

UNICEF EASTERN AND SOUTHERN AFRICA REGIONAL OFFICE

Multi-Country Independent Review of Technological Innovations in ESAR



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Acknowledgements

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Acronyms

AIDS	Auto Immune Deficiency Syndrome
AMREF	Amref Health Africa
CC	Community Champions
CHAI	Clinton Health Access Initiative
CHW	Community Health Worker
CO	Country Office
CVSU	Community Victim Support Unit
DFID	Department for International Development
EHT	Environmental Health Technician
EID	Early Infant Diagnosis
ESAR	Eastern and Southern Africa Region
ESARO	Eastern and Southern Africa Region Office
GoM	Government of Malawi
GoR	Government of Rwanda
GoU	Government of Uganda
GoZ	Government of Zambia
HIMS	Health Information Management System
HIV	Human immunodeficiency virus
HMIS	Health Management Information System
HMU	Health management unit
HQ	Headquarters
HSA	Health Surveillance Assistants
HTC	HIV Testing and Counselling
iCCM	Integrated Community Case Management
ICT	Information and Communication Technologies
ICT4D	Information and Communication Technologies for Development
INGO	International Non-Governmental Organization
ISG	International Solutions Group
IT	Information Technology
KII	Key Informant Interviews
MIS	Management Information System
NAC	National AIDS Council
NGO	Non-Governmental Organization
NIRA	Ugandan National Identification and Registration Authority
PCA	Programme Cooperation Agreement
RIC-NET	Rwenzori Information Centres Network
RTM	Real-Time Monitoring
SMS	Short Message Service
SRH	Sexual Reproductive Health
TOC	Theory of Change
UBOS	Uganda Bureau of Statistics
UN	United Nations
UNFPA	United Nations Population Fund
UNHCO	Uganda National Health Consumers' Organisation
UNICEF	United Nations Children's Emergency Fund
URSB	Ugandan Registration Services Bureau
USAID	United States Agency for International Development
USD	United States Dollar
VRS	Virtual Registration System
WASH	Water, Sanitation and Hygiene
WHO	World Health Organization

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Executive Summary

In 2007, UNICEF began exploring innovative approaches and tools to advance the rights of children, specifically in the area of information and communication technologies for development (ICT4D). The Eastern and Southern African region, led by the Rwanda and Uganda Country Offices, pioneered the design, development, and scaling of ICT4D initiatives across multiple programmes. This work ultimately identified entry points for ICT4D solutions within traditional systems, and initiatives have been taken related to health, nutrition, education, and youth engagement, particularly in Malawi, Rwanda, Uganda, and Zambia. As the tools and approaches evolved over the last seven years, they have been increasingly adopted and applied in other country offices in the Eastern and Southern Africa region and beyond.

Although there has been significant progress in the development and application of ICT4D solutions in Eastern and Southern Africa, a comprehensive assessment of these solutions has not been conducted. ESARO seeks to review ICT4D solutions that have been implemented in Malawi, Rwanda, Uganda, and Zambia to answer a broad overarching question: *If a UNICEF programme applied one or more ICT4D solutions, how did this application impact the programme (i.e., service delivery, stimulation of demand, cost efficiencies) over time?*

The review considered the following ICT4D Initiatives in Malawi, Rwanda, Uganda and Zambia. Although the countries were named in the Terms of Reference for the assignment by UNICEF, the initiatives to be reviewed were selected by CO staff upon the evaluation team's request:

- **Anthrowatch (Malawi):** Anthrowatch is a RapidSMS-based nutritional status monitoring system (part of the Mwana Programme) that supports growth monitoring of children under five years of age.
- **BackPack+ (Uganda):** The BackPack+ initiative envisioned a holistic system designed to support community health workers (CHW).
- **Community Victim Support Unit (CVSU) (Malawi):** The ICT4D initiative was implemented to improve case management monitoring in support of child protection services.
- **MobileVRS (Uganda):** MobileVRS is the de facto communication channel for the birth registration system of Uganda.
- **mTrac (Uganda):** mTrac contributes to a number of programme outcomes, including: monitoring supplies of a select set of government tracer drugs; surveillance of a selection of epidemic and endemic diseases; communications, polling, surveys, and general feedback from staff at the district and health centre level; and an anonymous hotline customer complaint / reporting hotline.
- **Project Mwana (Zambia) and Results 160 (Malawi):** Project Mwana and Results 160 both provide SMS delivery of test results for diagnosis of HIV.
- **RapidSMS (Rwanda):** RapidSMS Rwanda tracks pregnant mothers and newborn pairs, childhood diseases, weight gain of children for proactive nutrition intervention, along with reports on stunting rates, and provides an early detection system for children living with disabilities.
- **U-Report (Uganda and Zambia):** In Uganda, the original intent behind the development of the U-Report project was to provide a system for Ugandan citizens to flag problems in their community for action. In Zambia, U-Report was implemented in Zambia as a means to capture the opportunity of connecting with youth regarding HIV/AIDS awareness.
- **uSurvey (Uganda):** uSurvey is a mobile technology solution intended to replace traditional paper-based surveying systems that can provide government partners and UNICEF with high-quality, statistically representative data.

- **WASH MIS (Zambia):** The WASH Real-Time Monitoring MIS system is designed to provide real-time monitoring of water points and sanitation facilities and related human resources as well as provide data for monitoring progress toward Zambian policy goals.

Findings

Relevance

The successful transfer of ownership of ICT4D solutions to government partners varies widely across the initiatives. With regard to the engagement of government partners, the review has found that in all cases the government is engaged. The level of engagement, as with ownership, varies among initiatives. In cases where engagement is diminished, this appears to be mostly driven by availability of financing for project materials and staff rather than a genuine show of interest.

All the initiatives seek to create efficiencies by becoming or creating a communication pathway for data that have not existed before. As such, each initiative is essentially underscored by the grand theory of change, or promise, associated with information technology in general: the provision of higher quality data, at a fraction of the cost and time to allow better management decisions at the programme level.

There is a spectrum across each of the initiatives regarding whether stakeholders and rights holders are being engaged in new or different ways. Some are truly game changing (U-report or mTrac), whereas others have created significant efficiencies while delivering traditional programming (e.g. MobileVRS, Results 160).

Effectiveness

With the exception of Backpack+, all initiatives reviewed realized the major objective they set out to achieve: creating efficiencies by removing bottlenecks presented by traditional paper-based government reporting systems. However, the extent to which this opening of information ultimately contributed to improved programme performance varied.

At one end of the spectrum, mTrac and MobileVRS have become the default communication tool for data, whereas Project Mwana, Results160, and RapidSMS have contributed significantly to programme effectiveness. Anthrowatch, U-Report and WASH MIS have helped programming become more effective, whereas CVSU may require a redesign to realize its true potential. U-Survey is promising but has not yet been rolled out, and Backpack+ is no longer functioning.

Efficiency

It is noteworthy that financial information was the most difficult data to come by for this review. This is not because the data do not exist, but rather, UNICEF does not currently put a priority on tracking investments and programme costs associated with ICT4D initiatives.

Although the costs of development and ongoing maintenance of an ICT4D solution can appear steep at first glance, when compared with the costs associated with the human resources, printing, paper, transportation, and so on of a traditional system, the ICT4D systems look like fantastic deals. Importantly, with the exception of CVSU (Malawi), all the other solutions reviewed have been implemented on an open-source technology stack in which the total cost of ownership is reduced because there are no recurrent licences for the source code, middleware and database.

The opportunity costs associated with the ICT4D initiatives in essence appear inconsequential. Generally, the ICT4D initiatives in this review have been funded through traditional means—either using donor funding or internal UNICEF funds.

The review suggests that the access to real-time information and the engagement of citizens have provided UNICEF and its partners with real benefit in terms of reduced monitoring and implementation costs.

Impact

The contributions of ICT4D initiatives towards achieving programme results vary dramatically—from massive differences realized by mTrac and MobileVRS to an extremely limited difference in the case of BackPack+ (because it has been discontinued) and uSurvey (because it remains in the pilot stage as of this review).

Sustainability

The financial stability of individual ICT4D initiatives ranges across a spectrum. On one end, in the case of BackPack+, the initiative is essentially dead in the water and does not require further financing. At the other extreme, initiatives such as MobileVRS or mTrac have become so ingrained and adopted by their government counterparts that sustainability seems almost assured.

In cases where country-level funding has become available for an ICT initiative, the following factors are present:

- The ICT initiative has become the de facto communication channel for data (e.g. MobileVRS); and
- The country has official policies and/or laws in place that allow for appropriation of funds for the initiative (e.g. Uganda).

The review finds there is a basic understanding of total cost of ownership within government counterparts regarding ICT4D initiatives. Further, there is generally a genuine desire to shoulder the burden of the total cost of the implementation and ongoing maintenance of the ICT4D initiatives. However, the in-country realities of the slow process of change across large bureaucratic institutions and ingrained cultural expectations keep realization of total ownership elusive.

Conclusion – Towards an Enabling Environment

In its simplest terms, an enabling environment exists for the adoption and flourishing of ICT4D initiatives in all four countries included in the study. The learning within each of these environments can be applied by other UNICEF COs as a way to determine which, or whether, ICT4D initiatives are appropriate for their particular contexts.

Foundational factors

In ESAR, as a foundation for an enabling environment, each country that is a part of this review contains:

- One or more specific problems whose solution can be enabled (or outright solved) through an ICT4D solution;
- The availability of local talent (i.e. UNICEF staff, individuals or partner organizations) who either already have, or can acquire, the needed skills and experience to design, develop and maintain ICT4D solutions;
- Government or other official counterparts who are interested and engaged in the implementation of ICT4D solutions; and
- Adequate technological infrastructure to enable the transmission, collection and storage of data.

The absence of any one of the above factors would severely inhibit the ability of an ICT4D initiative to flourish and, as such, form the basis of a necessary analysis in determining whether these types of initiatives should be pursued.

People and culture

The learning resulting from the review does not suggest that there are particular cultural factors or social constructs that inhibit the implementation of ICT4D initiatives. However, human factors related to ICT4D initiatives remain the largest expense and the most significant bottleneck. An additional human resource challenge is the underlying tension or perception that individuals will be replaced by, or simply not be able to “keep up” with implemented technology.

Collecting data is truly only half of the game, and it is ironically also the easiest part. The use of, or demand for, collected data remains an ongoing challenge for even the most successful initiatives in ESAR (i.e. mTrac and MobileVRS). And in less successful initiatives, (e.g. Anthrowatch, CVSU), limited demand is directly related to ownership and sustainability.

Finally, the review suggests that there remains a general unpreparedness – at both UNICEF and with local counterparts – for the frustrations of technology (e.g. service outages, electricity issues, software bugs, updates, and glitches).

Processes

The process of defining, piloting, scaling and replicating ICT4D solutions is a good fit for the types of ICT4D programming pursued by UNICEF. The review suggests a nuanced understanding of this process would go a long way in helping create success for future initiatives.

Defining. At the front end of this process is the definition of the problem. Although it may seem textbook obvious, clearly defining the problem to be solved is a critical first step that remains overlooked or ignored in many cases. Including partners at the beginning of the defining process is critical.

Seeking to create simple, easily adopted systems that provide immediate, tangible value to all the system’s users is important. In cases where bottlenecks encountered by traditional paper-based reporting systems related to distance, transportation and the input of significant human resources are removed, substantial and clear efficiencies are realized nearly immediately (e.g. mTrac, MobileVRS, Mwana, Results 160). Indeed, these cases are where we also see the greatest uptake by government counterparts and the highest likelihood for sustainability. In systems that push complexity with multiple points of potential failure (e.g. CVSU, Backpack+), initial excitement appears to be quickly replaced by apathy and, in the case of Backpack+, abandonment.

Piloting. If the process of defining the problem is carried out properly, the piloting phase can be effectively used to determine whether expected results are possible. Accomplishing this is a matter of (A) defining a specific timeframe for the testing of an ICT4D solution and (B) the criteria by which its success (or not) will be judged.

Scaling. There is a temptation to believe that, after a pilot is deemed successful, the move to scale the solution to the greater population should be a matter of simply turning it on or making it available to a wider audience. Results from the review, however, point to a more iterative process – similar to the development of the technology itself, whereby a solution is rolled out across a population in phases, and adjustments/revisions are made along the way.

