

Rapid Assessment of Cell Phones for Development

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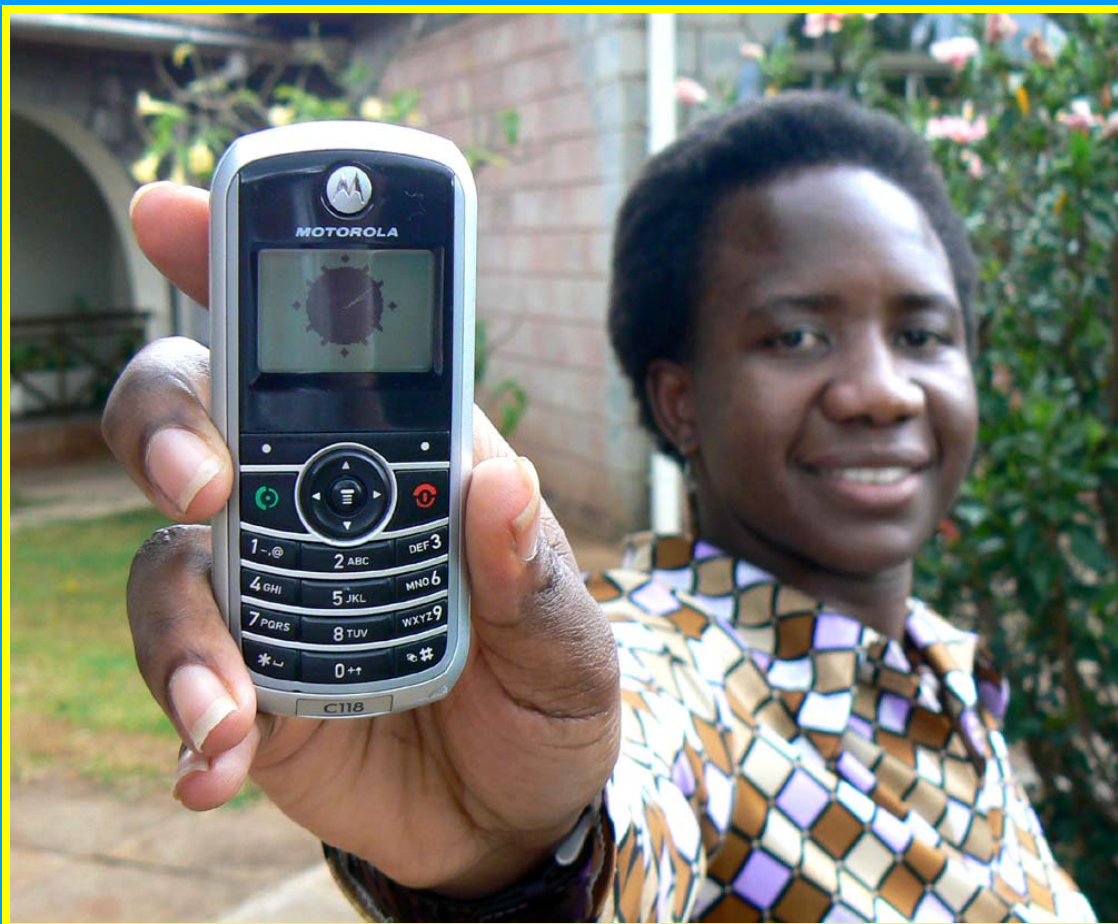


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Executive Summary

Introduction

Background to the project

This assessment, commissioned by United Nations Children's Fund (UNICEF) in South Africa and implemented by Women'sNet, aims to provide baseline data that will inform a strategy to launch a new generation of cell phone technologies to address underdevelopment and in particular HIV/AIDS as a development issue.

Lack of adherence to treatment and side effects resulting from anti-retroviral (ARV) therapy is a major obstacle to prolonging and enhancing the quality of lives of those infected by HIV. Cell phones are proving to be an important tool in overcoming this obstacle by providing a means by which patients can be alerted and reminded - at the appropriate time - to take their medication.

Text messages are also proving effective in getting information and messages on sexual health, HIV prevention and related issues to young people in a direct and discrete way. Text messaging is easy, cheap and popular, and people can have access to information which is anonymous and discrete - particularly in rural areas where stigma is still an obstacle to disclosure and openness.

In South Africa cell phones are easily accessible - approximately 40% of South Africans in rural and urban areas own phones - and relatively inexpensive with cellular networks covering approximately 90% of the country. It is therefore eminently suitable as a tool for delivering critical information or for transporting requests for information from members of civil society.

The long term objective of this activity is to support government and civil society programs to leverage partnerships with companies developing cell phone technologies and other related service providers to develop a comprehensive strategy and plan for monitoring treatment adherence, providing information on sexual health including help lines and services and prevention messages by the use of cell phone technology. The potential for harnessing the benefits of cell phone technology in other areas of concern such as gender based violence and violence and abuse against women and children is enormous. Potential, however, is mediated by factors that ensure the success of such initiatives - such as available infrastructure, contextual issues, resources, capacities and location of the project - both physical location and location within a larger project.

The information provided will be used by UNICEF as a baseline to inform and kick start further discussions and strategy development with key stakeholders for the potential scaling up of cell phone technology usage in projects with a development agenda.

The Rapid Assessment

Conduct an audit and give an assessment of the use of cell phones technology, focusing on HIV care treatment and prevention.

- The project size and scalability
- The cost and sustainability
- The impact and results in relation to project objectives
- The appropriateness of cell phones to the project objectives, including audience,
- The data content, language and affordability

About Women'sNet

Women'sNet South Africa is a vibrant and innovative networking support programme designed

to enable South African women to use the Internet and other relevant ICTs to find the people, issues, resources and tools needed for women's social activism and empowerment. The organisation has extensive experience and a keen interest in cell (or mobile) technologies for development. It has been an actor in the ICT for Development (ICT4D) sector since its establishment in 1997, and has a focus on gender and women - a sector of South African population most affected by HIV/AIDS). The organisation has particular experience in gendered aspects of the use of technology as well as expertise in content generation and assessment.

The possibilities that initiatives that use cell phone technologies pose for addressing inequality in access to information, and challenge of HIV/AIDS as it affects women and girls, is a focus of Women'sNet. We hope that this assessment will form the basis for undertakings that will help bridge the 'information' gap that currently exists, and which will strengthen existing initiatives and provide opportunities for more interventions in prevention care and treatment of HIV/AIDS and associated social problems.

Methodology

This rapid assessment surveyed existing initiatives to deploy cell phone technologies for development and social goals, started in December 2006 and was completed in April 2007. Our focus was also on projects that used cell phones to address HIV/AIDS. Geographically, our focus was on South Africa, and Africa. While UNICEF's focus is on children, we included initiatives for all ages.

A questionnaire was administered, however, initiatives proved to be too diverse for this methodology. Women'sNet undertook online research, and then conducted email and telephonic interviews with organisation's identified by desktop research, and key informants.

Assessment of the initiatives focuses on project scale and cost, sustainability, impact, language, content and affordability. We considered initiatives within the real in gender and other inequalities.

Limitations:

The project focused on the formal use of cell phone technologies- there is no doubt that cell phones are used to organize, share information and knowledge in the informal sense. The rate at which the cell phone industry has grown, and the extent to which even poor and rural people go to own one indicates that they are essential tools for daily life and survival.

We focused out data collection first on desktop research, and thereafter referrals from other actors in the field – as such we might have missed smaller, more informal use of cell phone technologies (such as small organisations using bulk messaging, or using Mxit)

Context

HIV/AIDS in South Africa

About 5.4 million people were HIV positive in the middle of 2006 and 600 000 were sick with AIDS, an estimated 711 000 people were in need of ARVs, but only 225 000 were receiving them. KwaZulu Natal has the highest prevalence and the Western Cape the lowest. In 2006, according to projections, over half of 15 year olds are not expected to survive to age 60, 47% of deaths will be due to AIDS, 71% of deaths of 15-49 year olds will be due to AIDS. Of the 5.4 million infected, 1.3 million are under the age of 25, 38 thousand babies will be infected at

birth, and around 26 thousand through breastfeeding¹. HIV/AIDS is arguably the most pressing development problem facing South Africa – and Africa.

The pandemic disproportionately affects women and girls – for social and for biological reasons. Biologically, women and girls are more vulnerable to the virus. Women are care givers to the sick, young women take care of their orphaned siblings. Girls and women are subject to sexual and domestic violence – severely limiting their sexual and reproductive choices. HIV/AIDS also intersect with other social ills – such as poverty, rural/urban divide, illiteracy and unemployment.

The Technology Environment

In South Africa, cell phones pose a much greater opportunity for communication than internet or even fixed lines do.

Mobile, fixed line and Internet Accessibility:

Mobile Signal coverage: % population covered by mobile signal 96.00%
Computers per 100 inhab. 8.36
Internet users per 100 inhab: 10.75
Fixed telephone lines per 100 inhab. 9.97
Mobile cellular subscribers per 100 inhab. 71.60²

Mobile phone or cell phone industry operators appears to be the fastest growing communications industry - when Vodacom started operations in 1994, it connected 10 000 subscribers on it's first day, by June 2006 had 20.4 million subscribers. Cell-C started up in 2001 and 2 year later passed had 3 million subscribers, MTN in June 2006 reported having 11.2 million subscribers. Mobile service providers also seem to have developed relatively (compared to fixed line Telkom) innovative ways of encouraging subscription, having more pre-paid than post-paid customers by far. In fact, the mobile phone industry has come closest to universal service. Universal service innovations include: pre-paid subscriptions, various tariff rates, Community Service telephones (CSTs) and by contributing to the Universal Service Fund³

Cell Phone usage and ownership

According to statistics (above) there are over 30 million cell phone subscribers in South Africa (though this is SIM card subscription, not hand-sets). The opportunities for innovation in the use of cell phones for mass communication, information provision, social organizing or service delivery is enormous.

Research shows that:

- 78.7% of rural respondents in a study⁴ reported that it improved their relationships
- 77.4% reported that they would call rather than travel to family & friends
- 26.5% said cell phones were useful in emergencies

¹ Dorrington R E, Johnson L F, Bradshaw D and Daniel T. The Demographic Impact of HIV/AIDS in South Africa. National and Provincial Indicators for 2006. Cape Town: Centre for Actuarial Research, South African Medical Research Council and Actuarial Society of South Africa

² International Telecommunications Union, ICT Eye, statistics for 2005, accessed from <http://www.itu.int/ITU-D/icteye/DisplayCountry.aspx?countryId=7>

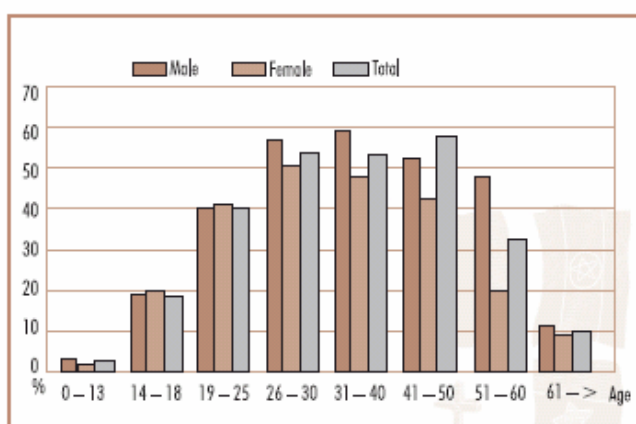
³ Achievement of the Telecommunications Act Objectives Analysis of the extent to which the objectives of the Telecommunications Act (103 of 1996), as amended were achieved (in the period 1997 to 2004) Report compiled by Adrian Schofield, Head of Research And Hlengiwe Sithole, Senior Researcher November 2005 Final Revision February 2006 Forge Ahead <http://www.usa.org.za/docs/gen/Achievements%20of%20the%20Objectives%20of%20the%20Telecom%20Act%20of%201996%2020.pdf>

⁴ Vodafone, "Socio-Economic Impact of Mobile Phones" (2005)

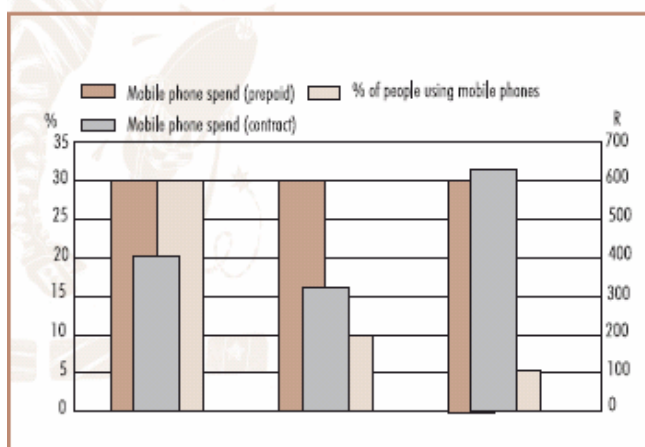
- 15.5% used them to find a job
- 83% respondents in 5 rural communities in KZN, owned a cell phone⁵
- 80% knew how to send and receive SMS'
- 76% used their phones to make voice calls to follow-up on social welfare, water, sanitation and electricity applications, or income generating opportunities.

In 2006, the mobile phone became the first communications technology to have more users in developing countries than in developed ones. More than 800 million mobile phones were sold in developing countries in the past three years.⁶

In terms of gender, in South Africa little difference exists in cell phone ownership (in 2005 a study reported that a 5% difference in favor of men⁷) In terms of age, the same study stated that ownership is highest amongst those between the ages of 30 and 34 (52.5%), followed by those between 25 and 29 years (51.3%) and 35 and 39 years (50.2%), with ownership dropping sharply after the 45 to 49 age range. More than half of the respondents said they did not ever share their cell phones, while 45% said they occasionally shared, and only 23% said their phones was regularly used by their family.



Does a household have a mobile phone (African E-Index 2005)



Mobile phone spend compared to Access (African E-Index 2005)

["When asked what people were prepared to sacrifice to get airtime,]

⁵ Langa Mtshali, Adv Anil Naidoo and Ntokozo Zungu, A Survey of Communities' Attitudes on the use of Short Messaging Service (SMS) and Podcasting Technology to Promote and Protect Human Rights in KwaZulu Natal, South Africa. The UmNyango Project (of Fahamu) Draft, March 2007

⁶ GSM Association, 2006

⁷ Alison Gillwald, Steve Esselaar, Patrick Burton and Aki Stavrou (Chapter 5- South Africa) Towards an African e-Index 2005 The Link Centre, Wits School of Public and Development Management <http://researchictafrica.net>

the answer was that mobile phones are a key to survival and that anything can really be sacrificed to ensure that the mobile phone has some credit (even it is a few cents). Therefore there is some income substitution away from other areas of expenditure such as CDs, clothes, accessories and sometimes even food. For example, faced with a choice between eating lunch or buying airtime, many people chose airtime".(African E-Index 2005, Chapter 5)

ICT Policy and Regulations

The policy and regulation environment for the mobile phone industry is an important consideration in initiatives that make use of this technology because, for the most part, initiatives must be funded or supported by the industry.

ICASA

The Independent Communications Authority of South Africa (ICASA), established in 2000, is the regulator of all telecommunications and broadcasting sectors. ICASA administers the licensing of telecommunications industry including mobile phone operators and also oversees the achievement of 'universal service'. As such, it includes in the licensing of operators, tasks to achieve universal service. ICASA also develops regulations and policies, engages consultative processes to develop rules, regulations and policies.

ICASA derives its mandate from four pieces of legislation: ICASA Act of 2000, The Independent Broadcasting Act of 1993, the Broadcasting Act of 1999 and the Telecommunications Authority Act No. 103 of 1996.

The key functions of ICASA are to:

- make regulations and policies that govern broadcasting and telecommunications
- issue licenses to providers of telecommunication services and broadcasters
- monitor the environment and enforce compliance with rules, regulations and policies
- hear and decide on disputes and complaints brought by industry or members of the public against licensees
- plan, control and manage the frequency spectrum and
- protect consumers from unfair business practices, poor quality services and harmful or inferior products.

<http://www.icasa.org.za/Content.aspx?Page=17>

Pricing

ICASA

ICASA is responsible for making sure that telecommunication costs are within reach of South Africans, and that efforts are made to bring telecommunications to disadvantaged communities. In May 2005, ICASA received a complaint about mobile pricing that gave rise to an investigation of mobile pricing structures. As such, The ICASA Council appointed a special committee in terms of section 17 of the ICASA Act (Act No.13 of 2000) to conduct public hearings that were held on 18 and 19 May 2006.

ICASA's framework for regulation in respect of mobile prices requires mobile operators to lodge tariffs or fees for services with the Authority before they charge for any services. Increases in any existing tariff plans cannot be greater than the percentage year on year increase in the Consumer Price Index (CPI). Where the Authority disallows or delays the proposed tariff increase, it must provide written reasons to the licensee for its decision. ICASA, however, have pointed out the short comings of this pricing structure in that it does not consider economic and social impact of increases in tariffs. As such, and as a result of the

investigation launched in 2006, the Authority announced that it would publish a discussion document in early 2007.⁸

ICASA also held hearings in April 2007 about hand-set subsidization for post-paid customers – the investigation focuses on consumer rights for those people who get a “free” phone when subscribing to a contract.

In terms of section 45(3) of the Telecommunications Act, public schools and other higher institutions of learning are entitled to a discount of 50% for all communications services. (ICASA)

WASPA

The Wireless Application Service Providers Association (WASPA) is an industry membership organisation, established in 2004 with the support of Vodacom, Cell-C and MTN. Membership at this point, stands at 85, and includes businesses that push content to cell phones.

Membership of WASPA is made compulsory for providers to Vodacom and Cell-C, and MTN makes adherence to its Code of Conduct compulsory. The Code of Conduct of WASPA makes provision for complaints and also sets out some content rules to protect the consumer.

WASPA’s mission success factors include “Support where possible the social and economic development objectives of governments and civil society”

Legislation:

Electronic Communications Act, 2005-Act no.36 of 2005

(http://www.icasa.org.za/Manager/ClientFiles/Documents/EComsAct_2005_No_36.pdf)

Telecommunication Act 103 of 1996

(http://www.icasa.org.za/Manager/ClientFiles/Documents/Telcoms_act.pdf)

Independent Communications Authority of South Africa 13 of 2000 (as amended by the ICASA Amendment Act 2006-Act no.3 of 2006

(http://www.icasa.org.za/Manager/ClientFiles/Documents/ICASA_Act,_2000.htm)

Regulations:

Mobile Number Portability Regulations

Published: 30 September 2005 (Government Gazette Vol 483 number 28091 30 September 2005)

Link: <http://www.icasa.org.za/Manager/ClientFiles/Documents/MobNumPortReg.pdf>

Findings and conclusions with regards to mobile pricing (Section 4c of the Independent Communications Authority of South Africa Amendment Act

Published: 1 February 2007

Link: available at the ICASA library (or for fee) the announcement of the document’s completion, and summary can be found at <http://www.icasa.org.za/Manager/ClientFiles/Documents/05.12.pdf>.

