Dairy in the future) creates incentives for service operators to ensure that their services are relevant and valuable for users. However, with respect to Sri Lanka, the verdict is still out on which model will be more successful in the long run. The Sri Lankan scenario is not much different from those in India where it is yet to be proven if a service with user charges is more viable than one that is done solely as a Corporate Social Responsibility (CSR) activity (e.g., LifeLines, a telephone based agro-advisory service in India with proven livelihood impacts is funded purely as a CSR activity by British Telecom along with Cisco Systems with the support of a NGO called OneWorld South Asia).

Challenges

Several examples exist in the region of viable m-apps that go beyond the rudimentary "library" service provided by 1919. But the effort being expended by the 1919 project implementation team to ensure that the relevant government ministries keep the central databases up to date, suggests that it will be sometime before this service evolves to provide more sophisticated government services. Significant changes would to the way that government functions would have to occur. An example of the level of change required within government is the train ticketing system on the Mobitel mobile network in Sri Lanka. Sri Lanka Railways and Mobitel are government owned entities. The only way for Mobitel to sell tickets to citizens using its mobile network is to pre-purchase a set number of tickets at the beginning of the month from Sri Lanka Railways before it then tries to resell these purchased tickets to its mobile users – an inefficient and potentially loss-making enterprise if demand is low.

The Sri Lankan m-app scenario also highlights the fact that incorporating sustainable business models at the design stage for these applications are the exception rather than the norm. Amongst Sri Lanka case applications only Tradenet is a completely private enterprise. The rest are dependent to various degrees on the government funding (1919 and 1920 are fully government funded whilst e-Dairy is partly government funded) long after service launch. However, even Tradenet's (and by extension GGS's) viability as fully functional sustainable business entities is yet to be proven (as of the submission of this report the intended transition of the service from a free to a paid service had yet to occur).

3.1   Sustainability and Replicability of Profiled Sri Lankan Mobile Applications

Of the four applications outlined in Section 4, only Tradenet has a clear business plan for expansion and longer-term sustainability. The others are all dependent on Government and/or donor funding as well as private donations. In the case of 1919, which provides access to government services, there seems to be a longer-term government commitment to the services since it is intended to cover all the government ministries and departments. In both 1920 and e-Dairy there are opportunities to move toward a paid service model or at the very least a revenue share model with telecom operators. Donor funding can play a key role in possibly helping these two services as well as GGS to develop a longer-term business plan and to explore potential partnerships.

4 Case studies

4.1   1920

Sector: Agriculture, Animal husbandry, Fisheries & Forestry
Segment: Agro- support, extension services

4.1.1   Description

Started on 23rd February 2006, 1920 (also known as "Govi Sahana Sarana") offers crop advisory and technology advice to farmers via a toll-free call to the number 1920 across all mobile and fixed operators. The service functions during office hours and is available in Sinhala or Tamil. The service was initiated by the Sri Lanka's Ministry of Agriculture as part of its Cyber Agricultural Extension Project (CAEP).

4.1.2   Application Objectives & Rationale

Agricultural extension services in the country have progressively weakened in the last few decades, leading to problems in technology transfer. The aim of the service is to address this issue, by helping farmers solve problems related to technical, inputs and marketing matters.

4.1.3   Features

Callers from anywhere in the country can access the service by dialling "1920" from any phone. The toll free service allows farmers to avail of crop advisory information. Call centre agents that man this service respond to queries from callers using their own knowledge or by querying a database of relevant knowledge (which also stores answers to past queries). Callers are given immediate feedback over the phone whenever possible. Where problems are more complicated, call center operators refer to agriculture experts and/or relevant literature before responding to callers (usually within 72 hours). A digital database containing the list of queries received to date is also maintained for internal purposes. The service is available during office hours from 9am-5pm, in Sinhala and Tamil.

4.1.4   User Benefits

Users benefit from regular access to free expert advice, available on both mobile and fixed telephone networks. A study by LIRNE*asia* has indicated that some farmers have even begun cultivation of new crops through information obtained from the 1920 hotline. There is very little demand side research to gauge how farmers are utilizing the service. A small study done around Dambulla (the location of the main wholesale agricultural market in Sri Lanka) suggests that only a third of the farmers in that district knew of the service. Increased use of mobile phones in the country as well as demand for immediate feedback on queries can be seen as two success factors that have led to its implementation in Sri Lanka.

