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BRIEFING PAPER

SOFTWARE PLATFORMS FOR MOBILE APPLICATIONS FOR AGRICULTURE DEVELOPMENT

INTRODUCTION

This briefing paper is one of a series of briefing papers to help USAID missions and their implementing partners in sub-Saharan Africa use information and communications technology (ICT) more successfully —via sustainable and scalable approaches—to improve the impact of their agriculture related development projects including Feed the Future projects.[1] The objective of this paper on software platforms for mobile applications for agriculture development is to provide an overview of information that will help distinguish between the options and enable decision-makers to make a more informed choice. This paper is intended for those without ICT technical skills although it may be a helpful tool for these readers to use as they discuss options with ICT professionals.[2]

A variety of mobile application platforms for agriculture have come onto the market to address different issues in the agriculture value chain. Few USAID projects take advantage of such platforms or seriously weigh them as an option, instead opting for custom software development (that is, software developed "from scratch" albeit often using pre-built software components) and thereby underestimating the full costs and risks of such an approach. These platforms (defined below) can be used by USAID projects (and the ICT-related service provider that they work with) to reduce the total costs of ICT interventions and the risks associated with their development. For the purposes of this paper, we will focus on platforms that have a mobile phone component.

Key Terms Used in This Paper

Software platform for mobile applications ("mobile application platform" or "platform" for short) – a pre-packaged ICT solution that delivers content and services on a mobile phone, manages the content, and may or may not include hosting as well as other services related to managing and operating the platform.

Platform provider – the entity that develops and sells or distributes the software platform, such as an NGO like Frontline SMS, a social enterprise (for-profit entity with a social mission), or a for-profit private sector firm like Microsoft. It may also be a consortium of partners.

Software as a service (SaaS) – a model developed in the private sector and adopted in recent years by technology providers serving the development sector, where the customer accesses the software and hardware over the Internet, via a web browser, instead of purchasing the software and hardware and hosting it on their own premises. The SaaS providers host the software on their own hardware at a data center.

Implementer – An entity, such as an NGO working with a farmer group, a USAID-funded project team, or a ministry of agriculture, that has acquired the platform and is implementing it for use by the agricultural community by populating it with content, training the community on how to use the system, and has overall responsibility for managing the use of the platform.

TYPES OF MOBILE APPLICATION PLATFORMS

A number of platforms are available today and have already been described in other FACET papers[3]. The lists below are meant to illustrate and compare the different types of platforms and are not meant to be an exhaustive list of platforms.

1. Mobile Application Platform Purpose

The platforms differ in multiple ways as shown in the tables below. One way in which they differ is whether or not the platform was originally designed specifically for the agriculture sector. The "General Purpose" tools are applicable to and being used across a variety of sectors, such as health, democracy and governance, natural resource management, and humanitarian relief operations as well as agriculture. Some of the best work on mobile application platforms has been done in the health sector, so these platforms should be considered even if they have been used only in non-agriculture sectors. A few examples are included in Table 1 below.

[1] ICT includes cell phone and Internet services, radio, a wide range of digital devices and related tools including cameras, geographic information systems, and a wide range of hand-held computing devices.

[2] For further assistance, USAID mission or project staff can contact the FACET project or an ICT services advisor.

[3] FACET profile papers are available for many of these mobile application platforms mentioned, providing a one-page description of the platform. See: https://communities.usaidallnet.gov/ictforag/document-library/ict-and-ag-profiles