Cell Phones Basic Facts:

- A cell phone is a complex radio
- Depending on the cell-phone model, you can: store contact information; make task or to-do lists; keep track of appointments and set reminders; Use the built-in calculator for simple math; Send or receive e-mail; get information (news, entertainment, stock quotes) from the Internet; play games; watch TV; send text

⁸ ICASA, Notice of the Findings and Conclusions Document in Terms of Section 4C of the Independent Communications Authority of South Africa Amendment Act 2007/02/01 accessed from <http://www.icasa.org.za/Manager/ClientFiles/Documents/05.12.pdf>

messages ; integrate other devices such as PDAs, MP3 players and GPS receivers⁹

- A single SMS (Short Messaging Service) can be up to 160 characters long.
- SMS is a store and forward service, so, SMS' are not sent directly from sender to recipient, but via an SMS Center instead. Each mobile telephone network that supports SMS has one or more messaging centers.
- SMS' can be sent and received simultaneously with GSM voice, Data and Fax calls. This is possible because whereas voice, Data and Fax calls take over a dedicated radio channel for the duration of the call, short messages travel over and above the radio channel using the signaling path. As such, users of SMS rarely if ever get a busy or engaged signal as they can do during peak network usage times.
- MMS (Multimedia Messaging Service) is a descendent of SMS. MMS extends text messaging to include longer text, graphics, photos, audio clips, video clips, or any combination of the above, within certain size limits.
- WAP (WAP Wireless Application Protocol) is a secure specification that allows users to access information instantly via handheld wireless devices such as mobile phones, pagers, two-way radios, smartphones and communicators. WAPs that use displays and access the Internet run what are called microbrowsers--browsers with small file sizes that can accommodate the low memory constraints of handheld devices and the low-bandwidth constraints of a wireless-handheld network.
- GPRS (General Packet Radio Service) is a packet-switched technology that enables high-speed wireless Internet and other data communications. GPRS offers a tenfold increase in data speed over previous technologies, up to 115kbit/s (in theory). Typical real-world speeds are around 30-40 Kbps. Using a packet switching, subscribers are always connected and always on-line, so services will be easy and quick to access.¹⁰

Overview of Key Considerations

"Its important to have a telephones in your home. When there were no phones, it was difficult making contact with someone, especially in an emergency, or for important business. Phones also important for contacting the outside world, just the thing for people on farms or remote areas" Johanna Fisher and Christina Elas , farm workers in the Western Cape 2002¹¹

Cell phones are "just the thing" to bridge the gap for rural people where fixed telephony is not an option (Telkom has fallen far short of it's target to connect disadvantaged people). Cell phones have value before formal projects – they give the people who possess them a sense of connection to the 'outside world', improve business opportunities, improve relationships, and saves the user money in other areas of their lives. They enable autonomy and increase choice.

In thinking about cell phones for more formal developmental projects, some key considerations must be incorporated. The following have been identified as key considerations when planning, implementing and evaluating projects making use of cell phone technologies. We have divided

⁹ How Stuff Works "How Cell Phones Work" <http://www.howstuffworks.com/cell-phone7.htm>

¹⁰ From Stouf communications

¹¹ Sandra Hill 2002 "The House Women on Farms Built" Women on Farms Project, Cape Town

key considerations into two areas – development practice and technologies – they are not, however, mutually exclusive.

Key considerations for cell-phone use in development practice:

We have paid special attention to the social aspects here and on HIV/AIDS.

1. Privacy

- HIV intersects strongly with gender-based violence and issues of stigma still endanger HIV+ people. It must be a consideration as to how data is transmitted and who has access to personal information
- In projects that transmit patient data, privacy of the patient must remain a primary concern, steps must be taken to ensure data is protected at all stages of transmission and storage
- Informed consent must be given for any data transmission and storage, and patients must be made fully aware of the details of the data collection and storage process
- The fact that some cell phones are shared resources must be considered

2. Affordability and Sustainability

- Cost as it relates to sustainability, must be a key consideration
- Cost to the project partners and initiators, as well as the user must be considered as it related to benefits
- Cost for benefit –does the cost and benefit match for rural poor?
- If the project is funded, or supported by a technology partner, how does this contribute to its sustainability? Are users aware that they may be expected to pay for the service in the future (once a grant period has expired)
- If the project is supported by a technology partner, how does this impact on its accessibility (does it lock the user to a particular service provider/service?) and affordability?
- What impact does this have on open source and open content ideals?

3. Impact of initiatives, methods for monitoring and evaluation

- Stakeholders – including beneficiaries must be consulted or involved in the planning of the project
- Beneficiaries must see a direct benefit for taking part in the project – this includes users
- If the project collects data for use in high-level decision making, the benefit for people from whom data is collected must be made obvious, and users must receive feedback as to the impact of their involvement
- Indicators for success, that measure impact, must include gender-related indicators

4. Profile of beneficiaries and users

- Women must be included among beneficiaries
- The related or direct impact on children must be considered
- Rural poor must be considered, special attention must be paid to these users and their contexts

5. Project content, language

- Language of information exchange must be suitable to the users of the project
- Content exchanged must meet the needs of users, and must respond to identified gaps in information availability
- Content must evolve with the needs of the beneficiaries and must therefore be evaluated as to it's impact on beneficiaries and whether desired change/benefit was met
- Gender considerations must be included when looking at potential content, and the intersection between HIV and violence must be recognized and accommodated
- Information must be child friendly/inclusive if the beneficiaries are children or youth
- The content exchanged must match the medium of exchange or technology used (for example, SMS or text based information sent to cell phones, with small screens or 160

character limitation)

6. Gender considerations

- Do women have equal access to the technology being used – access is not merely a question of physical hands-on the phone
- How do women use cellular technology differently to men – studies show that women have less power over the communication tool than men do – this relates to economic factors as well as social factors – this must be taken into account
- Can the technology be used to compliment current strategies to end gender-based violence and to provide information that is transformative rather than information that confirms social norms and values that promote inequality
- The project must respond and address inequalities related to access, and use of the technology

8. Regulatory framework

- With regard to issues of privacy and content, the regulatory framework within which a potential project harnessing mobile technologies would operate, must be considered
- Particular aspects of the regulatory framework that are potential obstacles must be brought to the fore (advocacy) and potential facilitators of such an initiative must be responded to
- Regulatory gaps must be made obvious so that they can be addressed through practice

Key Considerations for Technology:

Prepared by Toni Elias of Ungana-Afrika

Initially, these technology considerations were supposed to be used as benchmarks against which technology solutions would have been measured. Unfortunately, even though mobile technologies have been used for many commercial purposes for few years, the number of development oriented initiatives is still limited. In addition, since the case studies vary from each other considerably, and due the short-term nature of the project with limited time, these considerations are not comprehensive. Thus the term benchmarks or best practices, was not seen as appropriate. However, the considerations are based on a combined several years experience from technology, business, and development work of the author as well as findings from relevant resources (mainly 'The Real Access / Real Impact framework for improving the way that ICT is used in development' by Bridges.org), and do provide an important set of technology aspects, which can be used to evaluate different solutions.

Technology considerations are divided into the following five different high-level categories: Accessibility, Appropriateness, Affordability, Functionality, and Development. The logic behind every category is explained shortly at the start of the section after which each technology consideration related to the particular category has been introduced.

Typically SMS based solutions have two user groups. The end-users with mobile phone with SMS functionality; and the service provider, who is often an employee or a manager of an organisation using the technology solution for administration and reporting purposes. In cases where the system can or is required to be hosted by the organisation (or any other third party than the technology service provider) another user group, a service host, is necessary.

1. Accessibility:

Technology considerations under the accessibility category are looking at how available the technology is for different users of the system. These are not only technical requirements but also cover important usability aspects.

2. Usability:

-- Persons with disabilities

When evaluating the usability of technology solutions it is important to remember that many people suffer from different disabilities, which often limit the possibilities to use the particular technology. Since this study is focusing on simple SMS based technology solutions, people with remarkable visual disabilities are automatically unable to use the system. In addition, physical disabilities as well as illiteracy will limit the use of any SMS solution.

-- Minimum level of technology competency

The minimum level of technology competency required by different user groups will need to be known when considering the accessibility of the solution. These requirements will then need to be evaluated against an average user targeted. The Human-Device Interface is particularly important. Using a computer to view different types of reports or even the use of mobile phones can be too difficult for some people without proper training. The intuitiveness of the solution should not be overestimated.

In countries like South Africa, where multiple languages are spoken, the option of providing the service in different local languages is important. Unfortunately SMS based technologies limit interface options to text and some level of literacy is required. Interface based on voice or simple icons would solve this problem.

-- User guides and documentation

Different user groups should have clear written or graphical user guides that explain how to use the service and procedures in different problem situations (such as what to do if the phone has been lost or what if the connection is down). These guides should be provided in the languages the user groups are familiar with.

-- Support

Each service must have a clear support procedure which is documented and known by the user groups. Means to access the support service should be affordable and available to the user group accessing support services. Limited support procedure such as international phone numbers or Internet based support channel (such as email-address) are not good practices if the users are from the grassroots level or staff members working for a small community based organisation with limited communication possibilities.

- Technology Requirements

The technology requirements may differ widely between different user groups. From the list below only the following considerations are important for the end users with mobile-phones: Hardware, Software, Uptime, Connectivity, and Network Coverage. It is very difficult to set any minimum accessibility requirements that the technology should meet because the services can vary from very simple to extremely complex.

-- System

Whether the service provider needs to install the system or can use it as a service is important. If installation is needed what are the platform requirements? Also, the amount of possible system customization or configuration needed (including time cost estimates) has to be understood. Configuration is preferred over system customization which is often more expensive and less reliable.

-- Hardware

The required hardware and services to maintain the hardware should be easily available. Hardware related requirements may be specific mobile phone models or a minimum level of system CPU, memory, disc space, etc..

-- Software

The required software and version upgrades at a later stage should be easily available. Software related requirements may be specific third party applications etc..

-- Uptime

Uptime related requirements should be evaluated against realistic circumstances. For example, does the end-user need to keep the mobile phone switched on all the time or just few hours during the day? Or is there are back-end database that is required to be accessible all the time?

-- Network Coverage

The solution should work with all the local mobile networks. It is also important that the target region has a reliable network coverage provided by all local mobile network providers.

-- Connectivity

The required bandwidth for administration and monitoring of the solution should be considered. Is the speed of dial-up enough or would an ADSL be the only option for convenient use? These connectivity requirements should be feasible within the local context well understood by user groups. In addition, in case the service offers more advanced connectivity options (such as GPRS, 3G, or similar) in addition to the basic SMS approach, what are the additional requirements?

3. Appropriateness:

Technology considerations under the appropriateness category are looking at the local environments and suitability for different user groups. Evaluation reports of the service based on the technology solution would normally highlight major challenges related to the appropriateness of the technology.

- Electricity

Access to electricity may be very limited especially in rural areas. Without a reliable access to electricity, mobile phones and possible computers may not be charged and switched on at all times and the service should take this into consideration. For people without access to electricity, charging their phones has an impact on costs related to the handset, and well as the accessibility of service.

- Environment

The local environment and climate conditions should accommodate required equipment without causing too many problems. For example if computers are needed in rural areas accessible by long dirt-roads how equipment is protected through the hard transport conditions? Or if the area has constant thunderstorms is it possible to protect the equipment without too expensive arrangements?

- Security

Unfortunately new technology can be seen as an attractive object. In South Africa mobile phone and computer theft is reality. How this has affected the success of existing projects and what types of measures have been taken so that local crime doesn't compromise the level of service delivery?

- Psycho-social aspects

Understanding how the technology integrates into the daily life/work routines of the users is critical. For example, continuous SMS' may become routine for the end-user. On the other hand, if SMS' are used for information collection, the transfer from paper based methods can be difficult if the person does not see added personal value. Changing daily habits may require close monitoring and encouragement to succeed. In addition to the personal aspects, the technology solution may require changes to the higher level processes of the service provider which often require strong leadership capacity and local ownership from the management.

4. Affordability

The technology considerations under the affordability category are looking at the pricing options, costs of use, and how different user groups are able to justify the expenses occurred from the use of the technology.

- Developer's Pricing Strategy

Even though mobile phones have been available for several years and are nowadays one of the most used technologies in the world the development of mobile applications is expensive. Unfortunately, as examples with South African mobile network providers have shown, even high number of users has not been enough to bring down the service costs, limiting the importance of the competitive environment or economics of scale. It is important to understand the current pricing strategy of the technology provider as well as what influence a possible up-scaling would have.

Options for business models and conservative pricing strategies have been increased during the previous years, by the influence of several technology developer communities and open source philosophy, which have become increasingly popular. However, without strong leadership and significant number of community members, the benefits to the development of specialized applications are minimal. Fortunately, there are examples of development oriented companies, who are able to sustain the development costs without aiming at extremely high profit margins. Even though these companies would be ideal options, it can be difficult to find one with a product or service that would fulfill the particular needs of the customer.

- Pricing Options

Some providers are willing to offer a revenue sharing option in cases where the end-users are required to pay for the use of the service. This can be a good option if the share is fair, but not applicable if the costs for the end-user would be too high compared to the value of the service itself. Unless the technology provider is interested in cost sharing approach, where the aim is to strengthen the level of the product or service to make it more competitive in the future, a straightforward fee structure is the most common option for the service provider. With the fee structure, two common options are either the purchase of a license or a service (where the fees are based on the time or the actual use).

- Total Cost of Ownership

When assessing expenses it is important to estimate the total cost of ownership. Additional costs related to staff training, maintenance, upgrades, modifications, and possible future change of the technology provider are examples that should be considered.

- Value of the service and estimated cost savings

The provided service based on the technology either allows different user groups to save costs or improve the quality of the work (service provider) or life (end user). Organisations use new technologies to shorten the amount of time involved in specific tasks thus saving costs. In their simplest form, mobile phones often lower the communication or travel costs of both organisations and end-users. Without simple financial reason to utilise new technologies, there must be added value to the user, such as easier and faster access to relevant information.

5. Functionality:

Technology considerations under the functionality category are meant to provide understanding of the technology platform from both external (e.g. features, speed and reliability) and internal (architecture) point of view. It is clear that considerations such as performance or features are closely linked with the needs of different projects and should only be assessed against set service requirements. Nevertheless, the privacy considerations should have very high priority when looking at projects focusing on HIV/AIDS treatment and care.

- Performance and Speed

Different users should be satisfied with the speed and performance of the technology. Too long waiting periods may cause unwanted frustration and even compromise the willingness to use the service.

- Reliability of the service

Reliability considerations are mostly technical in nature but aspects of the service process itself, where people are responsible for specific tasks, should also be evaluated. For example, human users can cause unnecessary delays, or the quality of the data may be compromised if the information typed into the system is not correct. When considering the technology itself, it should be remembered that mistake free systems are rare. Keeping this in mind, issues such as required service availability (24/7, office hours, etc.), history of service availability (how often the system has had problems), maintenance intervals, and current level of system mistakes should be understood. Procedures for data back-ups and failure recovery are very important and should be covered in service level agreements.

- Scalability

Plans to possibly scale-up the project in the future may require certain level of preparations based on what type of a scaling up has been planned. If the number of end-users will grow substantially the system should be tested under planned loads. On the other hand, if the aim is to cover other countries or even regions, there may be limitations with the available services. The service may not work without technology provider being able to negotiate new contracts and/or making modifications to the system.

- Mobile Communications

The different options for mobile communications, such as the content or communication direction, depend on the particular service. These needs can be very simple with SMS solutions but if there are possibilities that the service would need to be able to provide complex functionality, then the importance of the current functionality of the technology solution will become a priority.

A basic SMS solution will require either one or two way communication functionality where users are only able to either receive or send messages or do both. The service can also have push (content sent at the time other than user requesting) or pull (user requesting content one-time basis) functionality, again based on the needs of the particular solution. If the service will have a high number of users who will all receive push-type messages, then it is essential, that the system allows bulk-sms sending, where messages can be sent to a number of people efficiently.

Basic mobile phones with only SMS capabilities have their limitations. In the future other types of content may prove to be more relevant for the service and the current high-end phones are already able to capture, view, process, and communicate multimedia (a combination of different content forms such as video and audio) or geographic content based on GIS (geographic information system). Also, phones that are able to send and receive data in binary

mode through carrier technologies such as 3G or GPRS, can be more cost efficient than SMS if used with innovative services. An example of such a service from South Africa is Mxit (www.mxit.co.za) which has been a success among young people, because the cost of short messages can be even less than one tenth compared to sending prepaid SMS messages.

- Privacy and Information Security

A health related information is sensitive and requires an end-to-end seamless protection from both external threats (viruses, hackers, technicians updating system or fixing hardware, etc..) as well as the internal threats (unauthorised system users). When assessing the privacy and information security aspects of the system, all the components will need to be part of the assessment including back-end server, monitoring tools, mobile phones, as well as the communication layers between the components (such as Internet). The way the data is being backed-up is also a part of the information security aspect.

- System Features

Systems and the features can vary widely and only few common issues are covered. Most of the SMS based services do have a back-end server with a user interface to access and process the data. Intelligent client applications, where local processing is done, may be used, but in the most simple systems they are not needed and web-browsers or SMS functionality is enough. Useful features for SMS services are management tools such as end-user profiling and grouping, ability to set communication intervals, and other information management tools like search option and data import/export. In addition, system log and monitoring tools are highly important. Some systems may provide statistical data that can either be used internally or shared for research purposes with other institutions.

- System Architecture

The technology considerations related to the system architecture is important when the system will need to communicate with other systems that are essential for the service. Also, if the system is based on older technologies or unsophisticated design the future developments are more difficult to add and/or maintain, which will increase the costs.

-- List of used technologies

A list of used technologies such as development environment or programming languages may reveal potential limitations or challenges. For example, programming language such as Java have better reputation as a multi-platform technology providing increased flexibility, which systems based on very old programming languages, like Fortran, may lack. In addition, popular technologies have often strong communities and technical staff is more easily available.

-- Modularity

A well designed modular system will make the replacement of older components, and additions and modifications to existing components less difficult. In addition, system problems can be potentially identified and fixed faster than with non-modular systems.