4.1.5 Business Case Analysis

Over a period of 15 months, till May 2007, the service had received approximately 40,000 calls. Currently the service receives about 200 calls a day and the trend has been increasing year on year (exact figures were not available) with an average call time of about 5 to 10 minutes. There is evidence to suggest that the actual demand for the services is much higher since a lot of callers report getting an engaged tone when trying to reach the service. The service is only available on weekdays from 9am to 5pm, which is seen as inadequate by farmers who would prefer to have the option to access this service in the evenings after they return home from their farmlands.

At present, the government is not taking any active measures to make the service sustainable. Both fixed and variable costs are borne by the government, with no planned revenue stream. The initial investment cost was approximately LKR 1 million (approximately USD 10,000), while yearly operational costs are approximately LKR 500,000 a year (equivalent to about USD 5,000 a year). The latter consists mainly of telephone bills and staff salaries. Due to increased demand the government is in the process of building a new complex, which can house twice as many call center operators at any given time. However no specific timetables have been given for the completion of the new complex. If the new complex becomes functional in the next year, the number of calls processed is expected to double.

4.1.6 Issues, Risks and Hurdles (SWORB analysis)

The following summarizes 1920's business analysis

Table 3: SWORB Analysis

Strengths	Opportunities
• Unique service in the country that provides crop advisory services on an individual basis.	• There is evidence to suggest that farmers are willing to pay for these kinds of services. If a sustainable business model were introduced the service could be scaled up much more quickly. • Exploring partnerships with Tradenet would give the services access to additional delivery channels (WAP, SMS and USSD). • Opportunity for donor funding to scale up this operation and assist in business development
Weaknesses	**Risks & Barriers**
• Limited funding limits the operating hours as well as the number of requests that they can handle.	• Dependent on government funding. No clear indication of government's commitment to scaling up the service.

4.1.7 Scalability and Replicability

The Department of Agriculture is, at the time of writing of this report, awaiting feedback on a proposal submitted to the Government of India to increase service penetration to the North and East. At present, Tamil-speaking call center operators aren't familiar with crops grown in these areas, and hence the proposal, if successful, can help address this problem.

Recently, video conferencing facilities were also introduced in several agrarian centers. Preparations are also being made to extend the service beyond voice, to that of email as well. The estimated initial investment cost would be LKR 10 million (approximately USD 100,000), and the operational cost per year would be LKR 5 million (approximately USD 50,000).

4.1.8   References

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4.2   Tradenet

Sector: Agriculture, Animal husbandry, Fisheries & Forestry
Segment: Agro- marketing/ trade

4.2.1   Description

TradeNet is a service launched by Dialog Axiata PLC, the country's leading mobile services provider, in December 2009, to deliver spot and forward agricultural commodity price information via mobile phones. In July of 2010, Tradenet started allowing trades to occur on their platform for all types of services and goods (beyond just agriculture related produce and/or services).

4.2.2   Application Objectives & Rationale

Tradenet provides farmers the ability to access up-to-the-minute prices for agricultural commodities, thereby reducing information arbitrage. This allows farmers to obtain better prices for their produce, and hence higher incomes. In addition, Tradenet envisages connecting buyers and suppliers of all types of goods and services.

4.2.3   Features

The agriculture component of the service (primarily the wholesale price information) was the result of a partnership between Dialog and Govi Gnana Seva (GGS), a non-profit organization involved in the collection and dissemination of wholesale agricultural produce trade information.

The agricultural price information service was launched in December 2009 and users can currently subscribe to receive up to five price alerts for up to five vegetables and/or fruits from each of the markets covered by GGS. At present GGS covers three markets, which includes the Dambulla Dedicated Economic Centre (DDEC), which is the largest wholesale market for fruits and vegetables in the country and handles nearly 80% of the wholesale trades in the country. The other markets presently covered are the Dedicated Economic Centers in Meegoda and Narahenpita.

The service is only available to Dialog subscribers across the country. Information on the TradeNet platform is disseminated via multiple digital communication technologies such as SMS, Unstructured Supplementary Service Data (USSD) and the web. The SMS service is offered in English, Sinhala and Tamil. Currently use of all these interfaces is free. A dedicated call centre has been set up to register users and to provide access to the service. The hotline can be accessed by dialling "977" from any Dialog phone and users have to pay a premium rate of LKR 3 (approximately USD 0.03) per minute to access the call centre.