Replicating. Replication, or going global, is the embodiment of success for an ICT4D solution. However, the review suggests that there is likely a disconnect between what is perceived to be possible and what is actually possible. In every case except for U-Report, the initiatives would need to be modified and adapted to their local contexts. Indeed, for U-Report to be truly relevant, it too needs to be made context specific. As with other, traditional, programming patient investment for the long term is the most likely path to success.

Platforms

Though UNICEF subscribes to principles that emphasize using open-source solutions to develop ICT4D initiatives, the review finds this to be a “nice to have” rather than a necessary condition for success.

However, as noted above, the review does emphasize that the pursuit of ICT4D initiatives requires a long-term, evolutionary mind-set. Although current initiatives have thrived using the RapidSMS platform, they should all evolve to RapidPRO to keep pace with current technology trends and requirements.

Partnerships and Ownership

Three of the foundation factors described above are realized via partnerships – with organizations, private companies, individual contractors and governments. There are a number of exciting partnerships found throughout the reviewed initiatives – from large companies to local NGOs. However, the coordination and collaboration of partnerships on UNICEF’s part, could be both broader and deeper.

There is currently a significant push within UNICEF to move ICT4D solutions towards “ownership” by government partners. As of this review, none of the initiatives are wholly “owned” by government partners. Yet, it is not clear that such a shift would necessarily equate to better functionality, efficiencies, effectiveness or sustainability.

To conclude, the identification of an enabling environment that supports the development and flourishing of ICT4D initiatives by UNICEF COs should be approached as a chef would any recipe or a craftsman the blueprint for a house. Some factors, such as the presence of network providers, are vital but have essentially become public utilities in nearly every part of the world. Other factors, such as the availability of locally savvy talent, are nice to have and would accelerate adoption but also can be built or created if necessary. As such, each CO should be intimately engaged in its local community to understand what factors are already available and how they can be carefully combined and cultivated to ultimately produce data leading to decisions that more effectively serve children around the globe.

Recommendations

Continue to invest in and evolve UNICEF’s ICT4D practice. It is worthwhile to continue pursuing ICT4D opportunities. It would be prudent for UNICEF, when designing any programme or initiative, to ask the question, “Is there a way we can use one or more ICT4D solutions to create efficiencies, improve effectiveness, or both to ensure that children are better served?”

Focus on technology that enables solutions to problems. Because ICT4D services are demand driven, ensure that there is a clear, specific, narrow problem the solutions are built to help solve. As one area to focus on, UNICEF has found considerable success replacing traditional paper-based systems with digital solutions. Avoid ICT4D initiatives that ultimately create more work for the end user by simply being an “add on”. Ensure all initiatives have associated training, tangible incentives and clear demonstrations of productivity increases. The ultimate pursuit should be to introduce technology that completely replaces old methods and becomes the de facto way of doing business. Finally, UNICEF should create avenues for feedback loops directly to line workers and beneficiaries where possible to maximize the positive perceptions around the initiatives and to engender buy-in.

Address the realities of a digital culture, broadly speaking. Invest in helping create an underlying understanding of issues such as software updates, service outages, bug fixes, connectivity issues, and the general potential for ICT to be a constant part of our lives for systems of record.

Promote a full understanding of technology as a living organism. There is a sense across UNICEF COs and partners that once an ICT4D solution has been developed, it is “done”. All technology

requires constant care (i.e. updating and evolution) and feeding (i.e. funding) across UNICEF, at COs and with local partners.

Develop acuity for innovation overwhelm. As demonstrated with the Ugandan moratorium on new ICT4D pilots, UNICEF would do well to develop a keen acuity about the amount of new technology it can introduce in any one setting and seek to coordinate with others better.

Create technology your mother would love. UNICEF should seek to implement “big button” solutions that “wow” non-tech staff and partners, as these remain by far the largest set of users for any ICT4D solution. Create a process during programme design that actively seeks out and questions complexity and identifies points of failure. Solve one problem at a time, completely and satisfactorily, and grow from there.

Ensure ICT4D solutions offer an opportunity for everyone. UNICEF should ensure that processes and procedures eliminate the possibility of data gatekeepers. UNICEF should also proactively address the tension, internally and with (especially government) partners, that people will lose their jobs (or simply be left behind) should IT solutions be adopted.

Specifically track financials related to ICT4D. UNICEF should be able to clearly and easily make the case for the financial efficiencies realized by ICT4D initiatives. This is currently not possible due to insufficient tracking processes of funding for the same.

UNICEF as an ICT4D implementer

This review was tasked with examining a cross section of ICT4D initiatives in four ESAR countries. Although our findings focus on those initiatives, there is also value in considering UNICEF an organization (i.e. structure, culture, processes) to understand how it might better enable or undertake similar ICT4D initiatives. Examples include:

Structure and Culture

Consider how UNICEF’s current organizational structure and culture could be transformed to better embrace ICT4D initiatives and promote consistent application of the same. UNICEF is an organization rich with processes, regulations and systems that seek to remove risk and to demonstrate accountability. However, these same systems (e.g. procurement) also have the unintended effect of limiting the risk taking necessary for identifying, creating and cultivating ICT4D solutions. Although outlets such as the Global Innovation Centre are a best practice, UNICEF should also encourage responsible risk taking at the CO level.

Leadership, Management and Talent

Invest in ensuring that UNICEF’s leadership, decision-makers and line managers actively embrace ICT4D initiatives, promote digital culture, and can attract and retain appropriate talent. Especially important is the identification and support of acquiring and developing leadership, management and staff who fundamentally understand how ICT4D technology works and contributes to programme outcomes.

Business model

Determine whether 100% ownership by government partners is appropriate for UNICEF’s long-term business model. Although the requirement for open-source technology, adopted as one of UNICEF’s innovation principles, is commendable, there are numerous examples of business models that allow for relationships that include licensing, technical support and ongoing development.

Technology is alive. There is a general feeling at UNICEF that technology ultimately results in less expensive programming and provides complete solutions to problems. Although technology provides high productivity, efficiencies and scale, it also engenders new problems, skill requirements and the need for constant funding to fuel its never-ending evolution.

Partnerships

Seek to align and deeply integrate the UNICEF brand with other global leaders of ICT4D initiatives for long-term support, partnerships and possible force/scale multipliers. This should not be limited to the traditional development and humanitarian aid space

Summary of Findings

Initiative (Country)	Type of initiative	Purpose of initiative	Relevance	Effectiveness	Efficiency	Impact	Sustainability	Scale	Recommendation
Anthrowatch (Malawi)	Routine reporting	Growth monitoring	High	Medium	High	Medium	High	Scaled	Significant potential; update technology platform
BackPack+ (Uganda)	Service delivery	Toolset to empower community health workers	High	N/A	N/A	N/A	N/A	N/A	Stop investment
CVSU (Malawi)	Service delivery	Child protection case management system	High	Low	Medium	Low	Medium	Pilot	Limited potential; redesign to improve efficacy
mTrac (Uganda)	Routine reporting	Disease surveillance and stock monitoring	High	High	High	High	High	Go Global	Ready for global deployment
mVRS (Uganda)	Service delivery and reporting	Birth registration	High	High	High	High	High	Go Global	Ready for global deployment
Project Mwana (Zambia)	Service delivery	Reminders to caregivers on use of health interventions	High	High	High	High	Medium	Scaled	Significant potential; update technology platform
RapidSMS (Rwanda)	Service delivery and reporting	1,000 days of monitoring and triggers for emergency obstetric care	High	High	High	High	Medium	Scaled	Significant potential; update technology platform
Results 160 (Malawi, Zambia)	Service delivery	Delivery of early infant diagnosis HIV results	High	High	High	High	Medium	Scaled	Significant potential; update technology platform
U-Report (Uganda, Zambia)	Citizen engagement and Service Delivery	Platform for improved social accountability	High	Medium	High	Medium	Medium	Go Global	Ready for global deployment
U-Survey (Uganda)	Surveys	Survey	High	N/A	N/A	N/A	Medium	Pilot	Significant potential; continue piloting
WASH MIS (Zambia)	Routine reporting	Monitoring community-led total sanitation interventions	High	Medium	High	Medium	Medium	Scaled	Significant potential; update technology platform

1. The Assignment

1.1. Background

In 2007, UNICEF began exploring innovative approaches and tools to advance the rights of children, specifically in the area of Information and Communication Technologies for Development (ICT4D). The Eastern and Southern African Region, led by the Rwanda and Uganda country offices, pioneered the design, development, and scaling of ICT4D initiatives across multiple programmes. This work ultimately identified entry points for ICT4D solutions within traditional systems, and initiatives have been taken to advance health, nutrition, education and youth engagement, particularly in Malawi, Rwanda, Uganda and Zambia. As the tools and approaches evolved over the last seven years, they have been increasingly adopted and applied in other country offices in the Eastern and Southern Africa region and beyond.

Although there has been significant progress in the development and application of ICT4D solutions in Eastern and Southern Africa, a comprehensive assessment of these solutions has not been conducted. ESARO seeks to review ICT4D solutions that have been implemented in Malawi, Rwanda, Uganda and Zambia to answer a broad overarching question: *If a UNICEF programme applied one or more ICT4D solutions, how did this application affect the programme (i.e. service delivery, stimulation of demand, cost efficiencies) over time?*

This document is a synthesis of four country reports prepared for this review for Malawi, Rwanda, Uganda and Zambia that highlights success, challenges and opportunities for the future.

1.2. Review Purpose and Objectives

The main purpose of this review is to create an evidence-based document that can be used by Country Office (CO) programme sections to help with deciding whether the application of an ICT4D solution will enable more effective and efficient achievement of programme results.

Importantly, the focus of this review is on programmatic outcomes. It is not a review of the inner workings of the technology for the ICT4D initiatives.

This review will be used by UNICEF:

- To advocate for the use of ICT4D solutions to accelerate the achievement of results for children;
- As a tool to support resource mobilization; and
- To forge new and strategic partnerships.

The review objectives are:

- To assess the effect, cost-effectiveness and sustainability of selected ICT4D solutions;
- To identify characteristics of an enabling environment for effective adoption and scale up of ICT4D solutions; and
- To propose recommendations for the adoption, scale up and maintenance of ICT4D solutions.

The review also provides a holistic overview of the selected ICT4D solutions and a regional perspective of:

- Key opportunities afforded by ICT4D activities to country programmes;
- The effect of ICT4D solutions on in-country programmes and systems;
- Efforts made and lessons learned in generating national ownership of ICT4D solutions;
- Country-level sustainability efforts, including national government participation/contribution to ICT4D solutions, and;
- The business case for investment in ICT4D solutions.

2. Methodology

2.1. Overall Approach

The review has relied on a suite of action research methodologies that collect both qualitative and quantitative data. These include a desk review of documentation, crucial informant interviews and focus group interviews with stakeholders. In addition, where significant programme activities or meetings were occurring in the offices we visited, the ISG team directly observed events.

2.2. Guiding Principles

ISG used a range of participatory data collection methods to ensure that principal stakeholders and partners are centrally involved in reflective and forward-thinking processes and adhered to the following principles:

- **Consultation** with, and participation by, key stakeholders to ensure that the assignment is fully relevant to its users and stakeholders and that the evidence and analysis are sound and factually accurate. Consultation has been iterative, and each stage has been informed by and built upon earlier project work.
- **Methodological rigor** to ensure that the most appropriate sources of evidence for answering the analytical framework questions have been used in an appropriate manner. The project team has used various data sources and methods throughout the study's process to triangulate information – checking and corroborating findings to ensure they are consistent.
- **Technical expertise and expert knowledge** to ensure that the assignment benefits from knowledge and experience in the fields relevant to ICT4D initiatives and that it contributes to building the body of evidence around what works, what does not work, and why.
- **Independence** to ensure that the findings stand solely on an impartial analysis of the evidence, without undue influence by any stakeholder group.

In this context, our approach has incorporated best practice review criteria and principles for effective development assistance.