-- Integration

If the technology solution will need to be integrated with additional systems an understanding of the integration architecture is important. Depending on the complexity of the service the technology solution may need to communicate with several external systems such as SMS gateways, aggregator platform, user databases, customer relations management systems, etc.. The integration can be implemented in several ways from having a dedicated integration component providing common APIs (application programming interfaces) to specialized integration platforms. In recent years, open standards (such as XML) have become a preferred

method to support system integration.

-- Compatibility

Systems that have been developed by using multi-platform development tools or languages may have more flexible software and hardware requirements. If the system will be used in an environment that has not been tested properly, it is still important to understand what are the costs involved for the testing and possible modifications.

-- Localization

A good system architecture supports efficient localization of the technology solution. In addition to an obvious language aspect, there are several other aspects that may require localization such as the format of addresses, id-numbers, date and time, currencies and so on.

Unfortunately one of the current limitations of SMS protocol is the multi-language support between Latin and non-Latin languages. This should be taken into account if the service would need to be offered for example in Kiswahili.

6. Development

Technology considerations under the development category focus on the credibility and potential of the technology provider, history and future strategy of the technology solution, as well as other relevant aspects to be evaluated, especially when deciding between similar technologies.

- Profile of the technology provider

When assessing the credibility and experience of the technology provider basic information about the organisation should be available. These basics include history, structure, and strategy of the organisation, number and roles of the team involved with the solution, research and development strengths, patenting and licensing approach, and used quality control processes. Sustainability or financial backing as well as current technology partners, and competitive environment are also very important, especially for the future potential of the technology provider and the solution. When choosing between several technology providers especially with an early stage product, one should prefer providers that either have dedicated research and development funds (venture capital, government support, etc..) or several customers sustaining and sharing the development costs.

- Community

A strong community around the technology solution is very positive for the future development or just for general advice and problem solving. Free and open source systems are based on a voluntary developer community but also popular commercial proprietary systems may have a user community with a knowledge sharing purpose.

If community approach is one of the strategies the technology provider, the organisation should provide strong leadership as well as quality guidelines and documentation to build and maintain an active community.

- Level of innovation

The level of innovation is not a major consideration as long as the solution meets the needs of the service. However, highly innovative technology solutions are often very expensive and without becoming popular the costs are likely to stay high.

- Level of development

Technology solutions within their early life cycle (in a prototype or pilot phase) are more likely to have defects than technologies in more mature stage. In addition, technology solutions with a long development history and a higher level of development are more likely to have more experienced team responsible for the development aspects as well as support services.

An honest technology provider will explain what problems have been identified, what has been done to overcome those problems or why the problems have not been fixed yet.

- Product strategy

A technology solution with a clear product strategy based on a combination of needs assessments or direct user feedback and long term high level goals is more likely to be successful than one without a strategy. A roadmap also helps when service improvements have been planned which will also require improved technology solution. Some providers may be willing to change priorities based on direct customer feedback but again, this could become expensive if it is not part of the existing roadmap.

- Policy Environment

Different countries have different ICT related policies such as the South African Electronic Communications Act. These policies may limit or even fully restricts the use of technologies such as strong encryption or wireless communications solutions. Technology providers may not know regulatory and policy environments in new regions where the technology has not been available before, and the policy environment should be evaluated during the service planning phase.

- Economic Empowerment

In many current development sector programs local economic empowerment has been given a priority. Technology providers are able to demonstrate positive economic contribution in many ways from being locally developed and implemented or having plans for sustaining impact including training and development of local expertise, to providing documentation which allows other to learn from the models and solutions.

Summary of Initiatives

Findings

How Initiatives used Cell phones

There are a number of ways that cell phones are currently being used – commercially and for public interest of social change.

A study by the Centre for Public Service Innovation (CPSI)¹² list the following as major areas of application:

- Connectivity
- Personal communication
- Information management
- Logistics
- Positioning and identifying
- Transactional

The Tactical Technology Collective¹³, identified the following scenarios for mobile advocacy:

- Access to information; e.g. recorded voice or audio and news updates
- Participatory processes and facilitation; e.g. polling, voting, surveying, incident reporting
- Citizen journalism and remote publishing; e.g. using mobiles to blog or create podcasts, to upload photographs, or for creating dynamic and interactive content
- Awareness raising and outreach; e.g. demographically targeted or time based messaging, alerts, ringtones and games or small scale applications
- Coordinating and organising; e.g. organising meetings, flash mobilisation, calls to action
- Services and coordination; e.g. alert/SOS for migrant workers, early warning, emergency response

At a meeting to consult with stakeholders in this assessment, the following uses were identified:

- Back Office support
- Mass messaging and education
- Supporting the health system to deliver health and treatment
- Monitoring and evaluation, research
- Amplifying the voice of people living with HIV/AIDS
- Participation

For the purposes of the assessment, we grouped projects that use cell phone technologies for the following purposes:

- Economic Empowerment
- Cell phones for health
- Social Service delivery
- Campaigning for change
- Commercial Use

These projects or initiatives use a range of approaches – from back-end support and data collection to mass messaging.

Economic Empowerment

Tele-density has been strongly linked to a country's economic development. Access to to

¹² Glenda White, 2005 Demonstrating the Power of Mobile Technology in Enhancing Service Delivery. A case study of four pilot projects implemented by the Centre for Public Service Innovation (CPSI)

¹³ Tactical Technology Collective: <http://www.tacticaltech.org>

communications tools – and to information- increases a person's ability to generate income. Poverty significantly impacts on a person's health – and HIV+ status. This section briefly looks at how cell phones have been used for increasing generating income.

- M-Banking

In South Africa, more people have cell phones than have bank accounts. The major obstacle to banking for poor South Africans is access and cost – banking charges being one of the highest in the world. Traditional banks are often located far from poor South Africans, or require documentation to open an account, such as proof of income and address, which many lack. Cell phones offer opportunities in this regard – turning a person's cell phone into a mobile ATM. It means people will not have to travel sometimes vast distances to get to a bank branch just to find out what the balance of their account is, and opening an account as well as managing one, will be a mobile affair.

The first innovator in the 'm-banking' field was WIZZIT¹⁴ bank in 2004, a division of the South African bank of Athens (as at 2006, WIZZIT has 50 000 clients¹⁵). Since WIZZIT arrived on the scene, a number of mainstream South African banks have offered similar services, including Standard Bank who teamed up with MTN to form MTN Banking. These banking services are specifically targeted at the poor, and unbanked, and offer sometimes significantly cheaper service charges. It means a person can use their mobile phone to make person-to-person payments, transfer money, purchase prepaid electricity, and buy airtime for a prepaid mobile phone subscription. Customers get a Maestro branded card, which they can use to make payments at retailers or draw money from an ATM. Clients do not pay monthly fees, but pay a fee per transaction, and a small fee for signing up.

The technology for WIZZIT is based on Unstructured Supplementary Services Data (USSD) – not SMS or Wireless Application Protocol (WAP). It's faster and cheaper than an SMS and doesn't require Internet or WAP enabled phones.

While the services don't offer banking to the poorest of South Africa's poor, it does significantly improve low-income earners the benefits of banking.

Another, more informal use for cell phones for money transfer, has been observed in Uganda, in which a person living in a city would buy cell phone air time, call a village phone operator and give the operator the air time details. The operator will load his/her phones with air time, charge a commission, and give the rest of the money in cash to the city dwellers' identified recipient.¹⁶ This practice is called Sente.

Through its microfinance program in the Philippines, USAID has found a way for Filipino microentrepreneurs to make loan payments with text messaging, which can help lower transaction costs significantly. The program is called Rural Bankers Association of the Philippines Microenterprise Access to Banking Services (RBAP-MABS)¹⁷.

- Cell phone Shops/Village phones as income generators

As part of their licensing requirements, MTN and Vodacom offer opportunities for entrepreneurs to become cell phone shop owners – or air-time sellers. Vodacom, for instance, offers Community Services Phone Shops to entrepreneurs in disadvantaged communities as franchise operations. These "phone shops" offer telecommunications services (only outgoing,

¹⁴ URL: <http://www.wizzit.co.za/>

¹⁵ Gautam Ivatury, Mark Pickens, *Mobile Phone Banking and Low-Income Customers Evidence from South Africa*, 2006 Consultative Group to Assist the Poor/The World Bank and United Nations Foundation UK

¹⁶ Jan Chipchase, Indri Tulusan *Shared Phone Practices Exploratory Field Research from Uganda and Beyond* Future Perfect http://www.janchipchase.com/blog/mt-search.cgi?tag=mobile%20phone&blog_id=1

¹⁷ http://www.chemonics.com/projects/default.asp?content_id=%7BD4EE9FE8-D174-471E-A1A1-20898BC6C029%7D

not incoming calls) to the local community, and some offer copying and faxing services too. Phone shop owners pre-pay Vodacom for calls on their phones. Phone shop owners retain a third of the revenue of calls made.¹⁸

MTN has installed 11 000 community payphone phone shops, and targets women and youth in particular as operators. Cell-C's community chat containers are on sale for R22,500, with a lower R3,000 for a smaller, one phone operation.

ICASA pricing regime sets community service rates lower than standard cellular rates, at around 0.90c a minute.

The Grameen bank has Village Phone initiatives in Uganda and other countries, linking up with local microfinance operators. Microfinanciers offer loans to entrepreneurs to buy a phone shop 'kit', who set up village phone operations as micro-businesses. So, they have income, while at the same time providing a service to local villagers.

- Cell phones as sources of information for income generation

Some initiatives, such as Mobile4Good, that provide information on job openings, or the Maluleke Project (South Africa), Chipata Women's Mobile SMS project (Zambia), or the Senegalese project Xam Marse SMS – all providing market information exchange for small agricultural or fishing industries. These projects are fairly expensive – to the user and the project funders. For the most part, users must subscribe to the service, or pay for data they receive.

Cell Phones for Health

- Data and Health Information Management Projects

Projects working in the area deal with health information – for the most part, general data. Data is collected using cell phones (sometimes with adjusted SIM cards). Data collectors are health care workers or home based carers. Projects like Dokoza aim to provide patient information to health professionals, enabling them to access patient data, such as results of blood test, with a cell phone. Others, like SIMpill, aim to increase drug adherence by providing reminders to patients, and information on the patients adherence to a health care provider.

The projects using cell phones for this purpose were the most experienced, some, like Cell-Life, having been testing their products in the field for over 5 years. With projections of over 2 million people on ARVs by 2015, projects that aim to increase adherence or assist in providing patient data, or health information, are key to the success to the health system in general.

Many projects in this group fail to move beyond pilot phase – the major reason for this is that policy within government does exist to roll out pilot projects (once a project is tested, a tender process is followed). This can sometimes mean a significant amount of time, money and investment in a pilot is lost because roll out is not timeous, or will involve a 'start-over'. Cell-life, a non-profit with significant experience in this regard, doubts that there is a universal solution that can be applied nationally (and even less likely, applied in different countries) without some significant customization.

All projects in the health information management field, must be able to 'plug-in' to the national health management system. At this point, the health information systems differ from province to province, and sometimes from health institution to health institution. The Department of Health's National Antiretroviral Treatment (2004) guidelines however, specifically encourage the use of technology – or "mechanical aids" to promote adherence¹⁹

¹⁸ Digital Dividends *Vodacom Community Phone Shops Case Study Interview* Vodacom 2003

¹⁹ "Encourage use of alarms, pagers or other available mechanical aids for adherence." National Antiretroviral Treatment Guidelines National Department of Health South Africa 2004 Jacana 2004

In addition, the National Health Act (2005) states that “the national department must facilitate and coordinate the establishment, implementation and maintenance by provincial departments, district health councils, municipalities and the private health sector of health information systems at national, provincial and local levels in order to create a comprehensive national health information system.”

So, while projects have a base in policy, and the need is certainly there, the infrastructure and money and personnel is not consistently present.

In the Western Cape all 3 central/academic hospitals, 8 regional hospitals and 22 district hospitals register patients electronically. However, only 23 of the 59 community health centres, 4 of the 12 maternal obstetric units none of the 112 mobile units and none of the 246 clinics, have access to electronic patient registration. These sites are where primary health care is delivered.²⁰ Because some systems are being implemented with either no connection to, or non-existent health information system, expectations for a mobile phone system is either too high, or it doesn't work with existing systems enough. In an environment where a comprehensive, and co-ordinated health information system is not present, health professionals are burdened with many different systems, mix of paper and electronic, adding mobile to this mix will add to the burden and confusion.

- Health Tips and Information

Some projects, such as One World's Mobile4Good, provide health tips and information directly to a user. With over 20 million SIM cards in service in South Africa, the potential of using cell phones as information providers is enormous. However, the kind of mass communication that this kind of project would require is not as effective, by far, as targeted, context-related information provision. Information on prevention is more effective when part of a larger campaign in which messages are reinforced by other forms of communication. Health communications initiatives such as Soul City would be a good candidate for investigating integrating cell phones into their communications tools.

Ironically, cell phones are listed among the items girls will have sex for in the 'sugar daddy' or transactional sex phenomenon. "Findings have shown that consumerism and materialism has led to many young South African women embarking on relationships for what researchers call "the three Cs", cash, clothes and a cell phone."²¹ Girls between 18 and 24 are the highest growing HIV positive population – initiatives providing prevention information must target young women in this age range and younger.

Cell phone alarms are also listed as a tool for adherence for children along with diary cards, pill counts, colour coding, reminders and pill boxes²².

Social Services Delivery

The BY-CELL venture, operating in Zambia, has been initiated by IBEX Project Services and is supported by a consortium of technology companies. They joined together to deliver services via mobile phone. The consortium works with local development organizations and microfinance institutions to deliver these services. Services include information and knowledge management, database management, web services, systems integration, patient record management, mobile banking, online micro-payment and microfinance services.²³ BY-CELL have also developed BY-CELL Impact – a monitoring solution for human rights activities.

available at <http://www.doh.gov.za/docs/>

²⁰ Human Factors in Health Information Systems: The Western Cape Experience by Rosemary S. Foster, Department of the Premier, Provincial Government of the Western Cape, Delivered at the Bamako E-Health/E-Sante Conference January 2007 [<http://www.sim.hcuge.ch/helina/32.pdf>]

²¹ Kerry Cullinan, Health-e, 15.09.2003 <http://www.health-e.org.za/news/article.php?uid=20030834>

²² Gous H, Moultrie HJ, Meyers TM. *Adherence interventions in children on anti-retroviral therapy at Harriet Shezi HIV Clinic, Chris Hani Baragwanath hospital*, South Africa. Int Conf AIDS. 2004

²³ BY-CELL website: <http://www.ibex.ch/BY-CELL/index.html>

Another initiative by the Resource Centre Development Network (RCDN) and supported by the IRC International Water and Sanitation Centre, uses an SMS Question and Answer facility. The pilot project started in August 2004 in Tanzania and aims to provide a community platform to assist with the ability of the RCDN to assess information needs in the water and sanitation sector.²⁴ The solution allows the public to report faults and find out information on where and how solutions can be found to water and sanitation services in their areas.

In Fahamu's UmnYango project, based in KwaZulu Natal, the intention is to provide a platform for reporting human rights abuses – with regard to access to land and violence against women. Interestingly, the (draft) survey on the use of cell-phones in five villages in KwaZulu Natal, where the project is implemented, shows that many villagers use their cell phones to follow up on social services such as grants applications, or water and electricity provision. Knowing the status of applications for services or grants, saves a significant amount of time and money for traveling to offices where services are administered. The South African department of Home Affairs, administers applications for Identity Documents (essential for applying for any social assistance), while the department of Social Development administers grant applications. Streamlining applications and notifications via SMS of the progress of applications and payments would save rural (and all) people time and money for travel.

The Independent Electoral Institute of South Africa (IEC) used SMS queries to enable voters to check their voter registration details for local and national election processes. This meant that voters were easily able to check that they were registered, and where they would have to go to vote.

Tactical Tech report that a South African organisation, Abahlali baseMjondolo has used mobile phones extensively as a way for people in settlements across the city to stay in touch to arrange ordinary meetings, share information and rally people for intervention. Abahlali baseMjondolo have also used mobile phones for what they call 'cell phone toyi-toyi', where members are asked to SMS a particular official to request a meeting.²⁵

In a new initiative by the Prime Media Group, a website and SMS service has been established to report crime (worryingly tagged as a service to which you can report: "Are you suspicious about your neighbours, relatives or friends? Do you suspect they are involved in crime?"²⁶)

Campaigning for Change

Cell phones can be an excellent tool for garnering public support and participation in advocacy work. By using SMS, users can send a message of support, or can donate money to an organisation in support of a specific campaign. In South Africa, the annual 16 Days of Activism on Violence Against Women (a global campaign) multi-sectoral task team, set up a short number to which supporters of the campaign could SMS to donate R5.00. The donation went to the Foundation for Human Rights and was distributed to civil society organisations for actions to address violence against women. The campaign enabled citizens to contribute to the sustainability of service organisations.

Commercial use

Commercial ventures, using cell phones, provide opportunities for adaptation or innovative use by civil society organisations or partners for development. Commercial use has focused on advertising and running competitions, or in the media, soliciting viewership through posing

²⁴ IRC Water and Sanitation Centre *Tanzania: Cell phone SMS brings instant relief* 15 December 2006 <http://www.irc.nl/page/29348>

²⁵ Tactical Technology Collective and Fahamu, Case Studies (In preparation for the development of a Mobiles Tool Kit, May 2007

http://wiki.mobiles.tacticaltech.org/index.php/Case_studies_and_scenarios#Southern_Africa

²⁶ Crime Line, 8 June 2007 <http://www.crimeline.co.za/Tipoff.asp>

questions about content. Uses include: notifications (products etc), tools (currency converters, weather reports etc), financial services, media and dating services.

In particular, and much publicized, MXit application, developed by a private enterprise based in the Western Cape, has a huge following among teenagers and young people. Some organisations and projects – such as South Africa's Treatment Action Campaign (TAC) are planning to use MXit for communications, and others, such as Meraka Institute's "Dr Maths" – are already utilizing MXit in their work. Using the MXit platform means that text messages are cheaper (less than a cent per message, compared to up to 75c for SMS).

However, there have been some concerns about safety for young people using MXit – and concerns about data security. MXit provide an Online Safety guide as well as terms and conditions that prohibit illegal content (such as nude pictures of underage girls). However, MXit still relies on users to report abuse to them so that action can be taken (at which point, it might be too late)

Other commercial options include bulk messaging – a cheaper option per message (one service provider, Axxess, sells an SMS package from Engen Stores, SMS' costing 23c per message) . Bulk messaging could potentially enable projects to keep in touch with beneficiaries (and receive feedback), organize meetings, alert users to a particular problem, or lobby for change. Bulk messaging is relatively easy to use, and fairly inexpensive and does not require any special features on a user's cell phone.