Table 1 – Mobile Application Platform Purpose

Intended Purpose	Platform	Brief Description	Example Uses and Locations
General Purpose	Frontline SMS[4]	Text messaging system, both inbound and outbound	Cambodia (crop price information plus other services); Ivory Coast (info on the world market for the cashew value chain); Kenya (farming advice via SMS[5] and radio); Niger (market prices and literacy); Tanzania (post-training evaluation by coffee farmers via SMS); Zambia (climate information alerts)
	DataDyne EpiSurveyor	EpiSurveyor is a web-based app for surveys. DataDyne's roots are in public health but the tools are used across multiple sectors.	Used worldwide
	Google Trader[6]	Google Trader is a trading system, like classified ads or a bulletin board for buyers and sellers to find each other.	Uganda, Ghana
Adapted to Agriculture	Souktel – Farm Price SMS Service	Market price information (adapted from existing JobMatch service)	Farm Price SMS - Uganda; Souktel - Middle East, North Africa, Sub-Saharan Africa
	Voxiva's eSoko[7]	Market price information (adapted from the Voxiva public health information system)	Rwanda - Ministry of Agriculture and Animal Resources [MINAGRI], Covers 78 commodities in 50 markets
	DataDyne Mobile Information Platform (MIP)	MIP is a general purpose text messaging system that is currently being adapted in Chile for agriculture with several partners providing content and technology	Chile – market prices for 9 crops and 825 producers
Agriculture Specific	Esoko	Mobile-based agriculture market information exchange for individuals and businesses	Benin, Burkina Faso, Burundi, Cameroon, Ghana, Ivory Coast, Kenya, Madagascar, Malawi, Mali, Nigeria, Rwanda, Northern Sudan, Tanzania, Togo, Uganda, Zambia
	Google Farmer's Friend	Farmer's Friend provides farm extension-type services	Uganda
	IFFCO Kisan Sanchar Limited (IKSL)	Voice-based agriculture information service	India, 3 million users, 15 call centers serving 18 states
	KenCall's M-Kilimo[8]	Voice-based farm extension service (they are testing SMS for some info) via a call center	Kenya – market prices for 41 commodities in 8 markets, 30,000 unique subscribers
	Manobi	Market information system with related agriculture information services	Senegal (food security, mango, beans, fishing) Mali (mango) Cote d'Ivoire (cashew) Niger (food security)

[4] See cases of FrontlineSMS for agriculture at http://www.frontlinesms.com/tag/agriculture/

[5] SMS stands for Short Message Service, which is the text messaging capability available on mobile networks and on all mobile phones. See http://en.wikipedia.org/wiki/SMS for more information.

[6] Google Trader and Farmer's Friend were developed by a partnership between Google, Grameen Foundation, and MTN Uganda and are based on Google SMS and its SMS Tips feature currently offers tips and advice on health, clinic locations, and agriculture. See also http://google-africa.blogspot.com/2009/06/google-sms-to-serve-needs-of-poor-in.html

[7] This is the name of the service used in Rwanda where it has been implemented. It is important to note that this is an entirely different system from Esoko, which has a very similar name and is developed by a Ghanaian firm.

[8] KenCall is a contact center business and launched M-Kilimo as a CSR initiative. See http://www.kencall.com/index.php/site/kenya_farmers_helpline/

Intended Purpose	Platform	Brief Description	Example Uses and Locations
Agriculture Specific	Nokia Life Tools (NLT)	Mobile information service (information via text message on Agriculture, Education, Healthcare and Entertainment) – available only on select Nokia phones	India – 275 crops, 5000+ markets and traders across 22 states China – 100 crops, 2000+ markets and traders Indonesia – 200 crops, 201 markets across 33 provinces Nigeria – 25 crops, 111 markets across 36 states
	Reuters Market Light (RML)	Market and agriculture information system	India – 250 crops, 250,000 farmers in 13 states
	TechnoBrain BioReg GRS	Biometrically-registered grower registration system for regulated commodities	Malawi – Tobacco Control Commission, 400,000 farmers are registered in the system

The "General Purpose" platforms offer functionality that serves a broad need, such as sending text messages to a number of people and receiving text messages from people, so there is less pre-built functionality for specific needs like agriculture market prices for multiple varieties of a crop. However these platforms provide the ability to customize the system, such as the ability to define contact groups or to create surveys, through the use of forms that a non-technical person can fill out to set up. If the source code is available, as is the case with Frontline SMS, which is built using open source technology, a software developer could customize the platform by changing the underlying source code or writing additional code as needed.[9] The other types of mobile application platforms also have the ability to customize the software, through data entry and configuration forms as well as data import or upload tools.