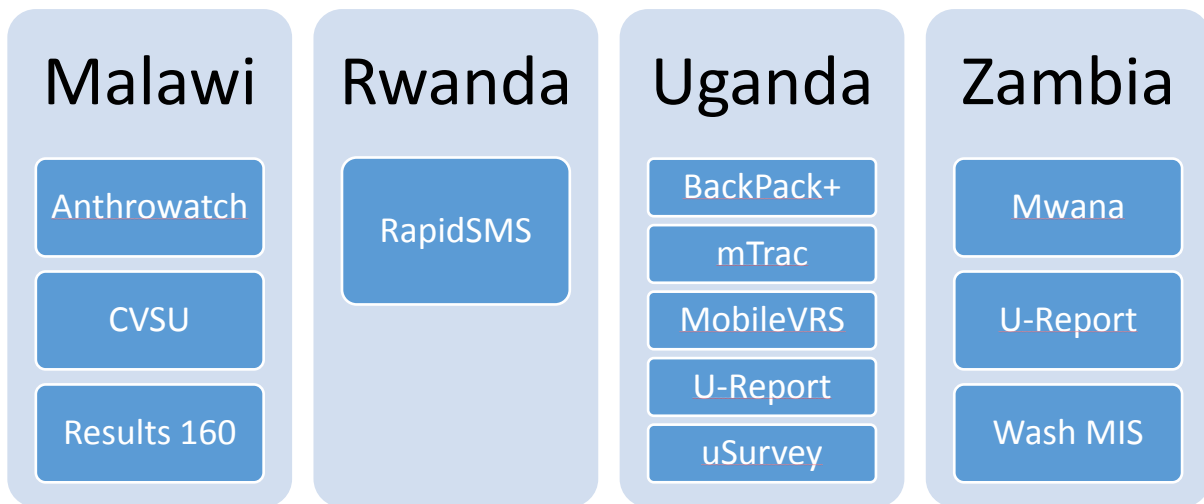
2.3. Country Selection

The review considered ICT4D initiatives in Malawi, Rwanda, Uganda and Zambia. These countries were named in the Terms of Reference for the assignment by UNICEF.

2.4. The Initiatives Reviewed

The ICT4D initiatives reviewed were selected by CO staff upon the evaluation team's request. Adjustments were made to ensure that the portfolio to be reviewed included a sample of initiatives along a spectrum of high and low performance and, where possible, comparisons could be made across countries (e.g. U-report in Uganda and Zambia; Mwana – which includes Anthrowatch and Results 160 in its suite of technologies – in Malawi and Zambia).

The final selection of initiatives is detailed in the table below:



Anthrowatch (Malawi): Anthrowatch is a RapidSMS-based nutritional status monitoring system (part of the Mwana Programme) that supports growth monitoring of children under five years of age.

BackPack+ (Uganda): The BackPack+ initiative envisioned a holistic system designed to support community health workers (CHW), who are often the frontline or point of contact, in their delivery of health assistance—especially in rural communities. The project considered the entire life cycle of the CHW: from recruiting and training, to provision of services and to feedback and advancement within the local health-care system.

Community Victim Support Unit (CVSU) (Malawi): The ICT4D initiative was implemented to improve case management monitoring in support of child protection services.

MobileVRS (Uganda): MobileVRS is the de facto communication channel for Uganda’s birth registration system.

mTrac (Uganda): mTrac contributes to a number of programme outcomes, including: monitoring supplies of a select set of government tracer drugs; surveillance of a selection of epidemic and endemic diseases; communications, polling, surveys and general feedback from staff at the district and health-centre level; and an anonymous hotline customer complaint/reporting hotline.

Project Mwana (Zambia) and Results 160 (Malawi): Project Mwana and Results 160 both provide SMS delivery of test results for diagnosis of HIV.

RapidSMS (Rwanda): RapidSMS Rwanda tracks pregnant mothers and newborn pairs, childhood diseases, weight gain of children for proactive nutrition intervention, and reports on stunting rates and provides an early detection system for children living with disabilities.

U-Report (Uganda and Zambia): In Uganda, the original intent behind the development of the U-Report project was to provide a system for Ugandan citizens to flag problems in their communities for action. Today the project has evolved to include polling and community engagement functions with an ultimate vision of becoming the de facto channel for direct citizen engagement and government feedback.

In Zambia, U-Report was implemented as a means of connecting with youth regarding HIV/AIDS awareness.

uSurvey (Uganda): uSurvey is a mobile technology solution intended to replace traditional paper-based surveying systems that can provide government partners and UNICEF with high-quality, statistically representative data.

WASH MIS (Zambia): The WASH Real-Time Monitoring MIS system is designed to provide real-time monitoring of water points and sanitation facilities and related human resources and to provide data for monitoring progress towards Zambian policy goals.

2.5. Data Sources

The review has used three main sources of data: secondary programme/project documentation/data, key informants and group interviewees, and field observation.

Secondary Documentation & Data: Reviewing programme/project and other relevant documents and data (including technical outputs, monitoring data, and costs related to the ICT4D solutions) has allowed ISG to gain a fuller understanding of the selected ICT4D initiatives and their chief stakeholders. All relevant documents sourced by UNICEF and the project team have been listed as an Annex to this report.

Key Informants: Key informants interviewed (either individually or in a group discussion format) at the global and country levels from UNICEF staff at global, regional and country levels; primary stakeholders in each country (e.g. staff from government partners); and external stakeholders (CSOs, INGOs, private sector providers) and individuals who are using or benefitting from ICT4D solutions have been listed as an Annex to this report.

Field Observation: Field visits to Malawi, Rwanda, Uganda and Zambia to observe the implementation of initiatives in a community setting have been undertaken in consultation with UNICEF. During the field visits, the project team has taken note of and incorporated its direct observations into this report.

2.6. Analytical Framework

An analytical framework has guided the content and methodology of this review—to outline what the review should examine and how ISG has done this examination. With the Theories of Change (ToC) as a central reference point, the analytical framework uses the criteria of relevance, effectiveness, efficiency, sustainability and impact to assess the progress and results of the individual ICT4D initiatives.

Theory of Change

UNICEF has approached the design and implementation of ICT4D initiatives with the following implicit overall ToC: The use of information and communications technology (ICT) to remove bottlenecks for the collection and analysis of large datasets will result in improved and more efficient government service delivery, greater government accountability and transparency, and increased access to services for women and children.

Definitions

Context of ICT4D initiative: The review considered the local context specific to each ICT4D initiative, including implementing partners, to understand the origins, evolution and status of each initiative.

Relevance: The relevance of the reviewed ICT4D initiatives were considered against whether they were suited to the priorities and policies of UNICEF, target groups, recipients and donors. Initiatives were compared and ranked according to the following criteria:

- *High:* The initiative addresses acute needs in the local context.
- *Medium:* The initiative addresses “nice to have” issues of the local context.
- *Low:* The initiative is focused on marginal benefits to the local context.

Effectiveness: To discuss the effectiveness of the ICT4D initiatives, we reviewed the extent to which the objectives of the initiatives reviewed were achieved or are likely to be and what the major factors were influencing the achievement or non-achievement of the objectives. We approached the issue of the business case for ICT4D initiatives using the framework described by Bo Crader in 2013.¹ Beyond a typical investment mindset that limits the business case to solely revenue and cost impacts, we have also considered the criteria of enhanced mission delivery, increasing fundraising, reducing expenditures, replacing costs, and intangibles. Initiatives were compared and ranked according to the following criteria:

- *High:* Access to real-time information has completely changed programme performance.
- *Medium:* Access to real-time information has improved programme performance, with potential for more.
- *Low:* The initiative does not have the potential to radically improve programme performance.

Efficiency: When considering the efficiencies created by ICT4D initiatives, the review looked at outputs—qualitative and quantitative—in relation to inputs to make an overall value for money assessment. The most important consideration was how the costs related to ICT4D initiatives compared with the cost of “business as usual” associated with traditional systems. Initiatives were compared and ranked according to the following criteria:

- *High:* The initiative has realized significant time efficiencies associated with minimal costs.
- *Medium:* The initiative has realized some time efficiencies, with potential for more, at reasonable cost.
- *Low:* The initiative has realized limited time and/or financial efficiencies.

Impact: The review considered what has changed as a result of the inclusion of the ICT4D initiatives in country programming and what real difference the initiatives made to beneficiaries. Initiatives were compared and ranked according to the following criteria:

- *High:* The initiative has delivered a truly game changing service.
- *Medium:* The initiative has the potential to effect significant change but as of yet, has not been fully realized.
- *Low:* The initiative has helped create change but does not have the potential to have deep system-changing effect.

Sustainability: The review considered whether the ICT4D initiatives are likely to continue after donor funding has been withdrawn. Sustainability is equated with a commitment to continued action because, by their nature, ICT4D initiatives require ongoing funding, supervision and maintenance. Initiatives were compared and ranked according to the following criteria:

¹<http://npengage.com/nonprofit-technology/building-business-case-for-projects-nonprofit-edition/>

- *High*: The initiative is the de facto communication channel for programme data and enjoys complete government buy in.
- *Medium*: The initiative is an important channel for programme data and receives some government buy-in.
- *Low*: The initiative is used erratically and/or does not enjoy government support.

Scale: As a final criterion for reviewing each ICT4D initiative, the evaluation team considered where each initiative fell along a spectrum of scale. This spectrum was composed of three levels:

- **Pilot**: a solution that serves the specific needs identified but is limited to specific users or regions in terms of implementation.
- **Scaled**: a solution that is meeting defined needs with coverage expanded across the country.
- **Go global**: a proven solution, ready for expansion and global deployment.

These criteria are reflected in Table 1 below:

Table 1 - Analytical Framework Question Matrix

Focus	Key Areas of Research	Methodology	
		Target Groups	Tools
Context of ICT4D Solutions	<ul style="list-style-type: none"> To what extent are selected ICT4D solutions being implemented (pilot vs. scale up)? What was the process for the initiation/development of ICT4D solutions? Who are the key partners/stakeholders in ICT4D initiatives? What is the level of commitment of these stakeholders to ICT4D solutions (global, regional and national)? What is the extent of uptake of the selected ICT4D solutions? 	<u>Government partners</u> Govt. Ministries (health, children, education, technology)	Document Review KII
Programme Relevance	<ul style="list-style-type: none"> To what extent did national and local counterparts/stakeholders participate in ICT4D solutions design? To what extent do individual ICT4D solutions reflect UNICEF/national priorities/strategies? How aligned are ICT4D solutions goals/objectives/outcomes with development challenges identified in project documentation/TOCs? 	Local government	Focus group discussions
Efficiency	<ul style="list-style-type: none"> How supportive is the enabling environment for uptake of ICT4D solutions? What are the crucial elements? What has been the cost of ICT4D solutions vs. the cost of undertaking alternative interventions (opportunity cost)? How have ICT4D solutions been financed/budgeted? What are the constraints? Do ICT4D solutions demonstrate good value for the money? What is the quality of monitoring of ICT4D solution outcomes in relation to data collection, analysis and reporting, costs, and actions? 	<u>International partners</u> UNICEF Country Offices	
Effectiveness	<ul style="list-style-type: none"> To what extent do the ICT4D solutions work – how are strategies leading to outcomes? What are the criteria for selection/adoption/development of ICT4D solutions? Do these create an effective business case? What, if any, are the differences between the four countries in ensuring effective implementation of pilot ICT4D solutions? How successfully are countries taking ICT4D solutions to scale? How effective was capacity building of stakeholders in design, development, implementation, monitoring, and scale-up of ICT4D solutions? 	<u>National Partners</u> Local	
Sustainability	<ul style="list-style-type: none"> To what extent has UNICEF support to stakeholders/partners led to increased ownership and institutional capacity? To what extent are ICT4D solutions sustainable, replicable and/or scalable? Did changes in the macro-level environment affect sustainability of ICT4D solutions? 	NGO/INGO partners, tech companies	
Impact	<ul style="list-style-type: none"> To what extent have outcomes led to positive impact – as stated in programme documentation/TOC? What are the results of ICT4D solutions at the community level? How have results varied across programme locations, including ICT4D solutions approaches to local contexts? What are the unintended positive or negative achievements? 	<u>Other actors</u> Others	involved in ICT4D initiatives
Scale	<ul style="list-style-type: none"> Pilot: a solution that serves the specific needs identified but is limited to specific users or regions in terms of implementation. Scaled: a solution that is meeting defined needs with coverage expanded across the country. Go global: a proven solution, ready for expansion and global deployment. 		
Lessons learned	<ul style="list-style-type: none"> What are the principal lessons/best practices in designing, developing, implementing, monitoring and scaling up of ICT4D solutions? What are the preconditions for funding the development and implementation of effective and scalable models/pilots? 		
Recommendations for UNICEF, donors, partners, govt., etc.	<ul style="list-style-type: none"> What are the strategies, processes, tools and requirements for ICT4D solutions, particularly with respect to programmatic and technical challenges? How can partners in governments, civil society and the private sector support future programming? What are the best partnership approaches/models? How can promising ICT4D solutions be identified, implemented in pilot form, and scaled up? 		