4.2.4   User Benefits

With respect to the agricultural price information part of the Tradenet service, users are getting up to date information on price movements in wholesale agricultural produce. Research conducted by LIRNEasia on farmers utilizing this service has found that farmers who must travel between 10-15 km to reach their closest market are able to get a premium of 23.4% on the price per kg of their produce (when compared to the average daily prices for their produce). Farmers are utilizing the service to time the exact harvest time as well as the time of entry into the market so as to get a higher price. They are able to do so because most fruits and vegetables in Sri Lanka show high intra-day and inter-day volatility due to a mismatch between supply and demand. Accurate and real-time price information is allowing farmers to forgo the sunk costs associated with entering the market at a non-optimal time (since they are not able to take their produce back if the prices are low in the market due to transportation costs).

Utilization of the trading component of Tradenet is currently low partly because, at the time of this report, the trading aspect of the service had only been operational for less than four months and no successful trades have been conducted. At the moment, farmers have been using it to identify potential buyers for their produce. The benefit from this part of the service is so far unverified.

4.2.5   Business Case Analysis

The Tradenet system cost approximately LKR 8 million (USD 80,000) to build and this cost was primarily associated with technology development. A further LKR 8 million (USD 80,000) was allocated for project management, marketing and advertising though this fund has not been fully utilised. Operational costs for GGS to conduct the price collection are approximately LKR 1 million (approximately USD 10,000) per year. These operational costs are currently financed via an exclusive content provision agreement with Dialog.

So far nearly 1500 farmers have subscribed for the agricultural market information service and the call center receives nearly 50 calls a day. (The figure only refers to those requesting agricultural price information). Whilst the service is currently available for free during these initial stages, plans are underway to start charging subscribers a nominal monthly service charge (approximately LKR 30 or USD 0.3 per month though the rates have not been finalized as yet) by the end of the year.

Given the large farmer community in Sri Lanka - agriculture accounts for 32.7% of employment in the country as of 2009 - there is a potentially large subscriber base for this service.

The main challenge for the service is that it is limited to Dialog subscribers. Also, there are some concerns regarding Dialog's cell phone coverage in some rural areas, which would limit service uptake. Market research conducted by LIRNEasia and GGS has shown farmers to be willing to pay for this service. The research also indicated that farmers using the service have found the price information to be reliable and dependable to the extent that they are deriving real livelihood

benefits from it. It remains to be seen, though, how successful the service will be once subscribers are charged.

Another challenge is extending access to the service outside of Dialog subscribers. While the technology is owned by Dialog, it is important that GGS and Dialog enter into partnerships with other operators with some form of revenue share model so that the service can be extended to geographical areas that Dialog does not cover.

4.2.6 Issues, Risks and Hurdles

The following summarizes Tradenet's business analysis

Table 4: SWORB Analysis

Strengths	Opportunities
• Unique service in Sri Lanka that can allow farmers to access real-time price information in a convenient and ultimately cheap manner. • The only service that has leveraged the fact that there is demand for knowledge of the intra-day price movements. • Covers multiple markets • GGS has good linkages with the main wholesale traders especially at DDEC, the main wholesale market in the country. • Has a business plan for longer-term sustainability.	• Now that the service has been showing benefits, GGS & Dialog should consider partnering with other operators. • Partnering with the 1920 services can provide crop advisory information for farmers and increase the business proposition for the service. • Some potential role for donor funding primarily in helping GGS develop the business plan to make their activities sustainable in the longer term. • GGS could increase their coverage of other smaller wholesale markets in the country relatively quickly with low cost.
Weaknesses	**Risks & Barriers**
• Relatively weak linkages with cooperatives, farmer organizations and traders, which could limit the use of the trading component of Tradenet. • Technology infrastructure is owned by Dialog, which limits Tradenet's ability to reach non-Dialog mobile phone users.	• Other similar services (for agricultural price information and trading) are being currently launched which could impact Tradenet's market. • The service is only accessible to Dialog subscribers. There also might be some problems with coverage in the rural farmlands for Dialog which negatively impact the service

4.2.7 Scalability and Replicability

As the service expands, more partnerships and agreements with third-party entities will need to be developed to ensure that localized and context-specific information can be provided. Research has shown that just the provision of price information is creating additional interest in higher value crops, which is increasing demand for crop advisory services. If this too were to be facilitated via the Tradenet system there would be a better business proposition for this new service. Whilst the service is available nationally the price information aspect only covers three markets. There are an additional five regulated markets that are not yet covered, though they are small. Nevertheless, price information from these areas is vital to farmers within their catchment areas. GGS is in the process of adding more markets and two additional markets should come online by the end of 2010. The service is potentially sustainable should subscriber numbers increase and once the service transitions to a paid service.