Souktel, Voxiva's eSoko system, and DataDyne's MIP are in the "Adapted to Agriculture" category because to date they each have one example of a usage outside their original scope and are in early stages of development and use. Voxiva's eSoko system is based on their many years of work providing health information systems in developing countries, being one of the first to offer access from wireless devices. Souktel's system arose out of their well-known JobMatch service, in this case adapted to allow farmers to advertise the goods they have for sale and buyers to view the goods and prices. The system is in the pre-launch phase so there are no farmers using the system at the moment.[10] Souktel's platform is also used today in South Sudan for getting listener feedback by community radios. This is potentially another way Souktel can support agriculture initiatives, by incorporating it into agriculture programs on community radio. DataDyne's DatAgro system in Chile, based on MIP, uses SMS messaging to allow small-scale agricultural producers to send and receive information about crop prices, market information, weather updates, local news, and other information. DataDyne's MIP platform is being rewritten and is in pilot testing. DataDyne has several other projects in various stages of proposal and approval to adapt MIP for other agriculture as well as health sector purposes.[11] Given that the latter two platforms are under development, this paper will focus on the other mobile application platforms.

Some platforms were designed for specific agriculture processes. For instance, the BioReg GRS system was custom developed by TechnoBrain, a Microsoft partner based in Tanzania and operating in East Africa, for the Tobacco Control Commission (TCC) of Malawi to improve their operations. The TCC's role is to regulate the production, manufacture, and marketing of tobacco and the BioReg GRS system provides an integrated set of functionality to register farmers using biometrics (fingerprint), license farmers, specify the kind of tobacco the farmer can grow, and allocate a certain yield that will be allowed to be sold.

One well-known platform not mentioned here is Ushahidi. It is best known as a platform for receiving SMS data and processing it in real-time to display information on a map. It has become an essential tool for crisis reporting and election monitoring, to name a few uses. The research for this paper did not identify specific implementations for agriculture but Ushahidi could have applicability to agriculture, for instance to map pest reports to track a potential outbreak of an insect infestation.

2. Mobile Application Platform Services Architecture

This paper uses the term "platform" rather broadly. It does not refer strictly to the software component or hardware component but to the entire ICT solution, as illustrated in the architecture diagram below. The

[9] All free software is not necessarily open source (i.e. the code might not be public and editable, despite the software being free). Make sure to check first.

[10] Email exchange with Souktel, Inc. on July 10, 2011.

[11] Email exchange with Datadyne on July 5, 2011.

diagram is a highly simplified depiction of the major components of a mobile application platform, which include the following:

- The Hosting Infrastructure as the foundation
- The Content Management system which is comprised of the database where the content resides, the programming logic (code) to manage that data (data entry, update, send and receive data), and the forms that an implementer would use for data management and upload as well as for the configuration and setup required for certain functions to work
- The User Interface or Presentation Layer which presents the content to the end user on a mobile phone as an SMS or via a mobile application loaded on the phone, via a web page, or via an interactive voice response system (IVR) that prompts the end user with questions to direct their call to the answer or the right person with whom to speak.

The mobile application platforms differ in the services they provide and how they provide it, as shown in Table 2 below. Specifically, responsibility for the Content Management and Hosting components of the platform can vary. Sometimes both the implementer and the provider contribute to the task as can be seen in Table 2. In some cases the "End User", such as a farmer or trader, is the one generating the content. In other cases an end-to-end solution is an option, in which the platform provider employs their own enumerators (data or content collectors) and handles all hosting and connectivity responsibilities.