2.7. Limitations of the Review

The review experienced limitations commonly found in research and analysis projects of a similar nature. A limited timeframe for data collection, analysis and feedback ultimately constrains the breadth and depth of the study of each initiative and the lessons the review can provide for the design and implementation of future initiatives. As noted above, the review focuses on programmatic outcomes enabled by the ICT4D initiatives and does not discuss the technology itself in any depth. This would be a worthwhile conversation that should be undertaken by another assignment to continue to demystify ICTs and clarify how they can be used to help serve those in need.

The most significant limiting factor for the review was the availability of financial data. Importantly, this is not a statement about transparency or proper use of funds. Rather, resources used (i.e. people and money) to create, implement and support the initiatives are woven into and across multiple UNICEF programme sections and individuals' terms of reference. As such, the review did not have sufficient time to extract all relevant financial data for analysis.

3. Findings

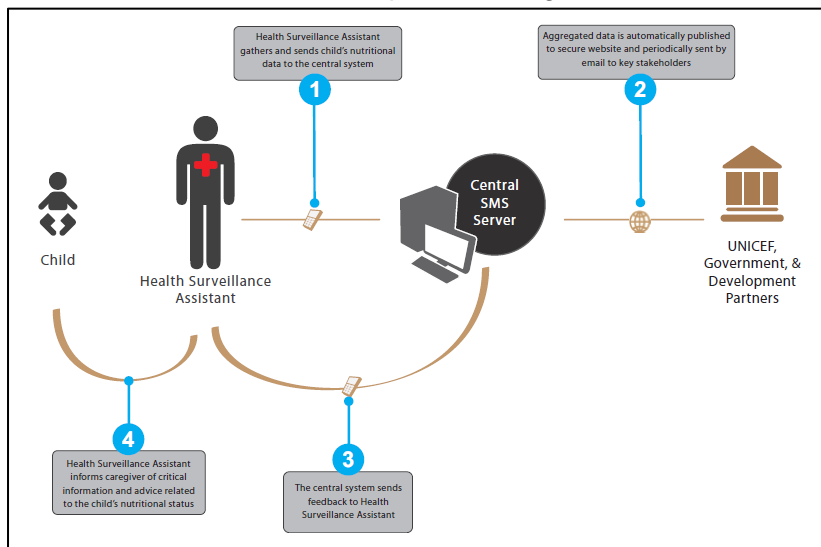
3.1. Anthrowatch (Malawi)

Description: Anthrowatch is a RapidSMS based nutritional status monitoring system (part of the Mwana Programme) that supports growth monitoring of children under 5 years of age. Operational since 2011, the project was initiated to help address the low engagement and return rates of caregivers to Health Surveillance Assistants (HSA) and facilities to receive nutrition or other related health services.

People: The Anthrowatch project is housed in the Nutrition section at UNICEF Malawi. The Malawi government counterpart is the Ministry of Health. The Office of the President and District Councils are also engaged with the project. Anthrowatch is supported by two mobile network operators: Telkom Networks Malawi and Airtel Malawi. The primary implementing partner is the Ministry of Health, with the Clinton Health Access Initiative (CHAI) providing backstopping and technical support.

Process: In the daily use of Anthrowatch, an HSA receives a patient and gathers critical nutritional data. This data are sent via SMS to the Anthrowatch server, which instantly performs necessary calculations. The analysis of the nutritional data is returned to the HSA with instructions for the child’s caregiver that explain how to ensure adequate nutrition for the child.

Technology: Anthrowatch is built on the RapidSMS platform.



Summary

Relevance	Effectiveness	Efficiency	Impact	Sustainability	Scale
High	Medium	High	Medium	High	Scaled

Relevance

At the initial stages and during the pilot of Anthrowatch, the GoM demonstrated willingness to adopt the system by collaborating with UNICEF in the following ways:

- Providing requirements for indicators;
- Engaging with UNICEF consultants since 2011; and
- Providing the human resources necessary for the system to be able to function.

As the initiative progressed, however, the review found that there was decreased momentum around the initiative. In addition, government officials have not taken ownership of the initiative or established concrete assignment of roles and responsibilities relating to the platform. This does not necessarily imply non-relevance, as the review found that officials and partners were interested in the initiative, and it clearly fits within government priorities.

The initiative remains highly relevant to the end user population, as it directly interacts with the provision of nutrition interventions.

Effectiveness

The Anthrowatch initiative's specific objective was to provide automated calculations of collected growth bio-data to inform nutrition-related interventions for identified at-risk children. At its most basic, the technology has replaced error-prone and time-consuming manual calculations done on paper-based charts. Before the initiative, identifying at-risk cases could take as long as three months to detect. With Anthrowatch, it takes 5 minutes to capture metrics and even less time to see results; cases can be identified early (between 2–3 weeks) and an intervention sought. Beyond the direct contribution to health outcomes of identified children, because the feedback is instantaneous and because interventions are made earlier, mothers are encouraged to bring children in for testing and to spread the information to others by word of mouth.

The number of children assessed through Anthrowatch rose from 11,625 in 2011 to 119,463 in 2014. In 2015, there were 8,744 out of 10,800 community health workers registered to report on growth monitoring through the system.

Although progress has been achieved, the review found challenges remain both on the demand (use for data-driven decision-making by the Ministry of Health) and supply side (health surveillance assistants are not consistent about supplying data). As such, the platform has a good deal of room for improving effectiveness.

Documentation and interviews describe a business case focused on enhancing mission delivery. Prior to implementation of the Anthrowatch system, monitoring of child nutrition – specifically chronic and acute malnutrition – was inadequate. Anthrowatch offers the potential to improve this monitoring and improve child nutrition-related health outcomes, such as preventing stunting.

Efficiency

Financial data for Anthrowatch, Results 160 and RemindMi (a related technology not part of this review) were provided to the review team in a consolidated format and, as such, are discussed here together. The costs associated with the design and development of the technology for Anthrowatch and Results 160 have been minimal (only 4% of non-staff-related costs) compared with overall project costs (SMS fees are 27% of total and Internet connectivity is 24%). Even adding in hardware, costs associated with technology only amount to 10 percent of the total. If staff and PCA figures are added, this percentage is reduced significantly. Further, because this review only considers the Anthrowatch and Results 160 projects (CVSU is detailed below), the addition of the RemindMi project (as the other component in the Malawi version of the Project Mwana initiative, see below) further reduces the financial burden for each project individually. The most significant costs are associated with human resources – at UNICEF, for staff costs, and with partners, for training. PCA-related costs had not been received at the time of this report.

Anthrowatch, Results 160 and Project Mwana provide a platform for the efficient determination of the nutritional health and HIV/AIDS testing of children. Apart from sustainability issues related to government engagement and unstable funding streams, the solutions provide high value for the money.

Impact

The review found that, in situations where the Anthrowatch system is used, there is a marked improvement in the delivery of nutritional information to beneficiaries. Specifically, the turnaround time for the receipt of the analysis of nutritional metrics for a child has been reduced from months to

minutes, allowing possible early interventions to occur. Interviewees indicated that this increase in performance has also had an impact on reducing the dropout rate in the programme. Similarly, the ICT4D intervention has contributed to improving the reporting on stock outs of nutritional supplements, reducing calculation errors, and identifying a larger set of at-risk children because of better information. Furthermore, the initiative has contributed to an improvement in overall data quality when compared with the use of paper-based reporting.

However, the inclusion of the ICT4D component has not yet resulted in countrywide nutrition surveillance, with only 21 of 28 districts using the platform as of this review. In addition, data collected as a part of the initiative are not regularly used by the government at policy levels. In parallel, in districts where the initiative is implemented, nutrition surveillance remains incomplete due to CHWs' low continual and active use of the platform.

As such, the review finds that when the Anthrowatch system is regularly used by CHWs, results for beneficiaries are markedly improved; however, the full impact of the initiative remains unrealized.

Sustainability

Anthrowatch and Results 160 were implemented in parallel as part of a grant from Global Affairs Canada from 2011–2014. Although addressing different health issues, the systems share a common technology platform and implementation process. As such, they also share some of the same sustainability challenges.

For both Anthrowatch and Results 160, the technology is old but stable. The process for reporting data and receiving feedback remain unchanged since both initiatives were rolled out in 2011. In the case of Anthrowatch, there are two major barriers to sustainability: ongoing SMS fees and demand. The alleviation of SMS fees can be accomplished via negotiations with mobile network providers and the adoption of new technology (i.e. RapidPro), which could potentially minimize the use of SMS for data transmission.

The more difficult sustainability issue relates to demand. The review has found that, while Anthrowatch is relatively simple to use, the demand for the service and the interest in advocating for its use have waned since 2011. This may not be specific to this initiative, as similar initiatives have experienced a comparable outcome over time. It is assumed these issues will be compounded if/when Anthrowatch is scaled to more districts across the country. In parallel, the data that are collected by the initiative are not regularly consumed, further analysed or used by decision makers for changes to policies and programmes. This, in turn, gives subconscious feedback to line workers that they are performing a busy-work data-collection task.

Summary and Current Challenges

The review found that the Anthrowatch initiative has been a relevant intervention that has had a real effect on the nutritional health outcomes of children in Malawi. Its implementation and ongoing operations are efficient, and the chances for continued sustainability are high.

Current challenges specific to the initiative include:

- The RapidSMS technology is outdated and should be replaced with RapidPRO.
- There is a perception that the system creates more work and is a time burden, which may contribute to low continual or active use by CHWs.
- The initiative is still perceived to be a UNICEF programme that is not owned or operated by the government.

- The project remains constrained, and uncertainty about the future is prevalent because of budget/funding constraints.

Initiative Specific Recommendations

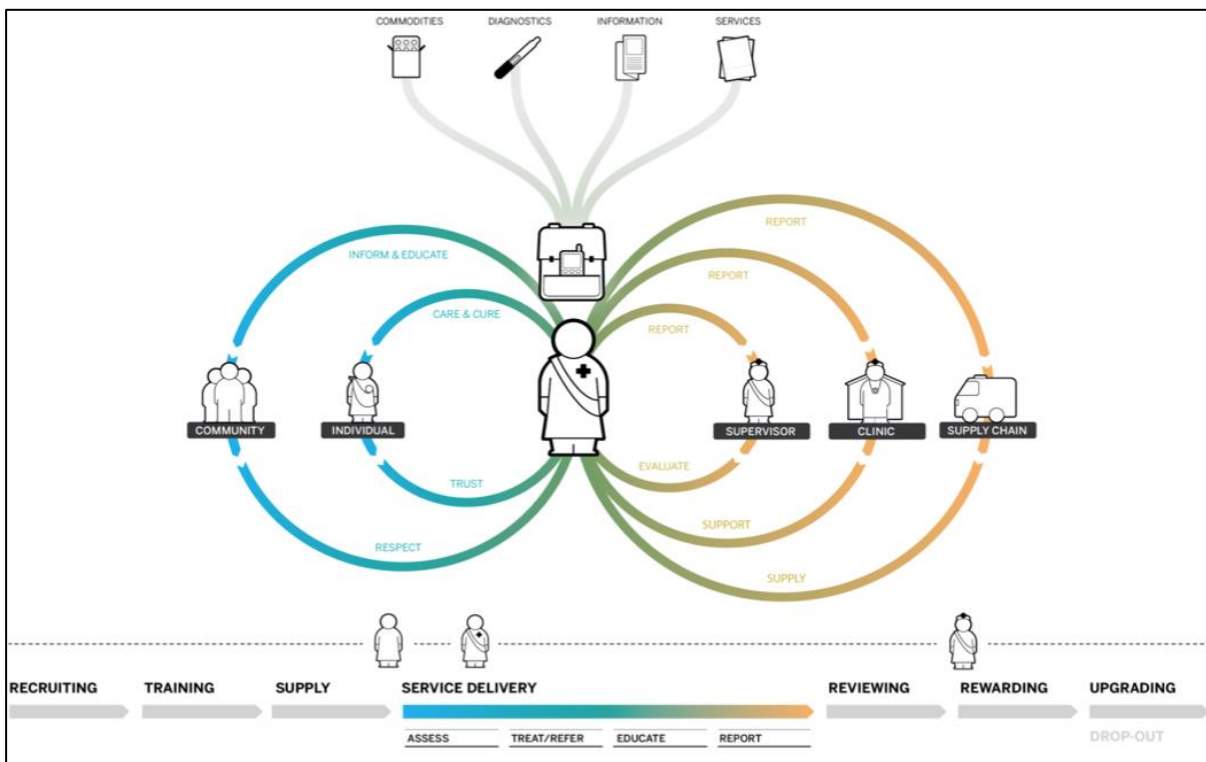
- Tokens and rewards such as certificates could encourage continual active use of the system.
- Seek to develop stronger rapport with government.
- Align the initiatives to consider government staffing structures and the best fit for the new processes.
- In cases where the initiatives create new processes, clearly outline the impact and map new staff roles to ensure coverage and minimize resistance.