Beyond this, applications for cell phones are becoming more and more sophisticated, allowing users to check email, manage documents, and receive radio and television broadcasts. Vodacom claims it has 33,000 mobile TV users that can choose from 22 channels on Vodafone live! Cellphones²⁷

²⁷ Telkom expected to soar on back of good Vodacom results By Marcia Klein, Business Times, 10 June 2007 <http://mybroadband.co.za/nephp/?m=show&id=6691>

Summary of Projects Using Cell Phone Technologies

Mobile4Good (Kenya, Tanzania, Nigeria and Cameroon)

Proponent organisation: Oneworld

Partners:

Accenture, Vodaphone Foundation and Vodaphone Group Plc, and Mobile Network Operator: Safaricom Ltd,

Internet Services Provider: Africa OnLine Ltd

Content Providers:

Kenya Breast Health Programme, Pure Health Ltd, Occasions & Days, CBI Ltd, Executive Advantage, Alice Ndong, Hilton Hotel Nairobi Fitness Centre , Movement of Men Against Aids Kenya, National Aids and Sexual Transmitted Diseases Control, Programme (NASCOP)

Other Partners:

Ministry of Labour, The Government Public Communications Office

Location: Kenya (Kibera), in various stages of development in Tanzania, Nigeria, Cameroon and Uganda.

Initiated: September 2003 (as OKN Mobile), pilot in operation at the end of 2004.

Sector covered: Employment, Health, HIV

Type of Project: user prompted information service, subscriber based

Target: unemployed blue collar workers, women of reproductive age

Type of information exchanged:

The service offers the following information:

Jobs: job seekers receive information on available blue-collar jobs, by sending a message prompt to a number, after subscribing to the service.

Health: Health Tips for "pertinent health tips". MyQuestion allows customers to ask questions relating to HIV and breast cancer and receive answers. There is also a lifestyle service aimed exclusively at women (and includes information on "etiquette"), and a community news service (the latter is free)

Cost: The service reports that it has broken even, for the last two years, and has annual revenue of US\$100,000²⁸. Cost for users stands at 7Kenyan Shillings a message received (about 10US cents) during the pilot phase. The Jobs service – KAZI560 costs 7Ksh per sms received, and 3Ksh to subscribe (there is not cost to post a job).

Reach:

The service is available to Safaricom subscribers – which stands at 600,000²⁹ and covers 94 towns in Kenya (all urban towns). MTN, Celtel and Safricom have recently launched a partnership lead by Celtel called One Network³⁰

Sustainability:

Oneworld report that the project is self sustaining and reports the following results:

- Mobile4Good now connects more than 250 jobs to jobseekers every week
- In 2005, more than 13,000 jobs in and around Nairobi were filled by people who received the information about the job via KAZI560
- An independent survey confirmed that each such job effectively helped at least five other people in community to change their life in a positive direction
- The project has resulted in indirect benefit to more than 150,000 people in Kenya³¹

²⁸ Oneworld website: FAQs on Mobile4Good on <http://uk.oneworld.net/article/view/117279>

²⁹ According to Safricom's website

http://www.safaricom.co.ke/2005/default2.asp?active_page_id=334&id=139

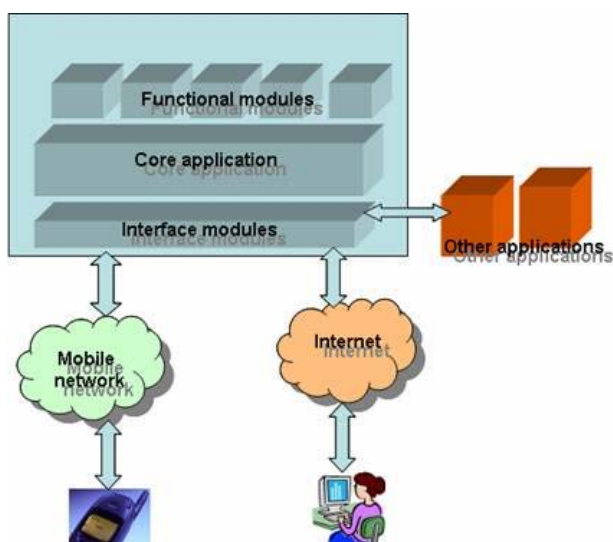
³⁰ <http://www.mobileafrica.net/n1863.htm>

³¹ <http://uk.oneworld.net/article/view/128972>

According to Oneworld, 60% of the Kenyan population are aware of the SMS messaging services rendered by OneWorld, which includes the Health service (focused especially on AIDS and breast cancer) and Community News.

Technology:

The technology platform used is made for franchise. 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. 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.³²



Link: <http://uk.oneworld.net/article/view/117284>

Learning about Living OneWorld UK (Nigeria)

Proponent organisation: One World Africa

Partners:

This is a multi stakeholder project, and OneWorld UK and Butterfly Works in Holland work closely with the following partner organisations:³³

i. The Government:

- Nigeria Education Research and Development Council (NERDC)
- Federal Ministry of Education (FMOE)
- Federal Ministry of Health (FMOH)

ii. Non Governmental Organisations:

- ActionAid Nigeria (AAN) – Strategic Partner
- Action Health Incorporated (AHI) – Lead NGO on content provision, development and capacity building
- Girls' Power Initiative (GPI) – Implementing partner in Cross River State
- Education as a Vaccine against Aids (EVA) – Implementing partner in the FCT, Abuja
- SchoolNet Nigeria – Implementing partner for the MTN Foundation School connect programmes

iii. Private Telecommunications Organisation

³² <http://www.oneworld.net/article/view/117282>

³³ email interview with Britt Jorgensen from OneWorld UK, April 2007

- MTN Foundation
- iv. Butterfly Works, Netherlands
- v. World Population Foundation

Sector covered: Education, Life Skills, HIV/AIDS

Location: Nigeria

Initiated: February 2007(a scoping study was done in 2006), and will run for two years. ³⁴

Type of Project: development and implementation of an e-learning system of the Nigerian Family Life and HIV/AIDS Education (FLHE) school curriculum, and mobile phones is only part of the project

Target/beneficiaries: Nigerian youth aged 10-18, both in and out of school youth.³⁵

Objectives:

Overall Goals:

- Utilize information and communication technology to equip Nigerian teenagers with the relevant skills to enable them make informed decisions about their sexual health, prevent HIV/AIDS and gender based violence, and associated mortality and morbidity
- Improve discussion and information on sexuality education and reduce socio-cultural tendencies that lead to reluctance in discussing these issues with young people
- Increase gender equality by reducing the prevalence of and offering positive alternatives to gender constructs that assume male superiority and the acceptability of violence against women in the Nigerian society.

Specific Objectives:

- By December 2008, at least 6,500 Nigerian Teenagers in 12 schools in 3 states are through utilizing ICT, equipped with the relevant skills and attitude to enable them make informed decisions about their sexual health, prevent HIV/AIDS and gender based violence, and associated mortality and morbidity). They have improved life skills, increased self esteem, and have acquired skills to improve their chances in the job market.
- Through the training of at least 136 teachers and 20 peer educators in 3 states in Nigeria by December 2008, there are improved discussions and information on sexuality education, and reduced socio-cultural tendencies leading to reluctance in discussing these sensitive issues with young people.

Positive consequences of achieving the outcomes

- Improved life chances for young people through providing accurate and unbiased reproductive health information to enable them make informed decisions about their sexuality
- Improve understanding of the rights of girls and women
- Increase gender equality, by reducing the prevalence of, and offering positive alternatives to, gender constructs that assume male superiority and the acceptability of violence against women in Nigerian society
- Life skills that empower girls to protect themselves from gender-based violence, unwanted pregnancy and other associated morbidity and mortality
- Life skills that empower boys with positive models of sexual behaviour
- Reduced incidence of HIV/AIDS and other STIs

Type of information exchanged: Life Skills

Costs: Funded

Sustainability:

The project involves a number of stakeholders – including government, civil society and private institutions – contributing to its viability. One World also has the success of Mobile4Good under its belt. This project does not have a business model where it will be self-sustaining by payment from users in the same way as M4G. Sustainability beyond the 2 first years is however being discussed already from the beginning of the project and it is something

³⁴ E-mail interview with Shashank Kansal, Telecom & New Projects, OneWorld London, conducted in March 2007

³⁵ Email interview, Britt Jorgensen, One World, UK

that the Nigerian partners are very involved in (this work is very aligned with the work they do already and they will include fundraising for sustaining the services beyond the 2 years).

Three options are being considered to secure the sustainability of the education services beyond the 2 years:

- sponsorship/grants from corporates
- Implementing partners incorporating the sustaining work into their other fundraising (as mentioned above)
- keeping down the cost of expanding and maintaining the e-learning platform and mobile services to keeping them going beyond the initial 2 years.

This is bearing in mind that the cost beyond the 2 years will be a fraction of the first 2 years because the project basically is a design project, and once the system and the training material and processes are finished the cost is minimal.

Technology:

As above

Link: <http://uk.oneworld.net/section/mobile>

South African Depression and Anxiety Group (SADAG)

Proponent organisation: SADAG

SADAG is a 12-year-old NGO, providing advocacy, training and awareness on mental health issues in South Africa. They run patient lead support groups on HIV/AIDS, provide counseling a referral service and support on mental health issues.

Partners: Stouf Communications (Donated all equipment – software and technical support)

Internet Services Provider: Stouf Communications

Location: Gauteng South African, service is national

Sector covered: Mental health services

Initiated: February 2006

Type of Project: SMS service

Type of information exchanged: Counseling on teen suicide

Cost: standard SMS costs. The organisation negotiated with cell-phone providers for all SMS costs to be standard rates. Costs to the organisation were very small, given that they had a computer already and software was donated.

Reach: SMS' are received by SADAG offices in Johannesburg, the service is national, and all 3 service providers are involved.

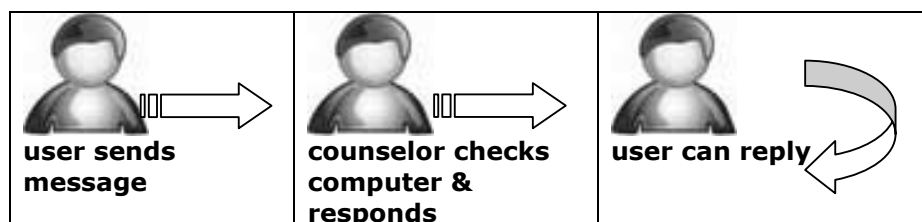
Target: South African teenagers at risk of suicide

Sustainability: SADAG reports having had significant problems with the system – an advert appeared on DSTV, which incorrectly used their SMS service number in a competition.³⁶ The influx of messages crashed their system. They have contacted the company involved, but they have broadcast the same advert again (with the same result) Another problem with the system is that they check the computer to which the messages are sent every half hour – so the system is not immediate.

Mostly, teenagers who SMS need to be called back, or the counselor will encourage them to call rather than SMS since the medium is not suitable for counseling. Setting up the system took a lot of energy and investment on the part of SADAG – contacting mobile operators to negotiate standard rates, then finding a provider and then integrating the service into their existing systems.

³⁶ Telephonic interview with Zane M. Wilson from SADAG March 2007

Technology:



The technology was easy to implement, SADAG already had a computer, and STOUF added the software and support. The counselors only check the computer every 30 minutes for new messages, so the system is not instant (even though the technology might be)

Link: <http://www.sadag.co.za>

Dokoza Project (South Africa)

Proponent Organisation: State Information Technology Agency (SITA), Centre for Public Service Innovation (CPSI), Meraka Institute (CSIR), Department of Health

Partners: In December 2003, a tender was issued by CPSI and its partners, for mobile technology proposals. The call was based on Batho Phele principles of government, and proposals were to respond to e-governance and improve access to services. 27 proposals were received, several pilots projects resulted. Kubatana, a private company, was one project selected.

Technology Services Provider: Kubatana (patented as "Dokoza")

Sector covered: Health (HIV, TB)

Location: Pilot was conducted in December 2005 in Helen Joseph Hospital and the Johannesburg General Hospital.

Type of Project: Data exchange, via data-base with cell phones as a tool. Interfacing with other systems such as the National Health Laboratory System (NHLS).

Target: Health professionals, laboratories

Objectives: exchange of real time health data, capacity building via cell phone, authorization via cell phone of patient treatment protocol.

Type of information exchanged:

Patient information (such as ID number, illness, treatment protocol, medication, illness) laboratory test results etc. Information is sourced from the patient, and from the NHLS.

Reach: Piloted in two sites in Gauteng

Sustainability:

After the pilot was conducted, the project stalled. A number of factors contributed to this – one being a restructuring at SITA³⁷, the other being that there isn't a policy in place to up-scale pilot projects or roll them out. The project was considered successful, and an evaluation by the CPSI recommended that it be further implemented.

Technology: mobile (cell phone) to web system, patented.

Link: <http://dokoza.co.za>

MobilED (South Africa)

Proponent organisation: Meraka Institute

Partners: Helsinki University of Art and Design in Finland, The University of Pretoria, funded by the Department of Science and Technology.

Sector covered: Education

Initiated: 2006 - 2009

³⁷ Interview with Doctor A. Fernandes, 16 April 2007, SITA

Location: pilots are being conducted at various schools, among them Cornwall Hill College, and Irene Middle school. (interest has been expressed by countries such as Brazil, Indonesia, Finland and the Philippines)

Type of Project:

Target/beneficiaries: School children, teachers and parents

Objectives: create a mobile solution for formal and informal learning

Type of information exchanged:

Costs: SMS are covered by the project. The project is funded.

Sustainability:

The project is in the testing phase for the next two years – and is being funded by the Department of Science and Technology. The project is covering SMS costs, but the project will investigate making the service affordable to users.

Technology:

The project has developed an audio wiki-pedia, accessed with an SMS keyword to a cell phone number. They receive a call back and a speech synthesizer 'reads' an article on the subject. The project is currently investigating an MMS content addition and delivery service (which will enable children to add content too)

The Meraka institute have also started an initiative called 'Dr Maths', using Mxit as a platform.

Chipata Women's Mobile SMS project OneWorld Africa

Proponent Organisation: One World Africa

Partners: Celtel Zambia, DFID, Fumbeni Development Association.

Technology Services Provider: Celtel Zambia

Sector covered: Agriculture, sustainable development, poverty reduction

Location: Zambia, 12 rural areas of Chipata

Type of Project: information exchange on market prices, and the availability of produce to potential buyers.

Target/beneficiaries: Rural women in the Chipata district of Zambia, engaged in small-scale agricultural activities

Objectives:

Contribute to the sustainability of small scale agricultural endeavors, and improve farmers ability to conduct business.

Type of information exchanged: market price information, agricultural information

Costs: SMS are free (Celtel supported), but phones will have to be maintained, solar chargers were provided to areas with no electricity. Phones can be used as pay-phones by the women to help maintain the phone, and to make a little extra money.

Xam Marsé SMS Market Information Service (Senegal)

Partners: Manobi (an operator of value added services on GSM whose headquarters are in Montpellier, France. In 2003 it established with the Sonatel Group, a Senegalese subsidiary which operates mobile data channels and provides professional services on GSM. It has just opened a new subsidiary in South Africa where it won the award of "Top African ICT Company of the Year"), Senegalese Ministry of Commerce has decided to support its launching operation organised on the World Telecommunications Day.

Technology Services Provider: Manobi

Initiated: started in 2001, and as at 2005, 4 000 Senegalese farmers and fisherman are using the service. Project was extended to fishermen in 2003³⁸ with additional support from the IDRC.

Sector covered: Agricultural information, poverty reduction, sustainable development

Location: Senegal, Niayes - a market gardening area in the West of Senegal

Type of Project: economic, information

³⁸ Manobi, Senegal "MANOBI's 'Innovative Internet and wireless e-services for the strengthening of Senegalese fisherman artisans' is a new project started in early 2003."

Target/beneficiaries: Senegalese small agricultural and agro-industrial operators.

Objectives: 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

Type of information exchanged: market prices, agricultural information. Weather, market prices, docking information (for the fishermen)

Costs: The sponsoring will cover the cost of the message transmission to ensure the sustainability of the service and make sure it remains free of charge for the producers. The first sponsors who joined this initiative are the Senegalese Agricultural Credit Fund, Sonatel and the Swiss Agency for Development and Cooperation.

Sustainability:

Market information provided to farmers improved their income to the equivalent of R7000 per hectare, per annum. "applied across Senegal, this translates into more that R14billion. Applied to the scale of Africa, this would equate to R150 billion annually, which could be re-allocated directly to the rural communities. This is about half of what the United Nations requires to eradicate poverty in the works from 2005 to 2015"³⁹

2003 Fisher project: The service requires users to buy a WAP-enabled cell phone (available locally for \$90 plus \$30 SIM card). Many fishermen already had cell phones (in order to contact their regular buyers). MANOBI estimates it takes around two minutes to access the data services, at an average cost of around 180 CFA (29 cents) a minute.

Technology: Manobi's information system on fruits and vegetables (SIM) is accessible by GSM. A team of Manobi employees collect 80,000 data from 10 markets per day and get it on line within a few seconds. Data has enabled the farmers to increase their sale prices negotiated from their fields or on the markets by over 50% per year. Overall, the development of this SIM use 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.⁴⁰

For the 2003 project on fishermen, the project employed two data collectors who recorded market prices in three locations in Dakar and Kayar, using a ruggedised Psion computer. Information was transmitted by cell phone to a central database and web site. Market prices were updated in real time, enabling fishermen to find out the latest prices immediately they return from the sea. In some cases this enabled them to land on a different beach in order to secure a higher price from middlemen. By the end of July 2003, some 57 individual users had registered for the service (41 buyers and 16 artisan fishermen).