4.2.8   Collaborations

Whilst Dialog Axiata PLC owns the Tradenet technology platform, it partners with GGS on the agriculture related aspects of the platform. GGS collects market price information from three markets and enters it in real-time (via mobile phone interfaces) into central database maintained by Dialog. GGS has been attempting to increase linkages with traders, agro-processing businesses as well as farmers' organizations and others to leverage the new Tradenet system to facilitate trades. In addition, Dialog and GGS has been jointly exploring relationships with other government organizations including the Ministry of Agriculture, Ministry of Trade, Marketing Development, Cooperatives and Consumer Services as well as Central Bank to utilize the Tradenet platform to facilitate market linkages in specific projects currently in the pipeline under each of these ministries.

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4.3　e-Dairy

Sector: Agriculture, Animal husbandry, Fisheries & Forestry
Segment: Extension services

4.3.1　Description

e-Dairy is a pilot project initiated in the district of Dambadeniya in 2009, which enables dairy farmers to request veterinarian services via SMS and touch screen computers. The service received the Manthan Award South Asia in 2008.

4.3.2　Application Objectives & Rationale

The aim of the service is to provide farmers with information and access to "just-in-time" services which can improve productivity levels and, hence, farmer incomes. Services include information related to animal health, milk prices, feed suppliers, medical drug suppliers, equipment bio-gas plants, bank loans, technical construction of dairy stalls, training programmes and mobile veterinary clinics.

According to the Chief Operating Officer of ICTA, Mr. Reshan Dewapura, the government discovered that 55 percent of the country's milking cow population at a given time wasn't pregnant. Low pregnancy rates are due to a lack of timely access to artificial insemination and breeding services, which results in a loss of approximately 30-35 days worth of milk (approximately 300 litres of milk or LKR 12,000). The e-Dairy service was introduced to address this issue, with the aim of providing farmers speedier access to such services.

4.3.3　Features

The service enables dairy farmers to request veterinarian services ranging from animal health, artificial insemination, prices and other dairy extension services via a simple SMS. The service is available on mobile and CDMA phones, as well as touch screen computers. The farmer types in a pre-assigned personal identification code number and the code number of the service he wishes to obtain. The request is then sent via SMS to all registered suppliers. If a supplier wishes to transact with the farmer, he then gets in touch with the farmer directly. Farmers usually obtain feedback within a few hours. So far 300 farmers have been registered for this service. The project also provides complementary training in the use of computers and the Internet.

4.3.4　User Benefits

The service provides farmers the opportunity of increasing incomes through improved access to information on animal health and market prices, and "just-in-time" services, potentially lowering costs and increasing revenue through improved market opportunities.

According to the DDF, milk production could be increased by 30 percent if artificial insemination services are requested and supplied in a timely manner. The ICTA further estimates that farmers can enjoy an additional income of LKR 30,000 (USD 262) per additional calf obtained per year, through the program.

Farmers can also benefit from access to market prices. Dairy farmers are usually paid every 15 days. Usually, once farmers' hand over their produce at a milk collection center, they don't know what price they will finally get for their produce. Using the e-dairy service, they can obtain prices before the milk is handed over at collection centers, safeguarding them from being cheated.

An official evaluation survey is being planned for the end of the year.

4.3.5   Business Case Analysis

The Dambadeniya Development Foundation (DDF), a grassroots community-developed-based organization developed the technology used, and supplies the information. The government-owned Information and Communication Technology Agency (ICTA) of Sri Lanka funded 50 percent of the initial investment cost (amounting to USD 50,000) through its Partnership Assistance Program (PAP). The Social Performance Development Center, an affiliate of the DDF now operates the service, with the DDF monitoring it. Dialog Axiata, the country leading mobile service provider provided a special SMS gateway for the service.