3.2. Backpack+ (Uganda)

Description: The Backpack+ initiative envisioned a holistic system designed to support Community Health Workers (CHW), who are often the frontline, or point of contact, for delivering health assistance – especially in rural communities. The project considered the entire lifecycle of the CHW: from recruiting and training, to provision of services, to feedback and advancement within the local health-care system. At its core, the system seeks two major outcomes: 1) to professionalize the CHW role through the focused nurturing and recruitment of qualified and interested individuals and 2) to yield efficiencies in service and commodity delivery through standardization and efficiencies of scale.

People: Backpack+ is housed within the Health Section in Uganda. Globally, the project received support from the Supply Division in Copenhagen. The Ugandan government counterpart is the Ministry of Health, Maternal & Child Health section. Over 60 organizations were involved in the development of Backpack+. Examples of these include UNICEF, Save the Children, Office of the UN Special Envoy/Millennium Development Goals Health Alliance, the One Million Community Health Worker Campaign, USAID, Population Services International, the Bill & Melinda Gates Foundation, Johnson & Johnson, GlaxoSmithKlein, IDEO.org and Frog Design.

Process: A complete process was never completed for this initiative. However, the graphic below provides an overview of the intended process’s scope:



Technology: No specific technology was developed for the Backpack+ initiative.

Summary

Relevance	Effectiveness	Efficiency	Impact	Sustainability	Scale
High	N/A	N/A	N/A	N/A	N/A

Relevance

Though the Backpack+ initiative held the promise of engaging community health workers in a variety of new ways through professionalization, recruitment, training and more, the system has been effectively discontinued at UNICEF. However, as testament to the relevance of the system, the MoH in Uganda has continued to develop a redesigned physical backpack for CHWs. Although funding is not currently available to roll out this new product, this redesign effort is evidence that the government saw Backpack+ as an initiative that was attempting to address relevant needs.

Effectiveness

The original intent of the Backpack+ initiative was to essentially professionalize the community health worker function. To achieve this, the project attempted to consolidate a large number of disparate interventions; provide ongoing training, recruitment and advancement; and generally standardize the range of services offered by community health workers. As of this report, none of these objectives have been achieved.

Significant effort has been devoted to developing cost models for Backpack+. The business case articulated in the documentation for these developments focuses on:

- *Enhanced mission delivery*: The initiative was designed to increase the effectiveness of CHWs, first and foremost by “investing in systems” and structures that support CHWs’ work.
- *Reducing expenditures*: One of the initiative’s clear goals was to seek economies of scale through the purchase of bulk quantities of commonly used commodities and supplies.
- *Intangibles*: The initiative also sought an overall “professionalization” of the CHW role through talent management, training and career path development.

Efficiency

Financial data were not available for the Backpack+ project. This project has effectively been discontinued and therefore has no current value for money consideration.

Impact

The project has been effectively discontinued at the UNICEF level and, as such, there has been no impact at the beneficiary level. However, the project has spurred direct action and movement at the ministry level. The ministry has initiated a complete redesign of the physical backpack associated with the project. The ministry also has maintained a working group to take this project forward, but it is unclear whether it will be able to do so without outside funding.

Sustainability

As of this report, the sustainability of the Backpack+ project rests with the Child and Maternity Health Unit at the Ministry of Health that continues to carry the project forward. Although there is clearly will and interest at the government level for continuing the project, the same from UNICEF is unclear. Further, there is currently a budget gap that needs to be solved before the project can move forward, and it is unclear what additional resources, in terms of human and technical, are necessary for sustainability.

Summary and Current Challenges

The review found that the Backpack+ initiative appeared to have high potential at its inception but is no longer an active programme and, although seemingly highly relevant to the CHWs it sought to serve, should be discontinued.

Initiative Specific Recommendations

Officially discontinue this project.

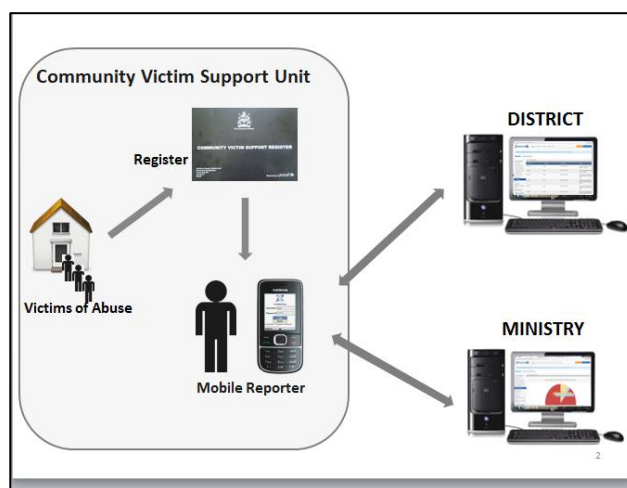
3.3. CVSU (Malawi)

Description: The initiative was designed to improve case management monitoring in support of child protection services.

People: The CVSU project is housed within the Protection section in the UNICEF Malawi CO. The government partners for CVSU are the Ministry of Gender, Children, Disability and Social Welfare and traditional authority organs. The CVSU technology was developed and maintained by the company DiMagi. Save the Children has contributed to the project's implementation.

Process: After receiving a potential victim of abuse, community development officers (CDOs) send collected data about the victim and their case, which is captured in community victim support registers, to a central web-based database system via feature phone. District- and central-level social welfare teams access this data in real time to monitor cases and provide support.

Technology: The technology underlying the CVSU programme is Comcare, a mobile health-care system developed by the company DiMagi.



Summary

Relevance	Effectiveness	Efficiency	Impact	Sustainability	Scale
High	Low	Medium	Low	Medium	Pilot

Relevance

As indicated by child protection workers interviewed as part of the review, the technology within CVSU initiative helps enable the larger child protection-driven programme and provides easier input of data, savings on travel costs and a more direct way to report to district offices. However, lack of funding and general uptake (or continued usage) of the technology at the unit level has limited progress.

Effectiveness

The CVSU initiative seeks to improve the way information is collected, organized, digitized and shared from manual registers at CVSUs. By addressing challenges in information management and monitoring weaknesses, the platform has enabled electronic collection of child protection indicators from the field and improved monitoring of frontline child protection activities. However, the review finds mixed views regarding results against objectives. On the one hand, the project has also realized efficiencies at the unit level, for example:

- There is now prosecution of cases, counselling, rehabilitation and diversion where deemed necessary.
- Sometimes CVSUs are able to close (by resolving) some of the cases that are simpler. Thus, now there is greater diversion/ leeway and understanding among child protection workers who can counsel but who will still revert to other arms and institutions where they feel others law enforcement arms should be involved.

On the other hand, between January and May 2014, 8,241 cases were reported in the 310 CVSUs across the country, which presents an under-reporting problem. Furthermore, the review yielded low-data utilization on the demand side, at the higher levels and for policy and planning purposes

Documentation and interviews describe a business case along the following lines:

- *Enhanced mission delivery*: The CVSU project has the potential to empower units to handle a variety of child protection issues in house. The system also supports the centralized collection, storage and sharing of relevant data, potentially providing CVSUs to minimize escalation of cases to other levels in the GoM.
- *Intangibles*: The CVSU system contributes to the continued building of positive perceptions related to the government-managed community protection services.

Efficiency

In the case of CVSU, the design and development of the actual technology required a relatively large portion of the overall project finances (29%), through 2015. However, no additional development has occurred since the project rolled out, and ongoing maintenance/hosting fees are a very small portion of project costs at 7%. As with other ICT4D projects, human resources (training 54%, for example) occupy the lion's share of project finances. The project requires an annual operation cost of \$6,000 USD for the Commcare Case Management tool, hosted and maintained by DiMagi. Notably, the proprietary nature with Dimagi complicates some aspects of the system. For instance, the landing page/dashboard cannot be branded with UNICEF/GoM colours and logos, unless UNICEF pays for its own Commcare implementation and hosts the system – a cost that currently cannot be justified and would hamper sustainability.

The CVSU system is the one of the more expensive and is the most complex, technologically, of the initiatives reviewed. Low uptake at the unit level and apathy or non-appetite for data at the ministry level suggest that, currently, the initiative has room for improvement in terms of value for money.

Impact

Although interviewees indicated that the platform enabled a better and more holistic response at the CVSU level due to the reporting platform, it is unclear how much the ICT4D initiative specifically contributed to this improvement in performance: At the time of this review, only 84 of more than 300 CVSUs are active, with many units dormant due to lack of resourcing after a pull back on funding from development partners occurred in 2013.

Sustainability

The CVSU initiative is currently in the middle of a grant from DFID that runs through 2016. Although the technology's development was a hefty portion of funding in the beginning, the platform is now stable, and ongoing costs are related to hosting. The bulk of remaining funds for the ICT4D initiative are focused on ongoing training activities.

One of the greatest barriers to sustainability for the initiative is user uptake within the units. Though CVSU units are trained on the use of the technology, it does create additional work for officers, which erodes adoption and has resulted in under or low reporting by some units. Similar to Anthrowatch and Results 160, demand for data and then usage of that data for analysis and policy changes (or programming decisions) have also been low, creating a negative feedback loop for the unit line workers.

Addressing this low uptake and usage of data will require the completion of a comprehensive technical support plan, and additional support to government counterparts to defining clear roles, rules and regulations will help aid the use of the data supplied from the CVSU case management tools.

Summary and Current Challenges

The review found that the CVSU initiative is highly relevant in the pursuit of better case management for child protection but that its complexity and overall support from users and data consumers have limited its impact and hampered its potential for ongoing sustainability.

Current challenges specific to the initiatives include:

- Activating the outstanding 280 units not using the technology.
- A lack of programmatic staff and other resources that have slowed the rollout of the initiative.
- Under- or load-reporting levels from active units.
- The misuse or damage of phones that were provided to the units for use with the system.
- Low or no data use or analysis by government consumers for policy and programme planning.

Initiative Specific Recommendations

- Seek creative/alternatives for funding activities that are ongoing for continuity, regardless of changes in government.
- Seek to reduce complexity of the interface between programming and technology.

3.4. mTrac (Uganda)

Description: mTrac contributes to a number of programme outcomes, including: monitoring supplies of a select set of government tracer drugs; surveillance of a selection of epidemic and endemic diseases; communications, polling, surveys and general feedback from staff at the district and health-centre level; and an anonymous hotline customer complaint/reporting hotline.

People: mTrac is housed within the Health Section in Uganda. Coordination also occurs with Planning, Operations and Communications. The Ugandan government counterparts for mTrac are the Ugandan Ministry of Health (including the Health Information Division, Epidemiological Surveillance Division, Emergency Operations Centre, Pharmacy Division and National Malaria Control Programme), the State House's Health Monitoring Unit, the National Medical Stores, regional and local government bodies and the public, NGOs, and private health centres. Other partners for mTrac include WHO, DFID, Centers for Disease Control, USAID and USAID Implementing Partners.

Process:

For drug stocks and surveillance data:

- On Monday, all health facilities send data via SMS;
- The facility receives immediate feedback confirming receipt;
- In cases where predefined thresholds for diseases or deaths have been breached, an SMS is immediately sent to all registered staff in the district health office to take action;
- On Wednesdays, the district biostatistician reviews and approves data from the health facilities;
- On Thursdays, the data are reviewed by the Ministry and pushed to the DHIS2 system; and
- The following Monday, the MoH Health Information Division sends an email summary to all national and district stakeholders.