A major success of the project was to persuade Sonatel to install a cell phone base station near the beach at Kayar in March 2003, which provides cell phone coverage up to 14km from the shore (allowing fishermen to access the MANOBI data services while at sea). In addition the pilot services have enabled those fishermen with cell phones to log their departures and estimated times of return, so that local fishing unions can be alerted, via their extranet web site and SMS, if fishing boats fail to return on time. Combined with access to real-time weather reports, this has improved safety for artisan fishermen operating from the capital Dakar and the nearby town of Kayar.⁴¹

Maluleke Project (South Africa)

Proponent Organisation: Manobi (mobile solutions company) Vodacom and Alcatel

³⁹ Daniel Annerose, General Manager of Manobi, quoted in "Farmers go to market via cell phone" 01.07.05

⁴⁰ Manobi press release: "Manobi launches in Senegal a free-access SMS market information service" 17.05.05 access from: <http://www.manobi.sn/sites/za/index.php?M=9&SM=20&Cle=54>

⁴¹ Gamos Ltd and Big World, InfoDev case Study: MANOBI's 'Innovative Internet and wireless e-services for the strengthening of Senegalese fisherman artisans' is a new project started in early 2003. July 2003 accessed from: <http://www.manobi.sn/sites/za/index.php?M=9&Cle=6&SM=18>

Technology Services Provider: Vodacom, Manobi

Sector covered: Agriculture, sustainable development, poverty reduction

Location: Northern Limpopo, South Africa

Type of Project: information exchange, via SMS, WAP MMS or Internet connections

Target/beneficiaries: small scale farmers in Maluleke, Limpopo

Objectives: to provide market information to small farmers, with a view to increasing their income, enabling better price negotiation.

Type of information exchanged: market price information: Retail and stock prices of produce (type, variety, origin, processing, ...) on South African, regional and European, Availability of products on the markets, Daily, weekly, monthly and yearly fluctuations of a produce price.

Costs: users pay for data, plans were for the service to be subscription based. Vodacom provided 360 starter packs and airtime vouchers worth R300 each. Alcatel provided 200 handsets

Sustainability: The project has been funded by Vodacom, Vodacom has provided 360 starter packs and airtime vouchers worth 300 rand each, while Alcatel has stumped up 200 handsets. The user pays for data. The project claims that the user's income is improved by "at least 30%
42

Technology:

Manobi South Africa uploads existing information onto their system. Farmers can access the information on a web-based trading platform via Internet-enabled phones, or can request prices and make trades via SMS, or text message. Local business like safari lodges and restaurants also have access to the platform so they can order from farmers direct. Vodacom acknowledge that their support of such initiatives is for the long term benefits of establishing a larger client base.

Domestic Relations Bill Advocacy (Uganda)

Partners: Uganda Women's Network ([UWONET](#)) and Uganda Land Alliance (ULA)

Technology Services Provider:

Sector covered: Women's human rights

Location: Uganda

Initiated: 2003

Type of Project: lobbying via SMS

Target/beneficiaries: Target: Ugandan parliamentarians (beneficiaries: Ugandan women)

Objectives: To influence parliamentarians to vote on the Bill – the specific clause at issue is the Co-ownership/Family Land Rights clause (which is regarded as a negative clause for women and the economy)

Type of information exchanged: secretariats of partner organisations sent out an SMS message to all Ugandan parliamentarians. The SMS read: "UWONET/ULA and the women of Uganda are relying on you to vote for the inclusion of the family land rights clause in the Land Act"⁴³

Outcome:

Following the debate, the Speaker decided to appoint a select committee to further look at the clause and report back to Parliament in the first week of May.

Women of Uganda Network (WOUGNET) Electronic Delivery of Agricultural Information to Rural Communities in Uganda

Partners: National Agricultural Research Organisation (NARO) and CAB International (CABI) with funding support from International Development Research Centre (IDRC).

Sector covered: Agricultural information, sustainable development, poverty alleviation

Location: Uganda

Initiated: 2006

⁴² Manobi "Hi-tech cell phones to aid SA farmers" 1 July 2005 accessed from: <http://www.manobi.sn/sites/za/index.php?M=9&SM=19&Cle=62>

⁴³ WOUGNET website: accessed from <http://www.wougnet.org/Alerts/domesticrelations.html>

Type of Project: economic development

Target/beneficiaries: rural farmers, women's groups, extension workers, youth groups, NGOs and community based organisations.

Objectives: to improve access to agricultural information by rural communities through the use of traditional and modern ICTs to increase agricultural production

Type of information exchanged: agricultural information, market related information

Dunia Moja (Tanzania, South Africa, United States)

Proponent Organisation: Stanford University International Outreach Program (IOP)

Partners: University of the Western Cape, Mweka College of African Wildlife Management in Tanzania and Makerere University in Uganda

Technology Services Provider:

Sector covered: education (tertiary)

Location: South Africa, Uganda, Tanzania

Type of Project: e-learning

Target/beneficiaries: students

Link: <http://duniamoja.stanford.edu/>

Rwanda TRACnet HIV/AIDS Solution

Proponent Organisation: Rwanda Ministry of Health, Treatment Research and AIDS Centre (TRAC),

Partners: listed on the TRACnet website are: Voxiva, University of Columbia Mailman School of Public Health, and CAMERWA (Central Purchasing of Essential Drugs, Medical Consumables and Equipment in Rwanda)

Technology Services Provider: Voxiva (a global company focusing on information systems in health) RwandaTel and MTN-Rwandacell (who have donated network time)

Sector covered: Health, HIV/AIDS management

Location: Rwanda

Initiated: Deployment started in 2005, with funding from the U.S Centres for Disease Control and Prevention. It is now deployed in all 94 health facilities offering ART in Rwanda, accounting for 100% of all ART patients in Rwanda. In addition, approximately 6,000 individual case records are monitored securely using the system.⁴⁴

Type of Project: database health management system

Target/beneficiaries: HIV+ Rwandans accessing ARV treatment

Objectives:

The solution is designed to collect, store, retrieve, and disseminate critical program, drug, and patient information related to HIV/AIDS care and treatment. The system was implemented to support the Rwandan Government's vision of rapidly scaling up HIV/AIDS clinical services in a variety of health care settings.

Type of information exchanged: health data – Lab test results, patient information, patient registry, drug inventory, personal communications

Costs: toll-free telephone interfaces, supported by Department of Health

Sustainability: the project has been in operation since 2005, and currently has all health facilities dispensing ARV's online.

Technology:

TRACnet provides a central repository of HIV/AIDS program information and delivers real-time information for decision-making. The system has transformed a largely paper-based one way information flow that took several weeks, into a bi-directional data exchange completed in seconds.

Most users (more than 90%) access the system via a toll-free telephone interface, thereby minimizing infrastructure-linked constraints (unreliable power supply, poor or non-existent internet connection), as well as the cost of accessing the Internet.

⁴⁴ Case study, Voxiva accessed at <http://www.voxiva.com/rwanda.asp>

Link: <http://www.voxiva.com/rwanda.asp>

Phones-for-Health (PEPFAR supported countries)

Proponent Organization: PEPFAR

Partners: the GSM Association's Development Fund, the U.S. President's Emergency Plan for AIDS Relief (PEPFAR), Accenture Development Partnerships, Motorola, MTN and Voxiva

Sector covered: Health, HIV/AIDS

Location: initially, Rwanda and Nigeria (2007) 10 African countries, building on an already successful deployment in Rwanda. The partnership is also likely to be extended further in Africa and Asia to address tuberculosis, malaria and other infectious diseases

Initiated: 2007

Type of Project: health management system

Target/beneficiaries: HIV+ people, health care workers

Objectives:

Phones-for-Health will make timely, relevant information available to program managers and service providers, while also helping PEPFAR achieve its ambitious goals — to support treatment for 2 million HIV-infected people, support prevention of 7 million new infections, and support care for 10 million people infected and affected by HIV/AIDS in an accountable and sustainable way.⁴⁵

Type of information exchanged: health data, patient information, lab results etc.

Costs: funded

Sustainability:

PEPFAR will provide initial support of \$2 million to this alliance for system expansion in Rwanda and Nigeria in 2007, but the project is billed as a 10 million dollar public-private partnership.

Technology:

Phones for Health will allow health workers in the field to use a standard Motorola handset equipped with a downloadable application to enter health data. Once entered, the data is transferred via a packet based mobile connection (GPRS) into a central database. If GPRS isn't available, the software can use a SMS data channel to transmit the information. The data is then mapped and analyzed by the system, and is immediately available to health authorities at multiple levels via the web. The system also supports SMS alerting and other tools for communication with field staff. Health workers will also be able to use the system to order medicine, send alerts, download treatment guidelines, training materials and access other appropriate information

Link: <http://www.pepfar.gov/press/80384.htm>

Connect Africa

Proponent organisation: Connect Africa (registered NPO)

Partners/Funders: Vodacom, Development Bank, HP, Iveco, Graffiti and the Shuttleworth Foundation, Mogalakwena Municipality

Technology Services Provider: Vodacom

Sector covered: Development, access, agriculture, health, education

Location: Limpopo Province

Initiated: 2005/6 with research and trials, roll out in Limpopo and the 'road shows' are taking place in 2007

Type of Project: Access to information – development information and government services, conservation

Target/beneficiaries: residents of rural Limpopo, teachers and students, small business people, health workers, general residents

Objectives:

- T To make a positive impact on the lives of rural Africans through the provision of a

⁴⁵ PEPFAR: press Release March 2007 accessed from <http://www.pepfar.gov/press/80384.htm>

range of tailored services that contribute to quality of life and economic wellbeing.

- To provide a mobile and technology enabled infrastructure for the delivery of these selected services to rural communities on a self sustaining basis.
- To provide access to computers and internet based learning for children attending rural schools to increase learning opportunities and exposure to new technologies.
- To provide access to phones and internet for individuals living in remote rural communities to enable them to communicate easily and affordably with friends, relatives and/or business associates.
- To provide access to a range of government and other services that might otherwise only be available in the nearest town.
- To provide a service that can transport relevant health, education, agriculture and government professionals on visits when necessary.
- To engage entrepreneurs in the delivery of these services through a franchise model, thereby creating employment, economic opportunity and innovation.

Type of information exchanged: In addition to providing communication facilities, the mobile unit will distribute business facilities, including a banking and insurance service and education through rural computer lab maintenance and training. Government services include those from the home affairs, social development, economic development and labour departments and Eskom. A partnership with the Shuttleworth Foundation's "tuXlab" initiative will enable Connect Africa to test a rural maintenance and service function for education authorities.

Sustainability:

The initiative will be based on commercial viability providing multiple employment opportunities, both direct and indirect. Connect Africa will work with franchising specialists to identify community members who can expand the service delivery network on a franchise basis, he says. The successful franchisees will be trained and managed in the use of the equipment, vehicles and distribution network infrastructure by Connect Africa.

Technology:

Mobile units – vans, enabling consisting of a double cab bakkie (pick-up) or van with trailer, both fully fitted with phones, fax, printing, copying, computing and Web browsing services, will continue to visit rural villages on a regular routine weekly basis.

Link: <http://207.234.152.57/index.php?s=20>

The Village Phone Initiative (Uganda and Rwanda, Cameroon, and the Philippines)

Proponent Organisation: Grameen Foundation

Partners: MTN Village Phone Uganda was incorporated as a for-profit company, and is a joint venture between MTN and the Grameen Foundation USA

Technology Services Provider: MTN Uganda

Sector covered: Micro-finance

Location: Uganda and Rwanda (expanding to Cameroon)

Initiated: launched in Uganda in 2003

Type of Project:

Village Phone, originally pioneered in Bangladesh, establishes mobile phone businesses that provide "pay phone" service for entire villages.

Village Phone brings affordable telecommunication access to the rural poor in a way that is both sustainable and profitable. Through for-profit and non-profit partnerships, Village Phone links the telecommunications sector with the microfinance sector to enable microfinance clients to borrow the money needed to establish a Village Phone business in their rural communities. These grassroots entrepreneurs, Village Phone Operators, then rent the use of the phone on a per-call basis providing both affordable telecommunications access in their community while earning enough to repay their loan and raise their level of income. *Village Phone Direct* is a replicable model, for take-up. Village Phone Direct allows microfinance institutions to provide a much needed, and indeed profitable, mobile communications product to their clients and select from which local telecommunications provider to buy the pre-paid vouchers. It also enables

microfinance institutions to implement small-scale programs in targeted areas of the country.

Target/beneficiaries: rural poor, microfinance organisations

Objectives:

The Village Phone acts as a tool for networking and information exchange providing modern digital wireless telecommunication services to some of the poorest people in the world. Information and Communication Technology plays a vital role in the social, political, and economic sectors of every country.

Costs:

The kit (consisting of an adapted Nokia 1100 phone, a ten meter cable connected to an external antenna, and a battery to keep it charged) costs about 200USD. The Village Phone initiative links with local microfinance organisations, and operators are given loans to buy the kit.

Sustainability:

Village Phone has become recognized as a solid business model for reaching rural populations. It is also acknowledged as a sustainable development tool by governments and development agencies such as the World Bank, the United Nations, the International Finance Corporation and USAID. Village Phone Direct has enabled micro-finance, and other empowerment projects, to start their own Village Phone initiatives.

Nine indigenous microfinance institutions (MFIs) have partnered with Village Phone Uganda to provide financing to clients for the purchase of Village Phones. In May 2005, more than 1,500 Village Phone Operators were serving rural villagers in 49 of 56 districts throughout Uganda. To date, Village Phone Uganda has demonstrated financial sustainability for all partners involved and is on target to become a profitable company providing telecommunications services to the poor.⁴⁶

In April 2005, the GFUSA Technology Center began a similar pilot Village Phone program with three microfinance organizations and 50 Village Phone Operators in fifteen districts of Rwanda. Initial goals are set for the deployment of 5000 Village Phones in Uganda and 3000 in Rwanda within five years of their respective business incorporation dates. The development value of these projects are two fold – in providing an income for the VPO, and also in providing added connectivity and information to rural villagers.

Technology:

An adapted cell phone (Nokia was involved in the project in Uganda) the kit (above) is provided to a Village Phone Operator (VPO) as part of a microfinance scheme. The VPO sets up operation, villagers request a number to be called, and agrees with the VPO on the duration of the call, the VP operator dials the number and hands the phone to the customer. VPO's are sometimes also used to forward money to village residents. A person buys phone time in the city and calls the VPO, who then loads the air time on her phones, charging the client a commission and forwarding the balance to the villager for whom the money was meant.⁴⁷

Link: <http://grameenfoundation.org>

The Network of Mobile Election Monitors (NMEM) Nigeria

Partners: (NMEM) is organized by the Human Emancipation Lead Project (HELP) Foundation. With the assistance of Professionals for Humanity (PROFOH) another Nigerian NGO, the Network started out with 54 associates resident in each of the 36 states of the country, and

⁴⁶Ryan Stanley *Village Phone – A Tool for Empowerment* Grameen Foundation USA Publication Series November 2005 Accessed from <http://www.grameenfoundation.org/>

⁴⁷ An interesting photo presentation by Jan Chipchase and Indri Tulusan explains the process http://research.nokia.com/people/jan_chipchase/JanChipchase_VillagePhone_vFinal_External.pdf

Abuja.⁴⁸

Technology Services Provider: The Technology behind this project was made possible using a SMS hub called FrontlineSMS, developed by kiwanja.net,

Sector covered: election monitoring

Location: Nigeria

Initiated: April 2007 (Presidential Elections)

Type of Project:

Target/beneficiaries: Nigerian electorate

Objectives: To provide a platform to which Nigerians could report election irregularities, and to act on reports made.

Type of information exchanged: information on elections procedures, and opinions

Sustainability: The project plans a post-election period project

Technology: FrontlineSMS – developed for the non-profit sector

Link: <http://www.mobilemonitors.org/>

⁴⁸ Election Monitoring Report, Compiled by Network of Mobile Election Monitors, April 2007, Nigeria
http://www.kiwanja.net/miscellaneous/NMEM_Election_Report.pdf

Conclusions

Peopleware

In any initiative, people are the most important factors for success. This is true from high level decision makers, to data capturers and users. Benefits must be clear and must be obvious at all levels. For any project to succeed (and in particular, in health information management projects) training must be provided, users, and implementers must be consulted and evaluations must involve all stakeholders.

"I think it's a general problem for all provinces that IT isn't really seen as a priority – they don't attach enough value to it, and to what extent it has become how we do business, and as technologies are converging, the departments are lagging and not thinking ahead and not listening, it's the last thing in line- resources like money and staff, are like the blood in the body, but the nervous system is like the IT"⁴⁹ Information technologies – including cell phone technologies are not prioritized – perhaps not surprisingly since IT is often considered a luxury in comparison to seemingly more pressing needs in the health system.

Scalability and Sustainability

Projects that involve partnerships, and that makes use of private/public partnerships are more sustainable. Cell-Life's relationship with Vodacom, for instance, has ensured that the non-profit is supported for a further 3 years. In the case of smaller projects – like the South African Depression and Anxiety Group, a relationship with a local communications company made their SMS project possible. Investment by technology partners is encouraged by telecommunications regulations and opportunities certainly exist for these partners to increase their user base through supporting projects that make use of cell phones. It's also important to partner with local actors – who know the environment, and who have existing relationships with communities and stakeholders.

"Technology, applied where a system is not working, will not fix the system, but technology applied where a system is working, can certainly make it work much better"⁵⁰

Entrenching any system – making its use intuitive and part of daily life – is a long term investment. Jessie Dias-Alf (Dokoza Project) estimates that a health information system will take from 5 to 10 years to entrench. Therefore, support for projects must be sustained and long-term, and roll out must be steady, planned and sustained. Promises to communities and users must be fulfilled.

In terms of HIV/AIDS, not only is the context different, but the nature of the virus is different. For projects dealing with, for instance adherence, or health information, there must be quality control in terms of the technology. These systems, in many cases, are a matter of life and death for the beneficiaries. Quality control must therefore be an essential part of up-scaling any project.

Projects that respond to national targets (such as the newly drafted National Strategic Plan on HIV/AIDS, either through service or data collection, have a good chance of being supported, or at least, contributing to a national effort to curb HIV.

Project also have the potential to change power relationships in the communities in which they operate – these changes must be anticipated, and must be documented.

⁴⁹ Dr Rosemary Foster, telephonic interview

⁵⁰ Peter Benjamin, general manager of Cell-Life, 19 April 2007, Rapid Assessment workshop held at Women'sNet.

Impact and Results

Impact assessment of projects differed widely – for projects in the health sector – assessments were regular and in-depth. This is partly due to the fact that many projects were in the pilot phase and therefore regular assessment was planned for and an essential investment for continuation of the initiative.

Initiatives such as One World's Mobile4Good, are sustained through user subscriptions to the service – showing positive impact. SIMpill's adherence projects show increased adherence to TB medication where the system has been used. Cell-Life's initiatives show positive impact on the ability of Desmond Tutu Centre to keep records of patients in home based care.