Figure 1 - High Level Mobile Application Platform Services Architecture

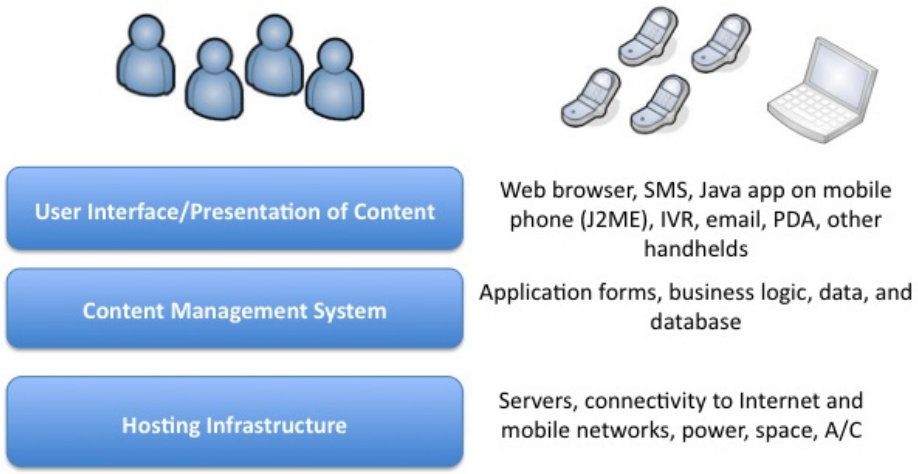

Table 2 – Mobile Application Platform Services Architecture

	User Interface/Presentation of Content					Content Management		Hosting Responsibility
	SMS	Web	Mobile app (J2ME or WAP)[12]	IVR	Call Center	Who Manages the Content	Content Generated By	
Frontline SMS	X					Implementer	Implementer	Implementer
TechnoBrain BioReg GRS	X					Implementer	Implementer	Implementer
Google Trader	X	X				n/a	End User (see description below)	Provider
Nokia Life Tools (NLT)	X					Provider	Provider and Partners	Provider
Reuters	X					Provider	Provider and/or Partners	Provider

[12] Indicates that a mobile phone application is available for phones that work with Java or WAP, namely "smart" phones versus the basic phone that is the most widely used in most rural poor areas. SMS will work on any mobile phone.

	User Interface/Presentation of Content					Content Management		Hosting Responsibility
	SMS	Web	Mobile app (J2ME or WAP)[12]	IVR	Call Center	Who Manages the Content	Content Generated By	
Market Light (RML)								
Google Farmer's Friend	X					Provider	Partners	Provider
IKSL				X	X	Provider	Provider and/or Partners	Provider
KenCall's M-Kilimo				X	X	Provider	Provider and/or Partners	Provider
Manobi	X	X	X			Implementer	Implementer	Provider
Voxiva's eSoko	X	X	X	X		Implementer	Implementer	Provider
Esoko	X	X	X			Implementer and Provider (optional)	Implementer and Provider (optional)	Provider

The degree of control and responsibility that these mobile application platforms offer relative to the degree of control and responsibility that you want or need are some of the factors to consider when evaluating a platform. For example, in the case of Frontline SMS, the implementer downloads the software for free, hosts it on their own personal computer or laptop with a mobile phone or GSM modem attached, sets up their own contact lists and content for text messages, and can start sending SMS. FrontlineSMS is described as an entry-level system and for many it will be the best solution.[13] The other products based on FrontlineSMS, such as FrontlineSMS: Radio and FrontlineSMS: Credit, might offer an intriguing option to integrate other functionality to serve the agricultural community.

TechnoBrain follows the traditional model of selling a software license to customers who are then responsible for managing and hosting the platform themselves as well as the content, but TechnoBrain has also provided technical assistance to help customers when needed, for example with data uploads and registering users. In the future they plan to implement a "multi-tenant" platform in which TechnoBrain will provide the hosting infrastructure for the customer, essentially becoming a "software as a service" (SaaS) provider.

Google Trader is an example of a platform whose content is generated by the end users. Farmers or traders send in a text message with buy or sell offers, and then those offers can be viewed or searched on the mobile phone or on the web. This could be thought of as a simplified version of an online classified ads system like Craigslist.

Manobi, Esoko, and Voxiva's eSoko follow the SaaS model. The implementer can load content into the system by themselves. Additionally, with Esoko its franchisees (see the Business Model section for more detail) may employ their own enumerators who visit the markets to collect market data and prices to populate into the system.

Nokia Life Tools (NLT), Reuters Market Light, Google Farmer's Friend, IKSL, and KenCall, offer the entire "stack" of mobile application platform services as depicted in Figure 1, using different methods to deliver the content to a mobile phone or the Internet, working with partners to collect, validate, and translate the content into multiple languages, manage the database, and provide the hosting infrastructure. Note that these platforms are all private sector-driven and they each charge a subscription fee or the user must pay the normal charge for a phone call or SMS with the exception of Google Farmer's Friend.[14]

In the case of content management, partners such as government agencies and non-governmental organizations (NGOs) are often involved to provide and/or validate the content such as market prices, weather, advice and tips.

Some of these systems are available only on certain mobile networks or technologies:

- Nokia Life Tools is available on certain Nokia phone models. Nokia has partnered with most of the major mobile network operators (MNOs) in the four countries where Nokia Life Tools is available (India, Indonesia, China, and Nigeria)
- IKSL is available only with a special Bharti Airtel SIM card called "Green SIM"[15]

[13] http://www.frontlinesms.com/aboutthesoftware/functionality-walkthrough/

[14] A variety of subscription models and business models are available for these and all platforms discussed. Subscriptions can be at the individual farmer level or at an association/group level. Also services can be sponsored by large buyers, processors, agrodealers, governments or some combination thereof. Business models are discussed further in the next section.