The initial investment cost, the majority of which went towards building the mobile component of the service, was LKR 10 million (approximately USD 100,000). The average cost of operation is LKR 600,000 (approximately USD 6,000) a year. However, no steps are being taken at present to recover these costs through usage fees. Farmers only pay the standard cost of an SMS when submitting a request to the service, which is recovered by their respective mobile operator. However, the e-Dairy service itself doesn't generate any revenue from the SMS.

Nevertheless, e-Dairy believes that farmers are willing to pay usage fees (in addition to the standard SMS charges) since they recognize its benefits. The management attributes the relative success of the service to the familiarly of using SMS amongst most Sri Lankans and point to it as one of the factors that could lead to an increase service uptake in the future.

Funders and other partners are needed to expand services to other localities. There is also a perceived lack of cooperation by the government in provision of such services. For example, in the case of veterinary services, although the service is supposed to provided free to farmers, they often have to cover technicians' transport costs.

4.3.6   Issues, Risks and Hurdles

The following summarizes e-Dairy's business analysis:

Table 5: SWORB Analysis

Strengths	Opportunities
• Unique service which is not currently offered by anyone else in the country	• There is a longer-term vision to making this initiative sustainable via partnerships with other operators. • Opportunities for donor funding to both scale up the operation as well as to assist in business development.
Weaknesses	Risks & Barriers
• Issues with technology as well as mobile connection/ signal even if it is usually resolved within half an hour.	• Dependent on donor funding and donations. Despite willingness to explore business relationships with service providers, there is no clear plan as yet.

4.3.7 Scalability and Replicability

An initial funding proposal for the deployment of similar services in Jaffna and Mannar submitted to the USAID has been accepted. e-Dairy is awaiting the final word on this matter. The investment cost of the three-year project is USD 1.2 million and will include additional services such as webcams that can remotely connect farmers with technicians and/or other personnel in other parts of the country to obtain information.

With the conclusion of the civil war, the North, East and Anuradapura areas of the country are seen to have high potential for this service. However, dairy farmers in these locations are more remote than Dambadeniya which may require additional effort for increasing service uptake.

No efforts appear to have been made to make the model sustainable. However discussions with the project implementers suggest that they are considering partnering with mobile operators to increase service reach as well as to make the initiative more sustainable. There have been some initial discussions with some mobile operators to create special packages for registered farmers, but so far they have not led to any concrete plans. The system itself might not be difficult to replicate, but it is unclear if other countries experience the same types of dairy production issues.

There are no plans, at present, to offer similar services via technologies such as voice and WAP; however, e-Dairy is willing to undertake development of these interfaces if the necessary funding and partner support is available.

4.3.8 Collaborations

The Dambadeniya Development Foundation (DDF) developed the service. The Social Performance Development Center, an affiliate of the DDF now operates the service, with the DDF monitoring it. ICTA provided funding for 50% of the initial investment required to build the system. In addition ICTA facilitate linkages between DDF and the mobile operators.

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4.4   1919

Sector: Governance/ Political
Segment: E-Government and m-Government services

4.4.1   Description

1919 is a hotline, launched in 2006, which provides access to information on government services in Sri Lanka. It is accessible on any telephone network and is offered in all three local languages, Sinhala, Tamil and English.

The service was initiated by the Information and Communication Technology Agency (ICTA), the apex body for IT in Sri Lanka, which also coordinates and owns the Government Information Center (GIC) website. More than 20 governmental institutions and 2500 services are now a part of this initiative.

GovSMS is a related channel launched in 2009, which can be used to obtain government information via SMS. The GovSMS platform uses a SMS short code 1919, which is unified across all GSM and CDMA operators. A nominal fee for the service is charged equivalent the cost of sending the SMS. Currently, information on train schedules and crop prices are available via GovSMS.

4.4.2   Application Objectives & Rationale

The application is designed to improve services provided by the government of Sri Lanka. The government envisages a reduction in the number of inquiries received by individual departments, since citizens are likely to be better informed on information requirements through access to a central portal.