Appropriate Technologies

Are cell phones an appropriate tool for development? Can cell phones make a contribution to HIV prevention, treatment, care and support? Some projects have proved effectiveness – SIMpill, Cell-Life are examples. There is, however a concern that cell phones are not necessarily the most appropriate technology to use in the health system: "I think it could work to a limited extent, we should not use cell phones just because they are there. Seems like the obvious thing, but it seems to support very thin information"⁵¹ The potential of using cell phones for data exchange is limited by screen size and the technology used (SMSes are limited to 160 characters per single SMS). So, cell phones are more suited to smaller, less complex information, or information more suitable for input into a database – not for discussions, knowledge exchange or counseling, for instance.

In addition, using cell phone technologies is a complicated process – there are dozens of operating systems (as opposed to 2 for computers) and numerous service providers with different pricing structures and operating under different sets of policies and regulations based on their location.

From a user perspective, cell phones are accessible, coverage is at 94%, and they are easy to use and relatively inexpensive. Electricity might be a problem for some users (to recharge their phones) but many find ways around this (charging phones with batteries for instance). New generation cell phones also offer huge potential for cheaper and more effective data exchange.

Data content and Language

For the most part, the language of information exchange is not limited by technology but by context. In most cases more than one language is spoken (in one case, complicated by the fact that doctors in the area in question were not from South Africa – adding another language dimension to content exchange). Language questions need to be fully considered with the context in mind, and the primary needs of the beneficiaries foremost.

Where patient data is involved, all projects to the necessary steps to ensure patient confidentiality. In the case of the Fahamu UmnYango Project, content will be exchanged in the local language. For further investigation on use of cell phones, is whether or not users use their home language when using cell phone text functions.

⁵¹ Dr Rosemary Foster, Western Cape Director, Health & Social Development: e-Innovation, telephonic interview, 18 April 2007

Current and potential use:

Prevention	Treatment	Care	H I V & T e c h n o l o g y U s e
Encouraging safer sex-practices, condom distribution, information and awareness, volunteer counseling and testing, prevention of mother to child transmission, providing formula for babies, promoting gender equality, preventing gender-based violence, addressing socio-economic inequalities	Information on health, nutrition (socio-economic factors) access to health care and information, service provision (water and sanitation, primary health care etc) counseling and support groups, disclosure counseling, prevention of infection and re-infection, prevention gender based violence, access to grants and nutrition,	Access to nutrition, Anti retroviral treatment, and adherence monitoring, counseling and support groups, access to primary and tertiary health care, treatment of opportunistic infections, prevention of infections, prevention of second and third line drug protocols, support to family, access to grants, home based care,	
HIV-	HIV+	AIDS	
Mass messaging and education Health information systems allowing results of blood tests to be sent to patients or health care providers Health Information systems, research and national data Reporting violence via sms Using cell phones for socio-economic gain	Mass messaging & education Patient management, patient registration systems using cell phones Provision of information on local service providers (ARV points) Test results – CD4 counts – to help manage status Plug in system to grants process – use cell phone to check whether ID is ready/use M-banking to transfer grants etc	Mass messaging & education Adherence: reminders and monitoring via cell phone or pill bottle device (SIMpill) Blood test results via SMS, home based care managers information via cell phone Health Information System: research and national data Plug-in to grants system, home affairs etc Management and monitoring of orphans by Health care workers	

Recommendations

In addition to the conclusions above, the following are recommendations for UNICEF when considering undertaking or supporting projects using cell phones as a tool, in particular as the projects relate to HIV/AIDS. Overall, there is clearly a need to learn from initiatives, and to pool knowledge for future interventions.

A People-Centered Approach

Initiatives must start with people first. For the most part, technology is not the limitation in projects - skills, capacity and management systems most often are. The culture and norms of the location of the project have a significant impact on the potential success or failure of the intervention. Any project undertaken must have adequate planning, consultation, must incorporate management systems and personnel and must make people rather than technology, a priority. There must be dedicated responsibility for management and evaluation, and this must be integrated into the day-to-day implementation of the project. There is a danger that projects fill a gap in management and staffing rather the purpose for which the project was intended.

A Needs-based Approach

A needs-based approach implies that the project does not use cell phones technology just because it can. There are instances where another option would be more appropriate. In cases where fairly complicated or detailed data is exchanged, for instance, cell phone technologies might not be the most appropriate option.

Where Essential Services are Involved

Where cell phones technologies are used in delivering essential services – for instance, patient registration or provision of ARVs – technologies used must be carefully considered. In these cases back-up technologies must be in place and dependent services such as electricity and connectivity must be in place.

Pilots and Phased Approaches

While pilot projects might be a good testing phase for a project, many projects included in this assessment never moved beyond the pilot phase. Projects implemented in the formal health system cannot move beyond the pilot phase without a tender process. In the case of Cell-Life, their phased approach has allowed them to progress to a well-adapted and tested system, because of their stable funding base - which is institutional rather than a project-based. A phased approach with at least a five-year planning cycle is recommended, for a project to be fully tested and incorporated into a system. The future of the project must be clear and expectations created by the project must be managed.

Public/Private Partnerships

In cases where the project aims to provide health information or services, a partnership with government is essential. While innovation may be best applied on a small scale, and by non-profits, roll-out on a larger scale will require buy-in and investment by government. A project should not be locked into one service provider, but should endeavor to garner support or cooperation from major service providers.

Adaptability

Projects often fall short of expectations because they fail to adapt to challenging local conditions⁵². There is no universal application of projects –any project will need to adapt to local needs and contexts. This will require flexibility and localization - a long-term plan, which will incorporate regular assessment of progress and that, will build on ‘failures’ rather than abandon useful lessons, leaving other projects to repeat them. Adaptability also applies to the technology used – in this case, using open source technologies could prove to be more appropriate (also considering government’s open source policies).

User Impact

Impact assessments must incorporate an assessment of the impact on users, and not just those involved in management or partnership of the project. Independent impact analysis is recommended. Bridges.org provide a useful 12 point Real Access/Real Impact criteria for impact assessment (http://www.bridges.org/Real_Access).

Information Services

Cell phones are becoming the new mass communication tool – which means the projects in which public interest information is transmitted have to compete with commercial interest information – advertising, entertainment, gaming, chatting and more. Information must therefore be carefully considered, and crafted for impact.

Futures

There are two processes currently underway – a network of organisations using mobiles for advocacy, and the development of a toolkit for mobile advocacy. The Network – initiated at a meeting in Kenya in May 2007 hosted by Fahamu, aims to provide a platform for co-operation and collaboration in the Pan- African context. While advocacy focused, the network has the potential to share experiences in other uses of mobile technology and provide a platform for sharing experiences, successes and failures. The Toolkit will be developed by the Tactical

⁵² Heeks, 2002, Implementing public information systems in developing countries: learning from a success story, Information Technology for Development archive, Volume 11, Issue 2 (Spring 2005) <http://portal.acm.org/citation.cfm?id=1146094>

Technology Collective, in partnership with Fahamu. The Toolkit will contain applications, resources and case studies where mobile technology has been used for social change, for use by civil society organisations.

Case Study: SIMpill – SIMpill Classic – Adherence Management System

Prepared by Toni Elias Ungana-Afrika

Introduction:

SIMpill's solution is an example of how SMS technology has been used for sending important reminders and to capture data for real-time adherence measurement, improving medication compliance. The solution uses a combination of mobile- and web-technologies, combined with traditional enterprise information system components such as a system database collecting data from various service processes.

About SIMpill:

SIMpill is owned by Tellumat Pty Ltd. SIMpill's vision is to be a leader in providing innovative, proven, affordable and usable solutions to enable health organisations to be more efficient and effective. Their primary focus is the use of wireless technologies to support patients with chronic conditions to take their medication as prescribed. The company is based in the Western Cape.

Product description

- A pill bottle which, when opened, delivers an SMS text message to a central server. The SMS contains a unique pill box ID number as well as some information about the battery status of the pill box. Each SMS is time stamped.
- The central server receives the incoming SMS and, if it is within the time tolerances set for the pill box sending the message is simply stored for statistical purposes.
- Should no message be received within the time tolerances then the server can be set to produce a number of responses (e.g. sending a text message reminder to the patient's handset, sending a text message prompt to a family member or community based care giver, prompting them to visit the patient to ascertain the cause of non-compliance and provide assistance, sending a text message to a clinic based health professional or any other user determined response), or indeed escalate through these responses as time elapses with no incoming message in response to the previous outgoing message.
- Data on levels of compliance as measured by the device are stored for future analysis and use.

User-Groups:

Technology Provider and Service Host: SIMpill, a company which has developed the technology solution. SIMpill also provides hosting service of the necessary back-end system components (web-server, database)

Service Provider: A staff member at a dispensary (such as health clinic), who uses a web-browser to access the information saved on the system database.

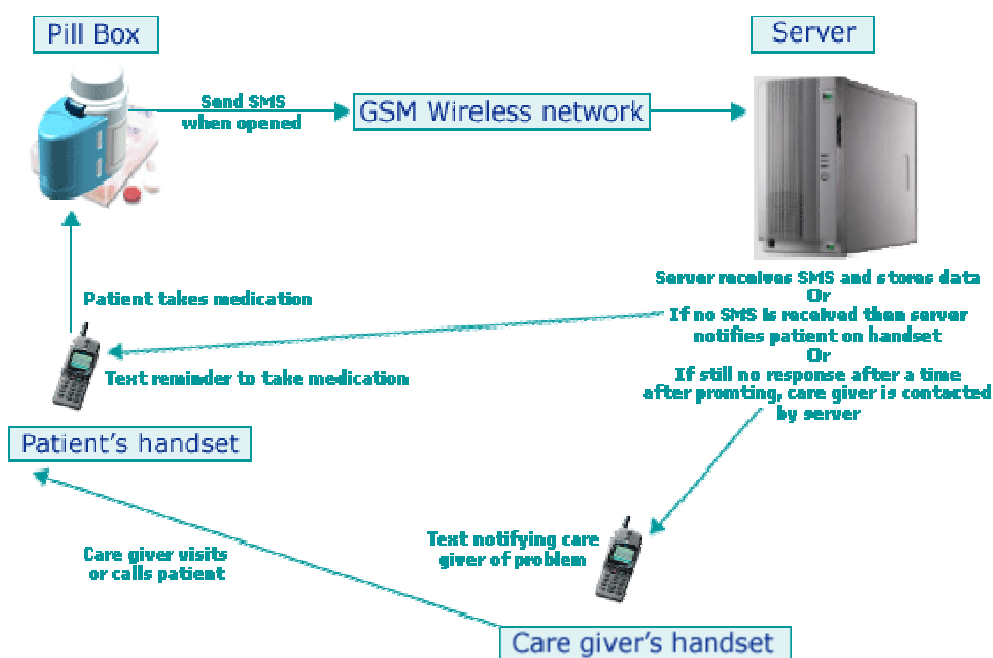
End-User: Patient who uses a pill bottle and mobile phone and a care giver who uses a mobile phone (such as friend, colleague, or family member). The pill bottle has an embedded mobile technology component that captures and sends adherence information to the back-end system (In the latest models the component can receive upgrades from the system). Mobile phones are used to receive reminders or notifications that the medication has not been taken in time.

Accessibility:

The simplicity of SIMpill solution for the end-user is a major aspect that will determine the success of the technology. SIMpill Classic has succeeded well in this regard. Because the data transmitter is been embedded inside a pill bottle and the patient does not need to interact with the pill bottle for more than taking the medicine and additional skills to read a reminder SMS if the medication was not taken in time, the patient does only need to be explained shortly how

the system works. This is done at the clinic where also other guidance is received. The patient is also given a little note with the pill bottle that explain the processes in writing. The carers are only required to be able to read an SMS sent by the system that if the patient hasn't taken the medication within a further time limit. In this case the carer does need to know the agreed procedure how to contact the patient. The end-user messages can be sent currently in three different languages: English, Khosa, and Afrikaans and new languages can be added without any major effort.

Staff at the dispensary are required to have basic computer skills to be able to use a web-browser to access the database and use the management and monitoring application. In addition they should be able to read SMS notifications from the system. During recently implemented pilot projects SIMpill had members of the community responsible for the project at the dispensary, these community members were preferably previous DOTS workers with a matric certification. Basic IT skills and SIMpill system training has been provided by SIMpill staff. The user documentation, which is available in English, is structured to follow a approved protocol set by provincial government and the particular clinic. The web-interface is in English and can be localised to be used with other languages when needed.



The support procedure is straightforward and follows the project structure. For the end-users the first contact for support is the team leader at the dispensary who can manage 40-50 patients. S/he can contact the SIMpill project manager, in case more difficult problems need to be solved. There is also a full support team provided by Tellumat for more technical problems (Tellumat is a co-owner of SIMpill also providing several operational and technical services).

Technical requirements for the mobile phones are simply an ability to receive SMS messages. The messages are sent through an aggregator service, an SMS gateway, that connects currently all South African networks to the back-end. All the users receiving reminders or notifications will need to be within the reach of the combined mobile network coverage of all networks in South Africa (outside of South Africa this depends on the aggregator service). A recently finished pilot study, covering 135 patients in three different sites, indicated that 65% of the patients had their own phone where as the rest needed an access to family members or care givers phone. In addition to the phone access, a patient does need a pill bottle which is being provided by the project and only supplied by SIMpill, since the bottles are custom made and not available locally. SIMpill has developed a solution, which works without the pill bottle called SIMpulse (patient will need to interact with a mobile phone for data capturing) but this

solution has only been released recently and hasn't been covered in this study. The pill bottle data transmitter is able to use either GPRS or SMS to communicate with the back-end server. If there is no network coverage when the device is being used, it records the action and communicates the recorded data, through the aggregator service, once network is available.

It is preferable that the service provider has a computer, even though fax has been used at sites without computers for reports and patient management and monitoring. With a computer a recent web-browser and a basic Internet connection are required. SIMpill has not recognised difference in the effectiveness of the service with sites that have only had fax ability, although it will require more human resources at SIMpill to manage and monitor the patients. In case the service provider is willing to run the whole system without SIMpill taking care of the back-end hosting, there is a recommended application server software and hardware configuration (similar that has been used for the hosting service). This configuration does require an ICT expert to take care of the set-up and maintenance or alternatively a local hosting service should be used.

The up-time requirements for mobile phones depend on the medication schedule. The back-end server should provide around the clock service for management, monitoring as well as web-access purposes.

Strengths

- Simplicity of the SIMpill procedure for the patient
- SIMpill provides hosting for the back-end system
- Full support team at Tellumat

Weaknesses

- Patients are required to use a specialised technology for the service (SIMpill pill bottle)

Appropriateness:

The results from the recent evaluation of SIMpill pilot indicates that the technology solution was received very positively by all user groups and as a result high adherence levels were achieved. The feedback from dispensary staff was extremely positive and 100% of patients who responded into a survey would like to use the SIMpill solution in case they would contract TB again. The SIMpill solution has developed from being only a simple SMS reminder into more intelligent solution that focuses on defaulters and their support network (carers and local clinic). This approach has helped the users to integrate the service into their daily lives and the benefits are easily understood.

Since the mobile phones used for the service belong to the patients, carers, or clinic staff themselves, the users have been used to keep the phones charged as well as protected from environmental or security threats. A high crime rate in South Africa, and especially with mobile phone thefts, has to be kept in mind, since a loss of a mobile phone will compromise the reliability of the service at least temporarily. However, the use of the service itself does not raise this threat because the users have purchased the mobile phones for other personal purposes regardless of SIMpill solution. In high risk areas or rural areas with limited electricity supply the service would not be feasible.

SIMpill pill bottle has a battery life that will last over 3 months. A Li-Iron battery is swapped every time the patient renews his/her prescription and refills the pill bottle. Due the basic design of the pill bottle, and its limited value to anything else than to be used as a medication device, there has been very few losses of the bottle. During the evaluated pilot, only three bottles from 150 were lost. The pill bottle functions within the temperature range of 0 to 50 Celsius which is feasible for most of the parts in South Africa. Some regions experience below zero degrees especially during the winter, which may limit the use of the device.

Even though clinics can only use fax to be able to provide the SIMpill service, a computer and Internet access are preferred. Those clinics with a computer access have a need to organise a

secure place for the valuable asset. If the computer is not easily available, because of the security measurements, the frequency to use the system may become longer than expected.

Strengths

- Highly positive feedback from the users of the pilot indicating that the solution was well approved
- Benefits easily understood and seen by different user groups
- The basic look of the pill bottle makes it less attractive for thieves

Weaknesses

- Uncertain functionality of the pill bottle in less than zero degree environments

Affordability:

Even though SIMpill has a socially relevant mission and vision it is a privately owned company and the investments into the research and development of the solution have been made keeping profitability in mind. There has been a great deal of interest internationally towards the solutions SIMpill has to offer but as a new concept creating a substantial amount of customers will take time. The results of the recent evaluation will most probably help the sales efforts of the SIMpill Classic in South Africa, and SIMpill has indicated that once they have reached high volumes of patients they are able to lower their costs. In addition, once the high communications costs are reduced, this will have a positive influence to the pricing SIMpill offers. As a concrete example of the promise, SIMpill was able to reduce the monthly rental pricing for SIMpill pill bottle from R 120 to R99 by making use of pay-as-u-go SIM cards, without limiting functionality. This price includes the hosting service for the back-end server.

When estimating the total cost of ownership, the service provider will need to consider if clinics have existing computers with Internet connectivity and whether any basic IT skills training is needed. If computers are needed, support and maintenance budget would need to be added on top of the set-up costs and monthly Internet fees as well as possible safety related measures such as insurance fees.

The patients have potential to save with their transport and health care expenses and the clinics are able to utilise their resources more efficiently by focusing their services on defaulters as well being able to reduce the number of daily patients attending the clinic. By using the SIMpill solution a community health worker is able to manage around 50 patients instead of earlier 15. The financial benefits of higher adherence levels will also raise the number of successful treatments and result in savings within the government run health facilities. In addition, South African businesses are potential beneficiaries such as insurance companies, medical schemes, and employers of the patients. It is clear that an average patient or even a clinic is not able to afford the monthly cost of the service and SIMpill should be able to provide estimates for the financial implications as a result of the use of the solution. Combined with the estimated higher treatment success rate this would make it easier for customers to justify the investment required to by the use of SIMpill technology.

Strengths

- Long term costs are reasonably easy to estimate, especially if the clinics are equipped with computers
- Clear financial benefits for the patient and clinics (in case the project fees are subsidized by government or any other third party)
- A business case estimating high-level cost benefits based on the use of SIMpill solution has been developed supporting the relevancy of the solution especially when SIMpill is promoting the service to interested customers such as local government departments

Weaknesses

- High monthly cost of the SIMpill bottle (SIMpulse solution, where patients use mobile

phones to send medication events to the server has a lower cost, starting from R20-30 per month depending on the scale of the project)

Functionality:

The SIMpill solution is able to provide real-time functionality and local users have been satisfied with the speed and reliability of the solution. In case a local network would introduce performance problems in new regions, SIMpill has experience from setting up a proxy servers to address the problem.