[15] http://gsmworld.com/documents/iksl-case-study-v2.pdf

3. Business Models

Most of these systems have not yet reached a solid level of sustainability or profitability (hence have not been scaled to 100,000s of users), but several different models are being tried as shown in Table 3 below.

Table 3 - Business and Revenue Model

Platforms	Non-profit	For-profit	Donor Support	Private investors	Fee
FrontlineSMS	X		X		Free
Google Trader and Farmer's Friend	X		X	X	Free to the farmer
Manobi		X	X		Free at entry-level, fees for more advanced features and/or service
Esoko		X	X	X	Combination franchise and organizational subscription model; cost to farmer may be subsidized (see below)
Voxiva's eSoko		X	X	X	Farmer pays normal SMS cost
Reuters Market Light and Nokia Life Tools		X			Farmer pays subscription fee
KenCall's M-Kilimo and IKSL		X	X		Farmer pays normal call cost
TechnoBrain BioReg GRS		X			Implementer pays for license

Esoko's business model is evolving given it has been in the agriculture information services business for several years and in several countries across sub-Saharan Africa. It is exploring several different business models, which is why it is being highlighted below, as follows:

- Private franchise where private companies seek private equity investment and sell (mostly organization level as opposed to farmer level) subscriptions, training/consulting services, and deliver services via SMS to target customers. Franchises will handle data collection, marketing, customer service, operations, and interconnect issues between Esoko systems and MNOs. They will share revenue with Esoko and must meet minimum performance standards.
- A licensee or reseller model in which private companies sell Esoko's subscriptions, training/consulting services, and SMS to customers. These private companies typically exist already and intend to use Esoko's offerings as a complement to what they're already doing. This model does not require equity investment, and the reseller does not have to meet performance targets while they maintain some levels of exclusivity in a country. Licensees will handle data collection, MNO negotiation, sales and client support. Licensees also share revenue with Esoko, though provide Esoko with a higher percentage of sales than a franchisee.
- Public-private partnerships where an NGO is funded by a donor to jumpstart a market information system with the long-term sustainability plan of transitioning operations to a private enterprise
- Public projects that sell licenses to Ministries of Agriculture, NGOs, or associations for the Esoko service or use of its platform.
- Private businesses that sell licenses to multinational corporations and businesses for the Esoko service or use of its platform.

Esoko has selected a "Prime Licensee", Wellspring, to provide support to customers in Malawi as part of the sustainability plan for the USAID East African Market Linkages Initiative (MLI). One benefit MLI sees in the licensee model is that the licensee will be a local presence and will directly support its clients, while Esoko will directly support the licensee. In general the local franchisee or licensee does not need to have technical skills to fulfill its role so the general scarcity of qualified local ICT resources will not impact the success of the project.

CHALLENGES FOR THE SUCCESSFUL AND SUSTAINABLE IMPLEMENTATION OF MOBILE APPLICATION FOR AGRICULTURE

1. Business Model

There are very few examples of business models for mobile application platforms for agriculture that have scaled to 100,000s if not millions of farmers and do not rely on ongoing government or donor support. India is the one market where there are examples that have scaled. They also happen to be led by or have significant involvement from the private sector, most likely due to India's market size and therefore potential: a population of 1.19 billion[16], 70% of which is rural[17], and 61% mobile penetration.[18] The first well-known large-scale ICT solutions for agriculture, namely ITC's e-Choupal, Reuters Market Light and Nokia Life Tools, were private sector initiatives launched in India. A venture that has gained more recent attention is IKSL, a joint venture between the Indian Farmers Fertiliser Cooperative Ltd (IFFCO) and two private sector actors (Bharti Airtel and Star Global Resources Limited). IKSL also has received grant and technical assistance from the GSMA mAgri Programme.[19] All are reporting user numbers in the 100,000s; what would be more useful to know is the percentage of users that are active users versus users who have tried the system only once or twice. The prevalence of agriculture ICT ventures in India raises the question of whether agriculture ICT initiatives in other countries, with a smaller population, can attract the same level of private investment, a reliable revenue stream, and achieve similar scale and sustainability.