For the hotline:

- Compliments and complaints are received via SMS on an ad hoc basis by a Help Desk at the MoH;
- The Help Desk monitors and directs routine compliments and complaints to the district level when appropriate; and
- If the reported case is criminal in nature, or there is no response from the district within two weeks, the State House's Health Monitoring Unit takes appropriate oversight action.

Technology: RapidSMS

Summary

Relevance	Effectiveness	Efficiency	Impact	Sustainability	Scale
High	High	High	High	High	Go Global

Relevance

The government of Uganda, in particular, the Ministry of Health and its internal agencies, has been intimately involved with mTrac and its continued evolution. As of this review, the Ministry operates all functionality of mTrac and its interface with the DHIS2 system, and the State House's Health Monitoring Unit provides complete oversight of criminal complaints and delinquent district responses lodged through the hotline.

mTrac has evolved significantly since its first version. Originally designed as a system for tracking only drug stocks for malaria, under the revised HMIS, mTrac now includes reporting on all tracer drug stocks, disease surveillance, polling of health centres and feedback from Ugandans and plays an integral role in the country's eHMIS system.

A part from the Ministry, mTrac engages various stakeholders and rights holders in the following ways:

- Workers at the health facilities:
 - Act as part of decision-making process for drug allocation
 - Provide higher levels of accountability and transparency
 - Are included in the process of surveillance
 - Engage with technology
- Patients and users of health facilities:
 - Engage with health facilities, generally
 - Are able to voice opinion and issues as they arise
 - Receive better access to treatments

Effectiveness

The mTrac initiative is a study in the evolution of a technological intervention. The initiative was originally designed to facilitate the tracking of drug stocks to treat malaria. Immediately realizing success, the project was expanded to track a larger library of drugs. Building upon this success in standardized reporting, the initiative recognized that, because community health centres are the focal points for reporting within the project, surveillance of disease outbreaks could also be accomplished. As such, this component was added to the technology and associated processes. Finally, recognizing a need for community feedback at the health-centre level, a help desk service/function was added that has proven effective in raising both the standards expected for a community health centre and accountability for the same.

Documentation and interviews describe a business case along the following lines:

- *Enhanced mission delivery*: Prior to implementation of mTrac, the Ugandan government relied upon a paper-based reporting system that was extremely slow and inaccurate. mTrac has enabled the realization of truly game-changing efficiencies with regard to drug stock reporting, disease surveillance and complaint reporting across the country.
- *Reducing expenditures*: The contributions of mTrac to system-wide savings are potentially enormous. These include the elimination of costs associated with transport and printing of paper reports along with overall improved health outcomes because of better drug stock allocations, faster disease outbreak identification and reductions in fraud and abuse.
- *Intangibles*: mTrac also contributes to the continued building of positive perceptions related to the government managed health system through overall better service and the actions resulting from reports submitted to the anonymous reporting hotline.

Efficiency

Over the life of the project, funds have been used for a variety of activities, including but not limited to:

- In-house software developers
- Server maintenance staff

- Call desk operators
- Biostatisticians
- Executive assistants
- Database administrators
- HMU data analysts
- National, district and health facility training and support supervision
- Hardware and internet data for national and district government
- SMS short code licenses and SMS Inventory

During the 2014/2015 period, the majority of funding provided to UNICEF (56.5% or \$250,985 USD) was used for activities specific to mTrac technology development and maintenance. Of this, \$165,484 was allocated for building out the IT infrastructure necessary for operating the mTrac system across Uganda. Almost 24% of allocated funds were used for UNICEF staffing, consultancy services and government secondees, and the remaining 20% were allocated for activities that supported the Ministry of Health in some way.

Even taken in isolation, this funding allocation is not only reasonable but represents excellent value for the money given the national scale of the mTrac program. When considered against the total funding provided by DFID both for iCCM and mTrac programming (\$4,164,945 USD), the amount that has been used specifically for mTrac (approximately 14% or \$444,530) is highly efficient. It also enhances the investment in iCCM, providing critical data to improve its performance that otherwise would not be available.

What the current financial numbers do not tell us is what the ongoing management and maintenance costs for the mTrac system will be. This review has considered the period through April 2017 (the timing of DFID funding) as the development and refinement period of the mTrac system. It is not known what additional costs will be incurred to continue the programme in the future. However, due to the efficient nature of costs in the current period, ongoing management, maintenance, and continued development of the mTrac system should be considered more than reasonable given the return provided by the system.

As the de facto system for drug tracer stock and disease surveillance reporting as along with citizen feedback on health-centre performance, mTrac has returned incredibly high value for the funding already provided.

Impact

The mTrac initiative has realized significant success in Uganda and is operational in all districts across Uganda. Although there is variability in reporting levels across the more than 4,400 health facilities, the initiative has had a profound effect on drug stock reporting, disease surveillance and government accountability. Indeed, mTrac has become an integral part of the system of record used by the Ministry of Health and others.

Beyond contributing to the improvement of specific health outcomes for beneficiaries through better drug stock management and disease outbreak surveillance, mTrac has engendered an active user base throughout the majority of the country through its help desk function. Any Ugandan can raise a complaint or provide feedback about health centres, staff, and so on directly with the MoH and, if these complaints are not responded to in a timely fashion, the president's office has designated a special unit to follow up directly.

Sustainability

The mTrac project is currently funded through 2016 by a grant from DFID. With the recent passage of the Ugandan eHealth law in early 2016, it appears that the initiative is not only sustainable, but that by 2017, it may also achieve the ultimate development goal of being completely phased out and having the DHIS2 system entirely replace its drug tracer stock and disease surveillance reporting

functionality. That would leave only the feedback/help desk function in need of oversight and maintenance.

Institutionally, the Ugandan Ministry of Health and the mTrac-associated organs are well positioned to fully own and operate mTrac. Although it has not happened as of this review, the recent passage of the eHealth law should enable funding to flow from the GoU to support the project that would be adequate for both technological and human resource needs. At that stage, support from UNICEF could begin to be phased out.

Summary and Current Challenges

mTrac is one of two case studies of the highly successful, efficient implementation of an ICT4D initiative that has had a massive impact on important and relevant issues (i.e. health outcomes) while essentially achieving sustainability. This technology is ready for global deployment.

mTrac continues to face challenges that include:

- Inadequate mobile network coverage and power outages.
- Inconsistency with feedback reports to health centres.
- Limited use of data and dashboards by decision-makers.
- Low perception of value by community health workers.
- Low reporting rates from private health centres.
- Inadequate training of health centre workers.
- Old technology that needs to be replaced (RapidSMS to RapidPRO).

Initiative Specific Recommendations

- Focus on building capacity, especially at the Ministry level.
- Work to demonstrate value to health workers.

3.5. MobileVRS (Uganda)

Description: MobileVRS is the de facto communication channel for Uganda’s birth registration system.

People: The MobileVRS program, part of the national civil registration services, is supported by the Child Protection Section in the Ugandan Country Office. The government counterpart for the MobileVRS programme was initially the Ugandan Registration Services Bureau (URSB). However, with the enactment of the Registration of Persons Act in March 2015, the National Identification and Registration Authority (NIRA), under the Ministry of Internal Affairs, was created. On the 1 January 2016, NIRA officially took charge of birth and death registration, including MobileVRS. Ugandan Telecom is a technology and technical support partner for MobileVRS.

Process: Ugandans receive two birth certificates – a “short form” at birth and a “long form” later in life, usually when the individual reaches the age of maturity and is ready to enter university, the workforce or similar. After a child is born, the birth is recorded into a physical registry either in the hospital or at a local authority’s office. This physical record is then input into MobileVRS by a data entry clerk at the district level, and the record is transmitted in real time into the NIRA server at the national level. Once properly registered in MobileVRS, the record is validated, and a uniquely identified short birth certificate is printed, signed and stamped by the relevant authorities and issued to the respective parents of the child. If an individual needs a long birth certificate, they have to apply for it from NIRA and attach their short birth certificate on the application. Both the long and short birth certificates have the same unique registration number generated by MobileVRS. Basic data on birth registrations by geographic location, by gender and by age group are available in real time at the MobileVRS website: <http://www.mobilevrs.co.ug/>.

Technology: RapidSMS

Summary

Relevance	Effectiveness	Efficiency	Impact	Sustainability	Scale
High	High	High	High	High	Go Global

Relevance

More than just relevant, the MobileVRS system is the communication channel for the system of record for birth registrations within Uganda. The system has been so successful that its process and technology are currently being considered for death registration and use within the new National ID system.

The most important difference MobileVRS has made for the everyday citizen is the ability to record and print the short form birth certificate quickly (although this process still encounters bottlenecks). This process not only provides the new individual with a record of birth, but also it provides them with a unique identifier for the national registry that can be used to receive their long-form birth certificate, verify their age, and so on online instantly. The system of registration also ensures that rights holders can access relevant services, as necessary, throughout their lives (e.g. education, legal, health).

Effectiveness

MobileVRS was originally intended to remove or eliminate bottlenecks related to the reporting of new births in Uganda. Although the project has not yet achieved 100% coverage or reporting rate, these are related to funding, human resources and other issues. The technology itself has met its objectives:

- The transmission of information in general from local to national;

- Countrywide standardization of the short-form birth certificate;
- Verification of the short form through a unique registration identifier;
- The availability of basic analytics; and
- Increased levels of accountability.

Documentation and interviews describe a business case along the following lines:

- *Enhanced mission delivery*: Prior to implementation of MobileVRS, the reporting and registration of births was extremely low (20% in 2011). MobileVRS has helped realize a true leapfrog moment for registrations, which has increased nationally to 68.4% in 2015.
- *Intangibles*: MobileVRS contributes to significant capacity building initially at URSB, and now NIRA, and its national organs. Further, by dramatically increasing birth registrations, the system has enabled greater effectiveness of many other government bodies to ensure the rights of children.

Efficiency

The anticipated budget for MobileVRS in 2015 was 1,308,955 USD. UNICEF does not currently bear any costs associated with the MobileVRS technology. UNICEF's work focuses on building capacity across the country for the continued uptake and use of MobileVRS and its outputs across targeted hospitals and health centres, with the bulk of the proposed budget (\$942,000 or 72%) for this activity. Support to URSB (or NIRA in the future) is the second largest allocation (\$180,000 or 14%).

It is the opinion of this review that these budget numbers reflect the registration system as a whole across Uganda. URSB simply did not have the capacity to support the inception and roll out a programme such as MobileVRS across the country, and, although not investigated in detail in this review, it is likely that NIRA will not be able to either going forward. As such, UNICEF's investment into the continued support of the programme—given its return—is sound for the immediate future.

As the communication channel for the system of record for birth registration, MobileVRS has returned the highest value for money across all the initiatives reviewed.

Impact

The MobileVRS technology has become the communication platform that feeds the system of record at the National Identification and Registration Authority (NIRA). The initiative has directly contributed to improving birth reporting of children under five years old from 20% to over 60% annually.

Importantly, the technology has not fundamentally changed the relationship between beneficiaries and the NIRA. Bottlenecks still exist during the birth registration process, including the entry of data into the Mobile VRS system itself and the printing and delivery of the initial short-form birth certificate to parents immediately after a child's birth. However, overall, the Mobile VRS has fundamentally changed the birth reporting system in Uganda and markedly improved the recording and delivery of birth credentials.

Sustainability

MobileVRS is an essentially sustainable operation today. Currently, hosting, operation and maintenance of the MobileVRS technology and server are maintained by Ugandan Telecom. However, as of January 2016, NIRA has started the process to fully take over the system internally. Ongoing technical support and capacity building continues to be delivered by UNICEF but, similar to mTrac, there should now be a clear path for a phase out of UNICEF activities related to birth registration.

Current Challenges

Similar to mTrac, MobileVRS is a case study of a highly successful efficient implementation of an ICT4D initiative that has had an enormous impact on important and relevant issues (i.e. birth registration) while essentially achieving sustainability. This technology is ready for global deployment.

However, also like mTrac, MobileVRS continues to face challenges:

- Bottlenecks in data entry because of poor network connectivity.
- Printed, but undelivered, short-form birth certificates.
- Data entry bottlenecks because of access to technology.
- Overall programme coverage in country to achieve closer to 100% birth registration.
- Old technology that needs to be replaced (RapidSMS to RapidPRO).