4.4.3   Features

Currently 1919 covers 134 government organizations (99 percent). Approximately 3,500-4,000 calls are made to the number every day, which operates from 8am to 8pm (12 hours), 365 days of the year. Call volumes have doubled in the last two years. The service aims to resolve all queries immediately. If the user's query cannot be answered immediately, they are advised to call after 24 hours with the reference number that is issued at the time of the first call. The unanswered question is then referred to and followed up with the relevant Ministry/ Government department by the Team Lead at the centre. 94% of queries are resolved within the first call. An average call lasts for about 1 minute and 6 seconds and the average queue time for an incoming call is about 0.12 seconds. There are approximately 16 operators manning the call centre, which can accommodate up to a maximum of 20 operators. The users of this service are primarily citizens of the country who are recipients of some form of government services. The 1919 service can also be accessed via the web at www.gic.gov.lk.

An additional program called GovSMS (as part of 1919) was launched in late 2009 and currently only provides train schedules and daily average commodity prices from the main wholesale market in the country. This part of the service has so far not been publicized and there are only very few users of this system at the moment. The implementers plan to launch an advertising campaign early next year once more services are added to the GovSMS interface.

4.4.4   User Benefits

The service provides users with up-to-date information on government services, and is available in all three local languages. Citizens should find accessing government services to be less time consuming and less expensive by using the 1919 service. Given the current changes in portfolios for most government ministries following the last general elections, 1919 is often serving as the first point of contact for the public needing specific government services.

So far the most frequently requested information is related to obtaining passports, a copy of a birth certificate, marriage and death certificates and new national identity cards.

4.4.5   Business Case Analysis

The service was established in 2006 with LKR 7 million (approximately USD 70,000) of World Bank funding through Sri Lanka's Information and Communication Technology Agency (ICTA). ICTA was in charge of setting up the technology for running this service as well as building capacity in government ministries to provided and regularly update the databases needed by the operators manning the call centre. Since 2008, ICTA's role has been solely to do the project management for this service on a continuous basis as well as ensure that ministries regularly update their information. Whilst the initial operating cost per year was around LKR 7 million (approximately USD 70,000) a year, it is now estimated to be around LKR 15 million (approximately USD 150,000) a year. The Presidential Secretariat currently funds the operating costs.

In terms of GovSMS, funding for GovSMS, which is part of the Lankagate Project, comes from ICTA. A year after the launch of GovSMS, only two services are functioning and neither of these services has been advertised, leading to very low usage. Despite the project implementers contention that new services are currently being added (pensions and passport services were to be added by the end of 2010) and that there were plans to do a major advertising campaign for this service in early 2011, there is limited evidence to corroborate this.

4.4.6   Issues, Risks and Hurdles

The following summarizes 1919's business case analysis:

Table 6: SWORB Analysis

Strengths	Opportunities
• Unique service that is currently not being	• Centralized system can be leveraged to

provided by anyone else. • Centralized team that serves a public function as well as facilitating the up-gradation of knowledge management and public access of all government ministries and departments	integrate services across multiple ministries (in the case where users need to approach multiple department/ ministries for a specific case)
Weaknesses • For the most part the service serves only as a "library" of information and provides only limited functionality for users to query on their specific personal cases/ applications with a specific government agency.	**Risks & Barriers** • Dependant on continuous government funding

4.4.7   Scalability and Replicability

The project has won awards and some work has been done to inform other Asian governments about the application. However, the project depends on continuous government funding to function. There is no business plan to recuperate costs directly for the service. The quality of the service has so far not been measured and it is troubling that a large number of the calls coming to the hotline everyday are for contact information for various ministries. Even if project implementers considered charging for use of the service, it is not known if there is sufficient value from the service that users would be willing to pay. The intention seems to be to continue this as a free service for the foreseeable future.

A service such as 1919 requires government leadership and investment to be replicated. Whilst ICTA serves as the project managers, the service itself sits directly under the Presidential Secretariat, which has been essential in ensuring that ministries comply with their duties in updating the databases used by the service. There is also significant overhead on the part of the project managers to ensure that government ministries update their information on a regular basis. This is an issue that has not reduced in priority since the inception of this service in 2006.

4.4.8   Collaboration

ICTA provides the project management and coordination efforts for this service. It frequently liaises with Government Ministries and departments to help in assisting in the digitization of their knowledge banks as well as in making sure that the database is updated on a regular basis by the relevant ministries/ departments. A project steering committee headed by the Additional Secretary to the President makes all policy decisions with respect to the GIC call centre as well as the website.

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