Some of the business models being tried offer the service only on specific models of mobile phone or only to subscribers of a specific mobile network. Time will tell whether these models will prove successful for both the platform providers who seek to retain old and attract new customers, and farmers who may or may not have an issue with being locked in to one brand of phone or mobile network.

It may not be possible to eliminate all donor, NGO, or government support. It may require a gradual transition, perhaps starting as a donor-supported service or public-private partnership while at the same time the donor-funded project identifies an organization that can take over responsibility before the conclusion of the project and prepares for that transition.

2. Content

Probably the largest recurring cost and operational burden in any mobile application platform for agriculture is managing the content. There are two main types of content: fairly "static" content that does not change, such as information about agricultural processes and techniques, and content that is dynamic, such as weather and market price information.

Much of the static agricultural content is not readily available in digital form. Trusted, reliable sources for content such as tips and advice for planting and disease management must be obtained and then rendered in the mobile application platform such that searches return the expected results and the content is easily retrieved. A team of people is required to convert the content into a usable and accessible form, whether that be into 140 or 160 character strings that can be sent via a text message, or as records in a call center database. Sometimes the content is already available but resides in disparate repositories from which the data must be extracted, consolidated, edited and deduplicated, and may need to be translated into multiple local languages. The GSMA mFarmer initiative has teamed up with the Bill and Melinda Gates Foundation and INSEAD to address this problem to create a prototype agriculture database and dashboard that will be sharable across multiple mobile application platforms for agriculture.[20] It is being tested now with three to four agriculture information services in sub-Saharan Africa.

The dynamic content must be collected at regular intervals, daily or weekly. Market price collection may require a team to physically visit the markets to collect updated prices and the prices must be regularly checked for accuracy. Weather information requires coordination with the national weather service and must be timely, accurate, and relevant to a farmer's specific location.

3. Total Cost of Ownership (TCO)

Anyone who intends to implement a mobile application platform for agriculture should calculate the **total cost of ownership (TCO)** to allocate funds in the budget and set expectations. One area where people tend to be misled is by the concept of "free software". The truth is that "free" does not mean there is no cost. With "free" software, there is no license or subscription fee to purchase the software but there are other costs. One or more technical staff may be required to install and support the software, hardware and connectivity to the Internet and/or mobile networks, and hardware may need to be purchased. This is not too heavy a burden with a platform like Frontline SMS which is an entry-level system and well-suited for lower volume or scale needs. It could be a good place to start and become familiar with how SMS works. However if the goal for your project is national scale or high SMS volumes, other platforms should be considered which may or may not have a higher TCO. The key is to understand whether the benefits outweigh the costs and to get the most value for money.

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[16] See: https://www.cia.gov/library/publications/the-world-factbook/geos/in.html

[17] Ibid.

[18] http://www.itu.int/ITU-D/ict/statistics/material/excel/2010/MobileCellularSubscriptions00-10.xls

[19] http://gsmworld.com/documents/iksl-case-study-v2.pdf. GSMA is an industry association of mobile operators and the broader mobile ecosystem.

[20] See: http://dl.dropbox.com/u/29582486/mAgri%20Working%20Group-%20Cape%20Town-%20Presentations/GSMA%20mFarmer_Content_Dashboard.pdf

To calculate the TCO, include at minimum:

a. Any other software required and cost of support and maintenance
b. Staff needed (technical and non-technical)
c. Hardware needed, if any, for additional computers, mobile phones for staff and cost of support and maintenance
d. Volume of SMS or voice calls
    i. With more generalized systems like Frontline SMS, since the implementer is responsible for the connectivity to the MNO, s/he must think about the expected message or voice volume that will be generated. If the SMS volume will be large, consider whether your project needs to negotiate for bulk SMS rates or use an SMS aggregator.[21]
    ii. Volume will also determine whether your current Internet service has the capacity to handle the expected volume of web traffic generated by use of the platform and the capacity of the hardware needed to support the expected load and data volume.

QUESTIONS TO ASK AND FACTORS TO CONSIDER WHEN EVALUATING A MOBILE APPLICATION PLATFORM

Once a project has determined that a mobile application platform for agriculture is needed to increase the impact of its work, it must select a platform. Using a platform that has been through several software development cycles and has a large user base and client references can reduce the risk and cost of implementing and operating a platform compared to developing a system from scratch.