Major defects have not been occurred and the system is being considered very stable. In case a server failures, the hosting platform provides other nodes with automatic fail over functionality. In the case of possible network failures, messages are stored and sent once the network has recovered. According to SIMpill, they have not experienced any major system defects. The service level agreement SIMpill uses, has three categories for problems depending on their severity. Severe defects are promised to be fixed within four hours, medium defects (which have a temporary workaround) are fixed within seven days, and the fixes for minor defects are included into a next system release.

SIMpill has plans to publish a major system release every six months, which will give enough time to test new functionality. System upgrades do not require major downtime periods and the events won't get lost even when the system is down for few minutes during an upgrade. The solution provides real-time back-up functionality which has been tested successfully and are tested periodically. In addition, nightly back-ups are taken.

SIMpill has been steadily upgrading the capacity of the back-end system to be able to meet growing future requirements. The company is very confident that even the current system can handle high loads of events but very high loads have not yet been tested. An architecture has been designed which will require modifications before a possible major up-scaling of the service. New countries require negotiations with local network provider if the service provided by the aggregator, Bulk SMS, does not cover the country. In case local hosting is required, a reliable and competent local company is needed. Also, a local partner with an ability to provide quality training and support is important.

The web-application provides secure communication protocol and the the servers are located in a data centre with 24 hour security and closed circuit video. The software on the server is updated with security patches as soon as they become available to prevent potential external hackers to break into the system. In case very sensitive data is being handled, there is a risk that someone has a physical access to the servers or external back-ups since the data is not encrypted.

The system provides sufficient monitoring and reporting tools. The back-end solution keeps multiple logs of the system events including medication events, web-access events, application events, and message log for outgoing SMS messages.

Architecture of the back-end is based on modular structure supported by the object oriented approach of Python (programming language) and is based on open web-standards such as HTTP, SMTP, HTML, and CSS. There have been only limited integration needs and previously medication events have been exported by using CSV and XML data structures. The server application can run on any platform that Python supports including Linux, Mac, Windows, and Solaris. Currently it has been properly tested on windows and Linux environments.

Strengths

- Users generally satisfied with the speed and reliability of the system
- Sophisticated hosting platform providing real time back-ups
- The system is based on modern techniques and standards

Weaknesses

- Large scale project including very heavy loads would require system modification (a plan for required system architecture has been prepared)

Development:

Even though SIMpill was established on 2004, when Tellumat and On-Cue merged, the foundations were laid over then years ago, when DR David Green founded On-Cue. In addition to the financial investment to support the research and development efforts of SIMpill's solutions, Tellumat is also offering important operational and technical support, which allows SIMpill team to be able to focus their core business. Tellumat, a mid-sized South African technology company specialising in electronics and communications (2006 sales R 337 million, 490 employees), has currently 75% stake of SIMpill. According to SIMpill, the current team focusing on their product development excluding sub-contracted services is eight people. The company has submitted a patent application to protect intellectual property rights of the most innovative component of the solution. SIMpill is claiming that they were able to provide the first real time compliance system in the world and that only recently they have identified competition in the international market. SIMpill has been able to build local partnerships with important stakeholders such as the SAP SA Research Group as well as Tshwane government. The technology partners and service providers for the SIMpill solution are Siemens (providing the data transmitter for the pill box), Upfront Systems (web-application development and maintenance), Hetzner (server hosting), and Bulk SMS (aggregator).

The product has taken several major steps during the last years and during the course of 2007 the solution will be reaching the status of a stable full scale product. SIMpill has been able to enter international markets and their solutions are being offered and actively marketed in United States, The Netherlands, and United Kingdom. In addition to the recent pilots in South Africa, the company is currently implementing a pilot in Botswana. The positive side of SIMpill expanding their markets to US and EU is that the quality process will need to comply with the demanding requirements set by the local policies. In addition, developments for the web-application will be most likely useful even for the local users. On the other hand, there is a risk that the local needs are different than the needs from international markets and the local priorities won't be addressed unless the customers are willing to pay the direct development costs. Different regions will have different customer segments because in the local market patients are unlikely to pay for the service directly where as patients in wealthy countries are more likely to have the financial means to cover the costs. SIMpill has been focusing on lowering the costs by developing less expensive products, such as SIMpulse, which is more affordable and also easier to roll out logistically. These options will need to be piloted and the results compared against the standard solutions that have raised the adherence levels.

Even though not well featured in their documentation, SIMpill has been looking at the feasibility of their solutions to address the increasing HIV/AIDS pandemic. They have developed a prototype of a small cooler bag which will be tested with children in a project where the ministry of health of Botswana is one of the stakeholders. In addition, in The Netherlands, a project including 5 hospitals are implementing a HIV/AIDS project relying on SIMpill's technology.

Strengths

- Financial and operational support from Tellumat
- Worldwide interest towards SIMpills solutions
- The solution has met high quality standards

Weaknesses

- Potential risk that the development efforts will focus on international needs rather than local needs

SIMpill Summary/Conclusions:

SIMpill has a long experience from medication compliance and mobile technologies, and with the recent pilot findings, the company has been able to prove the advantages of the solution when used with acute or chronic medication for a disease like TB. It is not yet clear how feasible the solution is for HIV/AIDS treatment since the adherence requirements are more complex requiring combination of medications with time, dosage and meal requirements. However, TB is a significant danger, and a leading cause of death for HIV+ people. In addition, TB is a significant problem, and one which is widely regarded as being a neglected development issue. At the moment, the cost of using the SIMpill solution is high in local standards and without clear local sustainability model there is a risk that the company will be focusing its efforts only internationally.

Before considering a project based on SIMpill adherence management system for HIV/AIDS treatment, it is recommended that the feedback and experience from current HIV/AIDS test sites are being analysed. Also, any local large-scale project would require that sustainability aspect are being analysed carefully. Piloting and evaluating the feasibility of SIMpulse, which is more affordable and doesn't require a pill bottle, is another possible strategy, even though the decision about a large-scale implementation would need to wait until the results of the pilot have been compiled.

Case Study: Cell-Life – Aftercare

Prepared by Toni Eliaz Ungana-Afrika

Introduction:

Cell-Life is a non-profit, registered in South Africa and based in Cape Town, that provides effective technology-based solutions for the management of HIV/Aids. Cell-Life's Aftercare solution is an example of how SMS technology has been used for data capturing as a part of HIV/AIDS patient aftercare. The solution uses a combination of mobile- and web-technologies, combined with traditional enterprise information system components such as a system database collecting data from various service processes.

User-Groups:

Technology Provider and Service Host: Cell-Life, a not-for-profit company which has developed the technology solution. Cell-Life also provides hosting service of the necessary back-end system components (web-server, database)

Service Provider: Home-based care manager who uses a web-browser to access the information saved on the system database.

End-User: Home-based carer or counsellor who uses a mobile phone to capture patient information and sends/receives messages from/to the back-end system.

Accessibility:

Cell-Life has emphasised accessibility aspects designing an intuitive product that would make it difficult for the users to make mistakes and providing necessary training and documentation for all user groups. As most of the counsellors are educated (community professional level) they already have the skills to use mobile phones, and only few minute interface training is enough. Also, most of the home-based care managers have basic computer skills to use the web-interface, and most of the time less than half-a-day system training is needed. Based on the higher skills level of users there has not been a need to localise Aftercare into other languages than English.

The support procedure is straightforward and based on the structure of the project. The first point of contact for a counsellor is the home-based care manager, who is usually capable of solving small problems. Cell-Life has a dedicated project manager, who will be contacted if problems can not be solved on site. So far Cell-Life has not received too high number of support requests but because the number of total projects of the organisation is growing, there are plans to establish a dedicated small support team starting from one person.

Technology requirements are low, especially because Cell-Life provides server hosting that allows the users to focus on their core service processes without the added technical administration. Aftercare works with even the most basic phones available in the market, even though for usability reasons the phone should have display that has minimum of 4-5 rows for text. Web-interface used by the managers works with current browsers, but naturally a computer with Internet connection is required. Even dial-up or GPRS connection is enough but if the connection is really slow this may cause frustration, especially if the manager will need to wait for few minutes to get reports or other system information.

The solution currently works only with Vodacom network which is good in major towns and cities. However, there are rural villages with only MTN network which would not be able to be included into the service. Cell-Life is working towards integrating other network into their solution but so far they have not been able to negotiate with MTN about the possibility to use their network.

Strengths

- Intuitive interfaces with low training needs
- Cell-Life provides hosting for the back-end system
- Low technology requirements

Weaknesses

- Network coverage restriction (Vodacom) limits which sites can be selected

Appropriateness:

The Aftercare solution has been evaluated by Vodacom in 2005, Even though the results of the evaluation were not published the continuation of the solution development and collaboration with pilot sites do indicate that there is a need for the service and that Aftercare has potential to improve the impact of home-based care procedures.

Local environment in current project sites have shown that the technology is feasible in most cases. Crime is reality in local communities in South Africa but the use of low-end mobile phones has kept the phone theft rate within the average community level. The electricity supply has not been a problem and Nokia 1100 phones, that are currently being used, have proven to have reliable battery. If a phone is lost it can take several days to get a replacement from Cell-Life. In these situations paper based forms are used as a back-up and the data submitted into the system at a later stage. Because computers are needed for the managers to access the solution there is a need to organise a secure place for the computer. This has been a challenge in some sites, and if the computer is not easily available, because of the security measurements, the frequency to use the system may become longer than expected.

Cell-Life has noticed that even though the managers have felt it easy to integrate the solution into daily routines some of the councillors are lacking the understanding of the benefits of the technology. The reason has been a lack of real-time feedback especially if there is no computer on-site, when reports are not easily available. In addition, some managers have very busy schedule and the reports may be provided once a week or even less frequently. Some technical problems, typical for pilot versions, have also forced councillors to still use paper based forms. Experiences have been more positive from sites where a lead counsellor has become a local champion.

Strengths

- Home based care managers willingness to use the system
- Use of a local champion to improve the integration of the technology among other counselors

Weaknesses

- Without an improved feedback process counselors are lacking the understanding of the concrete benefits of the technology solution
- Small problems with the solution that slows down the willingness of the counselors to give up the paper forms

Affordability:

As a not for profit company, the philosophy for Cell-Life's pricing strategy is to be able sustain it's operations and invest into research and development activities while being able to employ highly skilled people. Cell-Life convinces to be able to provide more affordable solutions and services than similar technology companies in South Africa.

One of the areas that Cell-Life does understand, is the fact that they should be able to provide

fact based estimates about the cost savings the service providers would be able to achieve, a fact that would highly increase the attractiveness of the solution and make it easier to promote.

Besides hosting the Aftercare solution, Cell-Life generates revenues from training and system customisations, which are essential because of the different policies between sites. Since Aftercare is based on open source licensing and Cell-Life is willing to share the source code with interested parties. The cost of using Aftercare is based on patient numbers and currently heavily subsidised and a clear pricing model has not been developed, which is typical to solutions in their early stages. In addition to Aftercare, Cell-Life has a number of other solutions, which have diversified the revenue streams and lowering the risk of relying on only the success of one solution.

Currently SMS messages that are sent to and from Aftercare are toll free, an example of the strong support from Vodacom. Cell-Life has plans to reduce the cost of messages in the future by changing SMS to messages supporting GPRS. Even though GPRS technology is not yet supported by all mobile phones the savings from each message would most likely be higher than the higher cost of more advanced phone.

Strengths

- Not-for-profit pricing strategy
- Vodacom billing system which allows Cell-Life (or a client) to be billed for air-time used by home based carers

Weaknesses

- As the number of sites using Aftercare is still small a clear pricing policy is still to be developed making it difficult to estimate the total cost of ownership for large and or long term projects
- The sustainability strategy to secure the Aftercare development and support activities is not clear at the moment
- A model that would prove or estimate customer cost benefits based on the use of Aftercare has not been developed, which makes it more challenging to promote the solution to interested customers

Functionality:

In general, users have been satisfied with the system. Besides few occasions where the Internet connection was very slow, Cell-Life has not received complaints about the system performance. After the SMS is sent, the data appears in the database almost immediately. Earlier the counselors were annoyed because they were not sure if the message was received successfully but after an acknowledgment feature was added, this has not been a problem. A clear success in this case is Cell-Life's response to feedback from users and their open line of communication with home based care managers.

According to Cell-Life, also the reliability of Aftercare has been high. Minor problems are fixed regularly and the solution has only had a small number of major system problems. Cell-Life does not yet have a clear policy in terms of system maintenance and problem solving. However, even though the development team is small they have been able to prioritise problems high and provide fixes quickly.

In terms of scalability, the experience in South Africa has shown, that universal solution is not possible. This is not a limitation of the technology itself, but the different information that is been captured in different project sites. Therefore a large scale roll-out would require several small customisation projects. In addition, until the system wont work with other than Vodacom network, large scale roll-out has the same limitation. Since the current sites have only a small number of users it is not yet tested under heavy loads, and a large scale project would most likely require that certain portions of the solution are re-designed.

Cell-Life is very confident about the security of the system even though they would appreciate an opinion from an external security expert. A small security risk that was identified during the interviews was that the data in the servers is not encrypted. In case someone has a physical access to the servers (either hosted by Heatzner or located at Cell-Life offices) with an intention to find an access to the database, this would not require a highly skilled expert.

All databases are backed-up every day. In case data recovery is needed, Cell-Life can restore one day old database in few minutes. Apparently, a full data recovery operation has not been simulated ever, which is a risk, in case the back-up process is not working properly.

The system itself provides sufficient monitoring and reporting tools. For example, even though user actions are not recorded the system provides communications and error logs which are helpful in problem solving. Cell-Life has plans to provide more comprehensive reporting tools that would support the needs for statistical data amongst other reporting needs that have been identified.

The current system architecture is very closed and modularity has not been designed. These are typical signs of a young solutions, where the emphasis has been to get the actual service to work during a pilot phase. Cell-Life has plans to support open standards and modular system design in the future, but it would require secured future prospects and well planned roadmap including architecture improvements. The first open standard support is HL7, used in healthcare systems. The lack of modularity results that localisation requires code changes, making the version management more difficult. Aftercare does not provide support for data integration and previously integration has required an additional project. There are plans to implement APIs to support data integration in the future. Written in Java, the system is platform independent and has been tested on both Linux and Windows environments.

Strengths

- Users generally satisfied with the speed and reliability of the system
- Fixing system defects has been efficient with current pilot sites (A large scale site may require additional resources within the development team)

Weaknesses

- Data recovery from the back-ups has not been fully tested (this process should be tested few times a year)
- Aftercare not ready to be used in a large scale site (the system has not been tested on heavy loads and planning and possible system modifications will be required)
- The system architecture of Aftercare will need to be revised and enhanced

Development:

Cell-Life is one of the most experienced initiatives combining mobile phone technologies and the management of HIV/AIDS in South Africa. Cell-Life has been able to develop a diverse suite of solutions and is supported by strong partners from private, academic, and government sectors. Being able to diversify its financial model towards self-sustainability (30% of the revenue is not donor based) and secure R 5 Million from Vodacom for the next three years, Cell-Life has a strong mid-term financial backing. Cell-Life has not identified strong competition in the sector so far. Recently, a multi-million dollar Phones-for-Health initiative was launched, and it has plans to connect health systems addressing HIV/AIDS pandemic in several African countries. As the initiative is being supported by large mobile phone stakeholders such as GSM Association and MTN, it is likely that competitive solutions are developed to compete with Cell-Life's solutions.

Currently Cell-Life is going through a major strategic planning process, based on the current prospects of the solutions, identified future opportunities, and possible funding restrictions. The management has several interesting options starting from the customer segment (should individuals be targeted), but due to the relatively small size of the organisation, more focused strategy is needed. A new strategy is in the pipeline - and will be published in July 2007.

As a product, Aftercare is still being regarded as a pilot, even though it is slowly maturing into more mature stage having its fifth version released soon. Cell-Life has identified several needs and the solution has its own development plan. However, without additional projects based on Aftercare, other solutions, such as iDart, Cell-Life's current flagship solution, will have higher priority. This may slow down the development efforts for Aftercare.

Cell-Life's solutions are based on open source model and they are keen to build a developer community to both open the development efforts as well as support the marketing strategy of the solutions. There were no clear plans how this will be implemented and the new strategy of the organisation will influence the future priority of this idea.

Strengths

- Cell-Life has several years of experience with both technology and HIV/AIDS
- Financial status healthy at least for the next three years
- Cell-life solutions are open source – in live with government policy on it's own use

Weaknesses

- The new strategic direction of the organisation may be less focused on Aftercare
- Aftercare has been successfully tested in few pilot sites but it is not a full scale solution yet
- There is no clear sustainability model for Aftercare

Cell-Life Summary/Conclusions

There is no doubt that Cell-Life has a very good understanding how new cell phone technologies such as SMS can be utilised to address different aspects of HIV/AIDS pandemic. Aftercare, as one of these solutions, has grown from a prototype into a relevant technology solution, and is one of the few live project sites in operation. However, it is clear that the solution is still young and without a large number of project sites providing financial sustainability new customers are required to contribute towards the development costs more than if using mature solutions (if these would be available). As a non-profit initiative, Cell-Life is providing a very reasonable pricing strategy.

Said Lulu Mtshiwa, the Home Based Care Manager, Desmond Tutu Centre Cape Town, "I want to believe we have saved a lot of lives – because if action is not taken promptly, then our clients could die." (interviewed 19 March)

Before considering a project based on Aftercare, it is important to know how the new strategy of Cell-Life will influence the future of the solution. Also, the current limitation of Aftercare only working with Vodacom network should be assessed against the short term needs. If projects outside of South Africa are planned, additional limitations of Aftercare should be considered carefully. Cell-Life should also be able to provide a certain quality of service terms in the service level agreement, if the solution will be used in a larger scale project.

Case Study: Fahamu - UmNyango Project

Prepared by Toni Eliaz Ungana-Afrika

Introduction:

The UmNyango (meaning “doorway” in isiZulu) Project is an example how SMS technology has been used to enhance the rural women’s and men’s access to vital human rights information as well as providing a mechanism to report human rights violations. The solution uses a combination of mobile- and web-technologies, combined with traditional enterprise information system components such as a system database collecting data from various service processes.