Initiative Specific Recommendations

- Facilitate the handover of the system to new government agency.
- Offer consulting/support services paid for by government.

3.6. Project Mwana (Zambia) and Results 160 (Malawi)

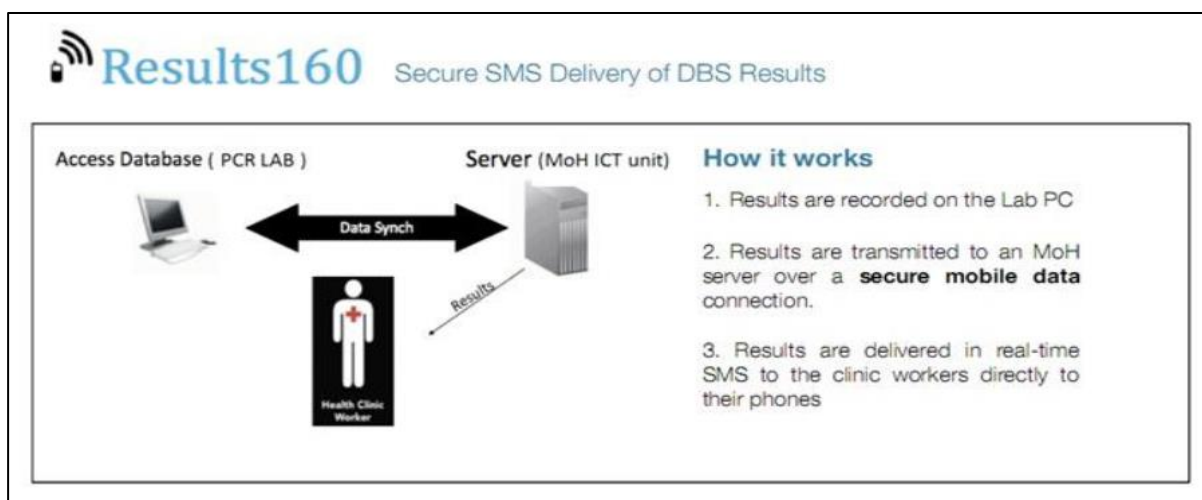
Description: Both Project Mwana and Results 160 provide SMS delivery of test results for diagnosis of HIV.

People:

Project Mwana is housed within the Ministry of Health with support from the Health and Nutrition section of the UNICEF Zambia country office. The government counterpart for project Mwana is the Ministry of Health. The project maintains strategic partnerships with Boston University affiliate – the Zambia Centre for Applied Health Research and Development, the Family Health International project called Zambia Prevention, Care and Treatment Partnership II, the CHAI, Churches Health Association of Zambia and the Centre for Infectious Disease Research in Zambia. The project has been adopted at sites where UNFPA and World Vision Zambia are implementing early infant diagnosis (EID) of HIV projects. The project also works closely with mobile network providers MTN and Airtel. The software for the project was developed by two technology companies: Cactus LLC and Dimagi.

The Results 160 project is housed in the HIV/AIDS Unit in the Malawi country office. The project also enjoys support and guidance from other programme sections, the ESAR office and UNICEF HQ. The Malawi government counterpart is the Ministry of Health. Results 160 is supported by two mobile network operators: Telkom Networks Malawi and Airtel Malawi. The main implementing partner is the Ministry of Health (Department of Diagnostics). The CHAI provides technical backstopping.

Process: For both Project Mwana and Results 160, a blood drop sample from an infant is sent to a lab for testing. After testing is complete, the results are transmitted to clinic workers via SMS (see graphic below for Results 160).



Technology: RapidSMS

Summary applicable to Project Mwana and Results 160

Relevance	Effectiveness	Efficiency	Impact	Sustainability	Scale
High	High	High	High	Medium	Scaled

Relevance of both Project Mwana and Results 160

Interventions such as Project Mwana and Results 160, which are specifically focused on addressing awareness, prevention and treatment of HIV/AIDS, by their nature are extremely relevant. Further, both initiatives, and their underlying technology, are especially relevant given their contribution to reducing the delivery time for test results. By contributing to this reduction in delivery time so dramatically, these ICT4D initiatives make a tangible contribution to saving the lives of children who have an HIV-positive diagnosis.

Effectiveness – Project Mwana and Results 160

Project Mwana was designed to improve the timeliness of reporting on HIV test results for newborns. Up to 30% of newborns who contract the virus from their mothers die before the age of one if they receive no treatment. However, there is a 75% improvement in survival rates among those diagnosed in time to begin treatment within their first 12 weeks of life. Reducing delays in early infant diagnosis leads to improved health outcomes because interventions are made earlier. By 2013, the number of clinics supported increased to 580, from 271 in 2012. The delivery of test results also increased from 10,775 in 2012 to 30,000 in 2013.

Beyond improving the delivery of test results, Mwana has also contributed to the improvement of communication among health-care providers, encouraged word-of-mouth marketing by community members and improved the accuracy of test results.

The Results160 initiative is similar to Project Mwana in that it was designed to improve the timeliness of reporting on HIV test results for newborns. The achievements of the initiative are similar as well—significantly increasing the speed of delivery of HIV test results for newborns, with approximately 60% of all HIV test results in Malawi delivered using the platform.

The system has also engendered similar externalities to those of Project Mwana, including improved coordination of monitoring of HIV early infant diagnosis testing services at central hospital laboratories and strengthening of communication between the Ministry of Health, district and health facility teams.

Documentation and interviews describe a business case for both initiatives along the following lines:

- *Enhanced mission delivery:* Prior to implementation of these systems, the Zambian and Malawi governments relied on an extremely slow paper-based reporting system. These systems have enabled the realization of truly game-changing efficiencies with regard to reporting on HIV testing.
- *Reducing expenditures:* The contributions of both platforms to system-wide savings are potentially significant with the elimination of costs associated with transport and printing of paper reports but also with longer-term costs associated with the reduction in the burden on the health-care system from fewer patients with HIV/AIDS complications.
- *Intangibles:* Both systems contribute to the continued building of positive perceptions related to the government managed health system through better overall service.

Efficiency – Project Mwana and Results 160

No financial data were available at the time of the review for Project Mwana (Zambia).

In Malawi, the financial data provided for Results 160 were combined with Anthrowatch and other technologies. This data have been discussed in the Anthrowatch section above.

Impact – Project Mwana and Results 160

The impact realized through the implementation of Mwana on the reporting of HIV test results has been significant. Before the initiative, in November 2009, it took 66 days for an HIV test sample to

travel to a testing lab and the result to be returned to the caregiver. In July 2011, a similar sample took 14 days to make the same trip. By 2012, on average, results were 57% faster between sample collection and delivery at facility. The improved delivery times have contributed to the early identification of HIV-positive newborns, allowing for the rapid initiation of appropriate drug therapies.

The impact of Results 160 is similar to that of Project Mwana. The initiative has contributed to the improvement in the percentage of early infant HIV diagnosis from 39% in 2013 to 59% in 2014. The system also helps facilitate same-day initiation of treatment for those infants who test HIV positive. At the time of the review, 60% of all HIV EID test results in Malawi are delivered using the platform. Also, while beneficiaries do not directly interact with the technology, the review noted that the rapid delivery of test results was welcomed by mothers who would advertise the availability of the intervention via word of mouth.

Sustainability – Project Mwana and Results 160

In Zambia, similar to Malawi's Anthrowatch and Results 160, the review finds that there are no significant barriers to complete sustainability other than ongoing human resources training and the costs of the SMS messages associated with scaling. Because the Mwana system is housed at the Ministry of Health and operated by the same staff (the salaried employees of the government), the only real barriers to sustainability and scale are financial. Thus, funding must be acquired for the continual training and SMS burdens.

Mwana was one area where a specific request was made to the review team to receive support and information from UNICEF regarding a breakdown of the total cost of ownership for the system, including all operational and implementation costs.

In Malawi, as discussed above with Anthrowatch, the technology behind Results 160 is old, but stable, and the process for reporting data and receiving feedback remains unchanged since the initiative was rolled out in 2011. In the case of Results 160, SMS fees remain the greatest barrier to sustainability. As noted above, there are at least two specific strategies to reduce these fees immediately. Results 160 has enjoyed continued uptake and greater scale throughout Malawi; this could be because of a perception that the seriousness of the issue (HIV/AIDS) takes precedence.

Current Challenges

Both Project Mwana and Results 160 have delivered a highly efficient solution that is relevant and effective for the delivery of HIV test results. And both systems have a good chance of achieving sustainability.

The initiatives share similar challenges for the future:

- Ownership of the system is still perceived to be UNICEF (more especially in Malawi) and should be moved explicitly to government partners.
- There is poor utilization of the data gathered by consumers and decision makers.
- There are challenges with mobile network infrastructure and coverage across the countries.
- The technology is old and needs to be replaced (RapidSMS to RapidPRO).

Initiative Specific Recommendations

- Tokens and rewards such as certificates could encourage continual active use of the system.
- Seek to develop stronger rapport with government.
- Align the initiatives to consider government staffing structures and the best fit for the new processes.

- In cases in which the initiatives create new processes, clearly outline the impact and map new staff roles to ensure coverage and minimize resistance.

3.7. Rapid SMS (Rwanda)

Description: RapidSMS Rwanda tracks pregnant mothers and newborn pairs, childhood diseases and weight gain of children for proactive nutrition intervention; reports on stunting rates; and provides an early detection system for children living with disabilities.

People: RapidSMS is housed within the Child Survival and Development Section. The government counterpart is the Ministry of Health. Management Sciences for Health has provided technical support for training.

Process: CHWs monitor pregnant women and newborn pairs, collecting standardized data that are transmitted to a central server via SMS. Although largely a data aggregation platform, the system also analyzes received data for red flags that prompt action at the community level.

Technology: RapidSMS

Summary

Relevance	Effectiveness	Efficiency	Impact	Sustainability	Scale
High	High	High	High	Medium	Scaled

Relevance

The level of investment and countrywide implementation of the rapid SMS initiative in Rwanda is a testament to its continued relevance in the country. The evolution of the initiative over the past several years from a tracking system for antenatal care to a broader, more comprehensive tracking system of the health outcomes of mothers and children suggests that Rwanda will continue to view the initiative as highly relevant for the foreseeable future. This is all the more so as the country considers the next iteration or evolution of the underlying technology.

Effectiveness

At the time of the review, RapidSMS Rwanda was tracking nearly 400,000 pregnant mothers and new born pairs each year. This tracking included antenatal care, new born health, immunizations, childhood diseases, weight gain of children for proactive nutrition intervention. The system also reports on stunting rates and provides an early detection system for children living with disabilities.

Documentation and interviews describe a business case along the following lines:

- *Enhanced mission delivery.* The RapidSMS system is viewed by the Rwandan government as a tool to facilitate consistent and real-time monitoring of health outcomes across the country.

Efficiency

Financial data were not available for Rwanda. However, whereas the review did not receive official financial data regarding RapidSMS in Rwanda, the level of engagement and ownership by the government suggests a perceived high value for the money.

Impact

At the beneficiary level, the initiative has contributed to an increase in the provision, quality and utilization of government health services. The development of the technology has begun to inculcate a culture of response. Red Alerts, in particular, trigger a direct response for the most vulnerable. The system has contributed to the coordination of services and accountability within the health system.

Sustainability

The RapidSMS initiative is completely owned, funded and supported by the government of Rwanda through the appropriate organs. As of this review, UNICEF is playing, at best, a secondary support

role. This may change in the future as the government decides to upgrade the current technology (RapidSMS) in favour of RapidPro.

Current Challenges

The government of Rwanda is highly invested in the RapidSMS initiative and has seen real value from its implementation and evolution over its lifetime. One specific challenge that needs to be addressed is the replacement of the aged RapidSMS technology with RapidPro.

Initiative Specific Recommendations

Offer technical and help desk support for the current system for the foreseeable future.

3.8. U-Report (Uganda and Zambia)

Description: In Uganda, the original intent behind the development of the U-Report project was to provide a system for Ugandan citizens to flag problems in their communities for action. Today the project has evolved to include polling and community engagement functions, with an ultimate vision of becoming the de facto channel for direct citizen engagement and government feedback.

In Zambia, U-Report was implemented in Zambia as a means to capture the opportunity of connecting with youth regarding HIV/AIDS awareness.