[21] For more information about SMS aggregators see: http://www.mobilestorm.com/resources/digital-marketing-blog/sms-and-sms-aggregators-playing-catch-up/

Below is a short list of questions and criteria to consider when evaluating and selecting a mobile application platform for agriculture[22]:

1. Evaluate the platform for both business and technical viability to ensure sustainability and scale. The platform your project chooses will depend on the project's goals, growth and scaling targets.

2. For business viability, look for a platform with a track record:
    a. Number of years the platform has been available (preferably the current version)
    b. Number of years the platform provider has been in business
    c. Number of customers and number of actual users using the platform ("installed base"):
        i. Are any of these customers similar in size, scope, and scale as your project will have?
        ii. Ask for references and talk to the references using a structured interview form
        iii. In the case of open source software like Frontline SMS, the size of the community of users and developers is important. An active community is an indicator of the viability of the platform, as can be seen by the volume, date, and frequency of the posts to the online community forums used for questions and answers
    d. Financial stability of the platform provider
    e. Background of the management, founders, investors
    f. Experience negotiating with MNOs

3. For technical viability, review:
    a. Background of chief technologists:
        i. This is not necessarily about university degrees, but about their experience in developing and launching similar ICT platforms or products in terms of complexity and leading their teams through several release cycles.
    b. Technologies used:
        i. Is the agriculture ICT platform based on open or well-known standards?
        ii. Is the technology current or less widely used (becoming obsolete)?
    c. System reliability:
        i. What are your uptime requirements or downtime constraints and does the platform meet these requirements/constraints? This requires the platform provider to have appropriate resources on hand or on call, well-documented procedures, and redundancy built in to the system.
    d. Quality assurance and customer support service:
        i. What kind of internal testing does the provider perform on the platform?
        ii. When is customer support available by phone, email, or the web? Will there be a person designated to your account?

4. Develop a detailed set of functional requirements and selection criteria and prioritize them:
    a. Examples of high-level requirements include "ability to do SMS push and pull", "ability to organize farmer profiles by geographic hierarchy (city, province, region, country)", and "self-service capabilities such as allowing farmers to self-subscribe to specific SMS content or to change their profile information".

5. Where do you want to invest your project's capital and resources?
    a. In content creation, software development, or system maintenance? This will help your project determine which

[22] This is a very brief, high level list of questions and criteria. A project may want to engage an independent and well-qualified ICT advisor who has experience with vendor evaluations and can assist with a more comprehensive evaluation. This is something that the FACET project may be able to assist with as well.

makes the most sense: to purchase a traditional license and run the mobile application platform on your premises or to select a provider who will manage the entire platform for your project.

b. This depends in part on your scaling and growth goals. At smaller scales and lower message volumes, it may be more cost-effective to host the platform yourself.

6. There may be a well-functioning mobile application platform for agriculture already operating in the country. In that case, there may be no need to reinvent the wheel. Instead a donor, implementer, or government agency should find ways to enable, enhance, or catalyze the use of the existing platform. This may include bringing more farmers, users or subscribers on to the platform; creating or improving the quality of the content; providing funds for market research on the real needs of the farmer; monitoring and evaluating impact and customer satisfaction; identifying best practices; and documenting what does and does not work.

LOOKING FORWARD

In the last eight to ten years, the exploding growth of mobile phones in developing countries has created numerous opportunities to leverage the reach and ubiquity of mobile networks. Mobile applications gained momentum quickly in the health sector and we now see firms such as Voxiva, DataDyne and Souktel (which began with a job match service) in the early stages of adapting their existing mobile application platforms for agriculture and other purposes. They are well-known and have had previous success. It is worth monitoring the development of these platforms as new features and functions are added and more implementations go online.

The Esoko franchise business model will also be interesting to watch. The franchise model is also being tried in other sectors such as health care in India, so this model should be observed to apply lessons learned.

The phone still serves a critical purpose as a communications device. One simple thing that can make a big difference and that projects can easily do today is to collect the names, locations and cell phone numbers of the farmers, traders, truckers, and other stakeholders in their agricultural community and make that information available. Simply having the information to call someone to coordinate logistics and negotiate prices can have a significant benefit for the farmer.

RESOURCES

FACET profiles on specific mobile application platforms described in this paper as well as briefs on related ICTs for agriculture are available at: https://communities.usaidallnet.gov/ictforag/document-library/ict-and-ag-profiles

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