Initiated: A survey of rural communities attitudes on the use of SMS and podcasting technologies took place October to December in 2006, the pilot was scheduled to be initiated in March/May 2007. The initiation of the service is now scheduled for June 2007. The project is set to conclude in October 2007 (the period for which funding was secured)

Location: KwaZulu-Natal (Dondotha, KwaDlanezwa, KwaGcewensa, Limehill and Muden)

Partner Organisations: Established by Fahamu, in association with Centre for Civil Society, Community law and Rural Development Centre, Domestic Violence Assistance project, Participatory Development Initiative and the Rural Women’s Movement.

Focus: community, human rights

Status: Pilot

Project goal: Reduce poverty and to promote good governance and the respect and protection of human rights of disempowered rural communities in KwaZulu Natal.

Language: isiZulu

About Fahamu:

Fahamu has a vision of the world where people organise to emancipate themselves from all forms of oppression, recognise their social responsibilities, respect each other’s differences, and realise their full potential.

Fahamu supports the struggle for human rights and social justice in Africa by:

- Supporting social justice advocacy through the innovative use of information and communication technologies
- Stimulating debate, discussion and analysis
- Distributing news and information
- Developing training materials and running distance-learning courses
- Fahamu focuses primarily on Africa, although we work with others to support the global movement for human rights and social justice.

The word Fahamu means ‘understanding’ or ‘consciousness’ in Kiswahili.

Link: <http://www.fahamu.org>

User-Groups:

Technology Provider and Service Host: Clickatell, a company which has developed the technology solution.

Service Provider: A staff member at Fahamu or a partner organisation specialising in human rights issues, and that uses a web-browser to send SMS’ to the community members and access the human rights violation reports saved on the system database.

End-User: A community member who uses a mobile phone to receive human rights related information or sends human rights violation reports through SMS’.

Accessibility:

At this stage it is assumed that the information different user groups are required to manage

and process is very limited and do not require complex system features, making it easy for users to understand the concept and learn the required procedures. Fahamu conducted a survey in 5 rural areas of KwaZulu Natal, as a part of the current pilot project, with the following high-level objective "whether rural participants would embrace the use of SMS and podcasting technologies for their access to information on human rights and for the reporting of human rights violations". The survey included few important findings regarding the accessibility consideration within rural communities in South Africa.

Although not all the community members own mobile phones most of the people are able to access one, and most of the due the low cost of SMS' people are used to send and receive information by using SMS functionality of their phone. According to the survey findings, it was found that 80% of the participants are literate (iziZulu) and able to send and retrieve SMSs, and that the network coverage is good and reliable. Only considerable risk factor is the possibility to make mistakes when typing a key word when human rights violations are sent. These key words are required in every incident report in order to be categorised and addressed properly. Since the service has not yet been piloted it is difficult to estimate how big portion of the sent reports are not written correctly even though the community members will be receiving training and given a manual, both in isiZulu.

Fahamu will be developing a manual for the partner organisations as well as providing one day training session to the staff members taking part of the UmNyango Project. These partners are required to provide a person with good computer skills, and ability to use web-browser and email. The web-application, training and manuals are all offered in English which is feasible considering the average skills level of the staff of the project partners.

Planned support structure includes field visits and monitoring (such as focus group meetings with the community members) provided by Fahamu. Fahamu also provides a contact member for the project partners in case they have problems. Technical support is provided by the technology provider, Clickatell, which consists of web-based resource centre and a support centre that can be contacted by phone, email, or by using a web-form.

Technical requirements for the mobile phones are simply an ability to send and receive SMSs. The messages are sent through Clickatell's aggregator service, an SMS gateway, that connects currently all South African networks to the back-end. All the users receiving or sending SMSs will need to be within the reach of the combined mobile network coverage of all networks in South Africa (outside of South Africa this depends on the coverage Clickatell is able to offer). The project partners are required to have a computer with a web-browser and a basic Internet connection, which is a basic standard for the types of organisations chosen as project partners. The only way the service provider is able to run the technology solution is through Clickatell's online service and there is no possibility for separate back-end system installation. However, the set-up and administration of the technology solution is straightforward and an average computer user without technical skills should be able to manage to implement these tasks.

There are no specific up-time requirements. Clickatell provides a continuous back-end service that can be accessed or used to send or receive messages at any time.

Strengths:

- Set-up of the technology solution hosted by Clickatell does not require an expert and can be done in a very short time
- Simple management and administrative tasks for the partner organisations to send and receive SMSs
- Full support team at Clickatell

Weaknesses:

- Without knowledge of the service community members are not able to access the service. A large scale implementation would require a massive marketing and possibly training effort, which are challenging to organise
- Training of a small group of community members is not demanding but to be able to reach

- and train larger amounts of people in the future will be challenging
- Human error factor such as misspelling of the key words during the reporting procedure

Appropriateness:

Because the service is not yet being piloted and Fahamu has not received any feedback about the appropriateness of the service, most of the notes in this section are based on assumptions. Findings from the recently conducted survey has been used to support some of the assumptions.

According to the survey findings, almost all the participants were interested in the UmNyango Project pilot. However, if the participants would not be provided free airtime vouchers this number might be much lower. With over 80% mobile phone penetration it is clear that the community members in the target areas have a reliable electricity supply. There is a constant risk of mobile phone theft in the communities but the users have purchased the mobile phones for other personal purposes regardless of the UmNyango Project. A loss of a mobile phone would compromise the service at least temporarily until the previous number is canceled and a new mobile phone number has been updated to the system. How the community members will welcome the service is very difficult to predict and this will only be understood better after the pilot results have been concluded.

Because the project partners have the required technology the only relevant aspect is related to the psycho-social aspects. Fahamu believes that this is a real opportunity for the project partners because they will have an opportunity to make an impact in far rural areas which have been excluded previously. In addition, the solution provides a platform for them to expand their operations. How the employees are able to integrate new tasks into their daily work routines can only be evaluated during the project pilot.

Strengths:

- Community members willingness to participate the pilot project is a positive sign

Weaknesses:

- Psycho-social aspects are not yet known and difficult to predict

Affordability:

The cost of the UmNyango pilot project are covered by donor funding and sponsorships, and the major expenses are project staff costs, provision of airtime to participating community members, and training related costs such as travel. Project partners will receive funding to cover their costs such as human resources. Long-term sustainability is very unclear. The assumption is that it will be too challenging to try to cover the costs by charging community members for the service or even those civil society organisations that are able to expand the coverage of their operations. Eventually, the local government should be responsible for this type of service to the local communities but the level of interest of municipalities is difficult to predict. Fahamu has had discussions with Durban municipality and received positive signs for possible additional pilot of the concept.

Even though Fahamu, the service provider, is a non-profit and not looking for financial gain, the technology provider for the pilot, Clickatell, is a commercial company. Clickatell's pricing strategy is based on the usage of the system where the hosted web-application has a subscription fee and each sent and received message has a cost (the amount depends on the volume). Clickatell sponsors the use of the technology solution during the pilot project but there are no promises for further sponsorships after the pilot. An estimation of the actual costs regarding the use of the technology solution are difficult to prepare without having an understanding of a realistic amount of messages and costs of the messages being sent and received.

The estimated value for the project partners are a possibility to expand the coverage of their

services as well as enhanced communications and improved interaction with the community members resulting better service to the customers.

Strengths:

- Current not-for-profit pricing strategy

Weaknesses:

- Realistic financial estimates are not available until pilot results are ready, practical experience has been gained, as well as long term pricing strategy with Clickatell has been agreed

Functionality:

Fahamu is using Clickatell ICM product, which is a campaign management tool able to send and receive messages. Typically Clickatell ICM is being used for different types of key word based marketing campaigns, competitions, or even sending ringtones. According to Clickatell they have not received complaints regarding the speed and performance of the technology, which is more than three years old.

Even though it is not advised to use Clickatell ICM for mission critical campaigns (a Tsunami alert system was mentioned as an example), Clickatell is confident about the high reliability of the solution. The system is down occasionally for maintenance and upgrade purposes but these are kept minimal. In case the service is not accessible or has problems, the company will use commercially reasonable efforts to fix any problems but does not give any guarantees. There is an active monitoring system and 24/7 service center so problems are usually fixed immediately if it is in the control of the company.

Every effort is made to provide accurate back-ups by Clickatell and the information is being archived only after 30 days. There are planned weekly back-ups by the Fahamu, to further prevent major data losses. These back-ups are taken by exporting necessary information from the Clickatell ICM solution to a laptop.

The system is highly scalable and Clickatell ICM has been able to run big campaigns including tens of millions of messages and can currently provide the biggest coverage in Africa.

Before the service has been tested in practice it is difficult to estimate the 160 character limitation of the SMSes for reporting purposes. Currently the system is purely SMS based and data or multimedia messages are not supported. This may become a problem for Fahamu, since many human rights related reports would for example benefit if pictures and videos could be sent as a part of the reports. Need for multimedia messaging is understood as a potential future functionality but because it is a niche area, there are no promises that it will be included.

Even though Clickatell has lots of expertise with data security (the company provides services to financial sector companies with high security standards), Clickatell ICM was not designed to be a highly secure system. The solution provides basic password protection but there is no warranty that sensitive information is kept safe and secure. Fahamu requires their partners to sign a confidentiality agreement to minimise a risk that project staff would reveal sensitive information to any third party. Also the Clickatell staff is requested to sign a confidentiality agreement.

Basic system log and monitoring tools are provided for the administrative user of the system but since the service has not been tested it is not clear if these tools are feasible.

Due the commercial nature of the technology limited information about the architecture was given. The system only provides simple integration functionality to import or export information, but Clickatell is able to provide support if more complex integrations are needed. Fahamu has not yet identified external systems where data integration would be beneficial

because of the early stage of the service. The solution is not designed for non-English markets and the company may not be interested in localising the system without a possibly expensive project.

Strengths

- Mature technology solution with high performance and reliability
- Scalable solution, used in several African countries and tested with heavy loads

Weaknesses

Terms and conditions are very restrictive. No quality of service or data security guarantees are given by Clickatell

Integration into other systems have not been considered which limits the possibility to assess if the technology solution is able to provide required integration functionality

Development:

Although the service concept is still to be piloted, both the service provider, Fahamu, and the technology provider, Clickatell, are experienced organisations and capable of implementing the pilot. Both organisations are well established and the main concern is the financial sustainability of the service itself. Clickatell will continue developing the Clickatell ICM based on the business interests of the company, and since Fahamu is just a small client, it seems very unlikely that outcomes of the UmNyango project will have any influence regarding the strategy of the company or the technology solution. Current project donor, Hivos, has provided funding for the pilot and without additional external funding the project will not be continued. Fahamu will make strategic decisions regarding the future of the service once the pilot report has been prepared and the project outcomes are discussed. In addition to the financial status Fahamu will consider the feedback and level of interest from project partners and community members. Decisions are estimated to be made around August 2007.

Strengths

- Fahamu and Clickatell are well established organisations

Weaknesses:

- There are no guarantees of the future of the service after the pilot project
- Because the project has not been tested possible future development needs are not clear. Therefore it is not feasible to assess how well the technology solution will meet the long term needs of the service

UmNyango Project Summary/Conclusions

The UmNyango project is in very early stage. It was included into the report because it was challenging to find projects using SMS technologies with HIV/AIDS focus, that would engage community members as mobile phone users. A survey conducted by Fahamu in the lead up to a pilot does indicate that there is high interest from the targeted community to participate in the project. However the feasibility of the service is still to be proved, and a long-term sustainability model developed and tested after the initial pilot.

The service is not directly linked with HIV/AIDS, however, violence against women and children are linked with different aspects of the pandemic, and these problems are part of the aspects that will be addressed by the project. Also, if the results of the pilot are encouraging, the technology solution supports the possibility to provide similar services focusing other areas linked with underdevelopment and HIV/AIDS. Before considering a project based on the concept, it is recommended that the results and findings of the pilot and Fahamu's decisions about the future of the project are first analysed.

Case Study: UWC Project (South Africa)

Prepared by Women'sNet

Proponent Organisation: University of Cape Town, Computer Science Department

Partners: Transcape (an NGO) University of Waikato and University of Delft

Sector covered: Health

Location: Rural Eastern Cape, South Africa Canzibe Hospital and Lwandile Clinic in Libode district.

Initiated: 2004 and is on-going (for the next 3-5 years)

Type of Project: Health management, information exchange and patient management and care.

User-Groups:

Technology Provider and Service Host: UWC and partners

Service Provider: postgraduate students at the University of the Western Cape (UWC) and University of Cape Town (UCT) doing research theses on various aspects of the project.

End-User: a) the patients who receive more informed and productive healthcare closer to their homes, b) the rural health practitioner with improved ICT skills, c) district and provincial Department of Health (DoH) management interested in the effectiveness of telehealth communication.

Objectives of the Project:

- learn how to cheaply enable communication between rural hospital doctors and clinic sisters
- learn how to support users to use Information and Communication Technology (ICT) applications and devices (First Inch) and networks (First Mile)
- learn to improve/evolve the system based on user feedback in a cyclical Action Research fashion using Outcome Mapping as a tool for data collection.
- Use Masters level studies to drive the project in terms of theses and academic publications
-

Affordability:

Beneficiaries are not charged for the service. The project funding is mostly aimed toward supporting post-graduate research studies in the Computer Science departments at UWC and UCT:

1) Telkom/Cisco/THRIP (South Africa) Centre of Excellence (CoE) programme at UWC at roughly R200k/annum 2005-2007 and well as the Telkom/Siemens/THRIP CoE at UCT at roughly R100k/annum.

2) SANPAD (South Africa Netherlands Policy Alternatives for Development), Netherlands - R350k shared by UWC and UCT during 2004-2006.

3) IDRC (International Development Research Centre), Canada, R350k also shared by UWC and UCT during 2004-2007.

UWC also encourages users and technical staff to use Mxit or Fring to text (Instant Messaging) over GPRS instead of sending an SMS. A single SMS costs about R.70, while 1MB of data (maybe a couple thousand messages) can be sent/received for R2.

Sustainability:

UWC views this project as a research pilot that can one day hopefully be developed into a product that a locally staffed organisation can install and support. It is expected that the DoH will pay that organisation for the hardware, network costs and maintenance.

Technology:

A rural Eastern Cape hospital typically "serves" about 10-12 satellite clinics. Cellular coverage tends to be sufficient, but there is no "culture" or practise for hospital and clinic staff to communicate with each other regarding rural patients. These patients prefer treatment at the

clinic because treatment is free and closer to their home (than the hospital). South Africa has some of the most expensive GSM, GPRS & Internet in the world. So we built a pilot rural long-range WiFi network along with custom communication applications running on laptops. We now use WiFi-enabled cellphones because laptops (and our application prototypes) were too cumbersome to use. Many rural habitants are very comfortable with cellular handsets. We use smartphones that enable text, voice & video over WiFi much more cheaply than data over GPRS (that is actually available throughout many of the rural areas). We are also encouraging users and our local support team to use applications like Mxit and Fring to text at costs orders of magnitude cheaper than SMS.

"Consider a blood test for a patient. The blood is drawn by a sister at the clinic. Every three weeks or so, a clinic manager visits the clinic. That manager takes the sample to the hospital where the blood sample is analysed. The results of the test are then returned to the clinic whenever the manager returns to the clinic. The worst case scenario would be about 6 weeks round trip. This does not include the time the patient takes to get to the clinic, nor the time that it takes to get the results back to the patient. Results are typically delivered by another clinic patient that happens to live close to the original patient.

With our system, there is still a delay for the blood to reach the hospital, and for the results to reach the patient. However, the clinic sister can inform the clinic manager (or appropriate staff at the hospital) that blood sample(s) is/are ready to expedite collection. As soon as the test is performed, someone at the hospital can snap a digital picture with a smartphone and instantly send a picture of the test results to the clinic for free over the WiFi network. If the patient has a cellphone, the information or a message from the nurse can be texted via Mxit or Fring at a fraction of the cost of an SMS, unless there is, of course, a budget for SMS expenditure."⁵³

Accessibility:

The project operates using a long-range WiFi network, and WiFi enabled smartphones that enable text, voice and video over the WiFi: "in some ways [for users] the accessibility is frightening" . The project initially used laptops but these proved too cumbersome. The project also encourages the use of Mxit and Fring platforms for communications (significantly cheaper for the user than SMSes). The project selected the Lwandile Clinic because of its remote location, and, at the time the project started, there was no GSM coverage in the area.

Appropriateness:

The context in which the project operates is challenging – both because of the technology and infrastructure, but also because staff morale is low and staff numbers have decreased by half – leaving the clinic staff overburdened. The project aims to bridge communication divides between rural hospital doctors and clinic sisters and increase the capacity of staff to use technology devices and applications in their work. The area previously had a Citizens Band radio in place for communications between clinics and the hospital in the 90's but this was abandoned. The WiFi network and smartphones provide the technology, and mobile applications such as Mxit, Skype and Fring enable communications. The technology, while appropriate and bridging a gap, has had a disappointing uptake. "We have several theories why this is the case but believe it's mostly that the clinics and hospitals staff have become accustomed to be isolated and are simply too busy to take the time to learn to use ICT systems."⁵⁴

Development:

The project, initiated in 2004, before the area was covered by GSM and before VOIP was legalised, has adapted significantly since its beginnings. The project will continue, "until we get it right" – for another 3 to 5 years. The long-term investment in the project from partners is evident. The project is regularly evaluated, using the Bridges.org criteria for impact assessment.

⁵³ Professor William Tucker, UWC Computer Science Department, email interview response to survey March 2007

⁵⁴ Op cit

Summary conclusions

While the project aims to address the very real necessity for communications between clinics and hospitals in a rural area, the challenges have been numerous.

- Lack of buy-in from staff who are accustomed to being isolated
- Low staff moral and too little time to learn new technologies
- Difficult context – the clinic chosen for the project experiences significant difficulties, impacting on the project (no mains power, only solar; no running water; only 4 sisters and no GSM coverage when the project started; poverty and cultural differences between nurses and doctors)
- The project was not initiated by the nurses or by the Department of Health, but by an NGO and Doctors
- A change in power dynamics disrupted relationships between doctors and nurses – without communication, the nurses were the only source of information. And with the introduction of ICTs the nurses felt inferior when they consulted the doctors using the new tools
- Nurses are suspicious of the motives of the project
- VIOP was illegal when the project started, and WiFi networks require licensing – which has been a very real obstacle to the project (and prevents the project from expanding).
- ICT literacy has been a problem – using a range of applications can be bewildering for users.

The benefits or strengths of the project:

- There s a very clear and long-term investment in the project from the initiators
- The project has adapted to it's environment – and conducts regular impact assessments
- The WiFi network is very stable (one reboot in 2 years)
- The project uses Masters Students – overlapping students so that the turn-over doesn't affect the project, and hiring students as full time programmers or network specialists (increasing response times)