People: In Uganda, the U-Report project is currently housed within the Communications Section, Civic Engagement Unit in the Uganda Country Office. Because the U-Report project is intended to be an independent reporting tool, it does not have specific government counterparts. However, the project enjoys support from many Ugandan ministries and all members of Parliament.

Other Partners

- Uganda Scouts
- Marie Stopes Uganda
- Straight Talk Foundation
- MildMay
- BRAC Uganda
- AMREF
- Governance, Accountability, Participation and Performance Programme
- The Medical Concierge Group
- UNHCO
- Church of Uganda
- Muslim Supreme Council
- Catholic Secretariat
- Uganda Youth Coalition
- Rwenzori Information Centres Network (RIC-NET)
- Barefoot Lawyers

In Zambia, The platform is housed at the UNICEF Zambia Country Office; UNICEF provides technical backstopping and manages the system support. The counselling component is managed by an NGO partner, CHAMP, initially identified by the National AIDS Council (NAC) and funded through a programme cooperation agreement, under the UNICEF and Ministry of Health joint annual work plan, under the 2011–2015 government of Zambia (GoZ) and UNICEF Programme of Cooperation. The U-Report project is positioned to be an independent reporting tool due to the nature of the sensitive data it transmits. NAC seems like a natural fit as an owner for U-Report, but NAC is yet to own it. Nevertheless, U-Report is included in the National HIV/AIDS Strategic Plan (2014–2016) as a tailored social and behavioural change communication platform for young people. Further support is provided by local telecom providers MTN, Airtel and Zamtel.

Process: In Uganda, U-Report is used as a platform for data gathering, campaigns and initiatives. Once an individual has joined the system as a U-Reporter, the U-Report project outlines the following data flow:

- The system issues questions to registered U-Reports weekly and sometimes more frequently in cases of emergencies or special events;
- U-Reporters respond to the question;
- Responses are aggregated by UNICEF and presented to decision makers; and
- Actions taken by decision makers are reported back to U-Reporters via SMS.

In Zambia, the main modules work as follows:

1. Ask, Learn and Share – this module provides personalized feedback to a youth SMS request. Most queries will be managed by semi-automated, thematic-based decision trees to address knowledge gaps.
2. U-Report SMS operators manage the SMS flow, screening out emergency/priority requests and linking with national experts for very specialized queries. This has been the primary offering, with a counsellor-initiated frequently asked questions (the knowledge bank) to respond to standard HIV and SRH questions.
3. Participate, Influence Demand and Access – this module will provide a systematic approach for real-time polling/monitoring youth opinions on issues that affect demand/access and utilization of HIV prevention and care interventions

Technology: RapidSMS

Summary

Relevance	Effectiveness	Efficiency	Impact	Sustainability	Scale
High	Medium	High	Medium	Medium	Go Global

Relevance

Both in Uganda and Zambia, the U-Report system is an exercise in citizen engagement. Through its methodology of call and response, or question-and-answer, the system is continually testing, refining and growing its relevance for U-Reporters.

In Uganda, the initiative offers, for many, a first time to contribute their voices to a number of outlets in their country. This includes the ability to:

- Engage and provide feedback to elected members of the government;
- Raise issues specific to their communities;
- Report on emergencies, disease outbreaks and other current events;
- File compliments and complaints about government services, such as those at health-care centres.

That said, in Uganda, the missing link for U-Report remains the connection between citizen engagement and realized action. Although there are numerous stories of action being taken, especially in crises, U-Report partners have a difficult time seeing the tangible benefits or changes brought about by the initiative.

In Zambia, because the underlying ICT4D solution is used as a communication channel for HTC along with SRH information and awareness, the programming available through the initiative has every opportunity to be highly relevant to its target population. However, the initiative should continue to invest in actually tracking behavioural changes resulting from the associated programming and, as such, remain relevant to the a very dynamic segment of the population that is predominantly youth.

Effectiveness

The original intent of U-Report was to provide a system whereby any citizen could easily report on issues that affect them to a centralized location. To that end, the initiative has clearly achieved its objective.

In Uganda, the initiative has evolved considerably, broadening its scope and reach. The system has contributed to a number of specific positive outcomes, as evidenced through anecdotal data. However, because the technology is not deeply integrated across all programme activities, its objectives remain diffused and unclear. Indeed, this is both the system's biggest strength and

weakness – when a specific objective is identified, UNICEF can take advantage of the technology for rapid and effective action. However, without specificity, U-Report quickly becomes a powerful tool on the shelf.

In Zambia, U-Report has been used for specific programme activities, in the two provinces of Copper Belt and Lusaka. In this case, the review has found that U-Reporters are engaged and active with the technology. However, there is need for current data to show whether this engagement has effectively increased youth awareness of HIV/AIDS related issues.

Documentation and interviews describe a business case along the following lines:

- *Enhanced mission delivery*: The U-Report platform offers a unique opportunity to engage individuals about the issues that matter to them most, especially those who might not otherwise have any outlet to express an opinion. It also acts as a conduit of knowledge and community sharing among U-Reporters who decide to join. A fully realized U-Report vision can potentially deeply affect how government service delivery is realized across Uganda (and any other country that implements U-Report) with essentially individual-level data, feedback and accountability.

Efficiency

Uganda

The greatest expenditures for the programme are projected to include buying SMS messages and contracting implementing partners to perform outreach (27% or \$350,000, each).² Notes on the budget suggest that 50% of SMS fees will be shifted to the budgets of programming,³ which would significantly reduce this burden on the U-Report project, but only transfer it elsewhere. The second and third largest portions of the budget are for UNICEF staffing for recruitment and coordination, at 12% and 14%, respectively.

Zambia

In Zambia, as experienced by other projects that are part of this review, the technological aspects of the project are the most affordable – in this case, the technology components are approximately 1% (\$28,360) of the total budgeted costs. Counsellors owned the bulk of the budget at 59%, whereas 10% was dedicated to responding to demand generated by PCAs. In this case, SMS fees only take a small portion of the budget at approximately \$12,045 USD annually.

Because of the nature of the U-Report project (e.g. independent initiative, crosscutting nature), the review is unable to provide a clear value-for-money determination. However, the nature of the technology suggests it may provide the lowest per-data-point cost of any system within the UNICEF ICT4D portfolio. What is clear is that U-Report has provided real value in a number of ways across multiple implementations, and the anecdotal evidence continues to mount. What needs to be determined by UNICEF is how U-Report fits within its global programming and whether it will become UNICEF's de facto platform for citizen engagement.

Impact

Although the underlying technology is the same in both countries, U-Report is used differently in Uganda than in Zambia. In Uganda, U-Report is used as a broad based community engagement

²UNICEF is renegotiating SMS rates as of mid-2016, and based on discussions that have been held with the MNOs and their current bulk pricing rates, expect approximately a 90% reduction in SMS costs. There are also plans to make a major advocacy push with the Ministry of ICT and Uganda Communications Commission for free SMS on the basis that this system serves the public good and has been successful in other U-Report countries.

³As noted in interviews, 100% of SMS fees in the Nigeria U-Report implementation are covered by the local mobile provider, eliminating this cost.

platform covering a diverse set of topics. In Zambia, U-Report is used specifically for delivering HIV/AIDS and sexual reproductive health (SRH) information. In Uganda, at the time of the review, there were more than 300,000 registered U-Reporters and in Zambia, 76,300.

In Uganda's case, there is massive participation and energy around U-Report, but its contribution to programme-specific outcomes remains underutilized and unclear as of this review. There is evidence that U-Report generates useful actionable data (e.g. rapid response to and therefore minimizing an Ebola outbreak and banana blight). However, the impact on individual beneficiaries is unclear, and the most important next step for the initiative is to become deeply integrated with specific targeted programme activities.

In Zambia, the use of U-Report has resulted in 65% of participants initiating a conversation with counsellors. However, the project has yet to document any behaviour changes. Notwithstanding, the HIV Testing and Counselling (HTC) poll of 2014 had significant "reported" behaviour change by U-reporters (e.g. went for an HIV test) post the HTC campaign (30% of 15–19-year-olds said they did get tested after getting the campaign messages),⁴ indicating the need for more of these kinds of validations to be done.

Sustainability

There is significant will and interest within UNICEF for the U-Report project, up to and including the director general. This alone should ensure its sustainability for the foreseeable future as the project continues to find its place within the organization as a whole—more specifically, within the two countries that are a part of this review:

- Uganda: U-Report enjoys very healthy local support from partners and is currently being integrated into specific country programming to share the costs of operating the platform.
- Zambia: The most significant barrier to sustainability, as with other initiatives, remains financial. There is buy-in from government partners, engagement with a sizable U-Reporter population and general good will around the platform. It is also acknowledged by the CO that there are many other opportunities (windows) being explored for using the technology, which would imply potential cost sharing for the platform across programme sections.

Current Challenges

The U-Report initiative has delivered a highly efficient communication channel for citizen engagement that is ready for global deployment. In both Uganda and Zambia, the issues of how U-Report will ultimately have an effect and a continued impact to remain relevant on issues are problems needing to be resolved.

Specific challenges that can be addressed by U-Report going forward:

- Tangible actions resulting from U-Report surveys
- Utilization of the big data collected
- Continued nurturing and maintenance of partnerships that drive demand
- Focused integration of U-report into Programme Section work plans
- Movement of the technology from a "nice to have" to a "must have" by program staff and government.

⁴UNICEF Zambia, Ministry of Health, CHAMP. (2015). PowerPoint Presentation – U-Report: one door many windows

Initiative Specific Recommendations

- Define and refine specifically how the tool connects with programme activities/objectives and subsequently measure and assess this.
- This is to create a global funding pool to sustain solution.

3.9. uSurvey (Uganda)

Description: uSurvey is a mobile technology solution intended to replace traditional paper-based surveying systems that can provide government partners and UNICEF with high-quality, statistically representative data.

People: The uSurvey project is led by the Social Policy and Advocacy section at UNICEF Uganda. The government counterpart for the uSurvey project is the Ugandan Bureau of Statistics (UBOS). The U-Survey technology was initially developed by the software company ThoughtWorks. Current and ongoing development has now been moved to Dhanush Infotech.

Process: uSurvey is currently in the pilot stage, and a specific process for implementation has not yet been determined.

Technology: RapidSMS

Summary

Relevance	Effectiveness	Efficiency	Impact	Sustainability	Scale
High	N/A	N/A	N/A	Medium	Pilot

Relevance

The genesis of uSurvey system was at UBOS. The underlying ICT4D technology for uSurvey has been designed and developed and is now being tested in true partnership with UBOS. In fact, the review found that the slow progress of development was partially related to the thoughtful and thorough contribution provided by UBOS to ensure that the technology can meet the agency's needs now and in the future.

Testing and evaluation of the tool have been concurrent with the development process itself. The pilot testing completed in early 2016 has thus far shown great promise for both the hoped-for efficiencies created by the technology and the delivery of high-quality statistically significant data. As both of these outcomes are realized, the initiative will have relevance not only in Uganda but also in a worldwide application.

Effectiveness

The objective of the uSurvey project is to create a technological solution that creates efficiencies for the collection of data related to large-scale statistically significant endeavours, such as census. Although a successful pilot was carried out in early 2016, the initiative has not been formally rolled out for broad application.

Documentation and interviews describe a business case along the following lines:

- *Enhanced mission delivery:* Currently, for most national surveys, the Ugandan government relies on a paper-based system for the collection of large-scale statistically representative data. This system, although ultimately resulting in high-quality data, is slow and costly – both of which hinder the implementation of national surveys and to the level of disaggregation required for equity-focused decision-making. The uSurvey system has the potential to realize truly game-changing efficiencies.
- *Reducing expenditures:* The contribution of uSurvey to savings are potentially enormous. These include elimination of costs associated with printing of paper questionnaires and other forms and costs associated with human resources for on-field supervision of data collection

teams, data entry, off-field data cleaning following entry and preparation of data sets for electronic storage.

- *Intangibles:* uSurvey has the potential to improve the service delivery of UBOS in ways not currently envisioned. As the principal data collection agency of the government and the coordinator of the National Statistical System, and the chief provider of official statistics for the Ugandan government, UBOS could see significantly increased visibility and responsibility with uSurvey. A fully implemented uSurvey will shift funding away from costs associated with data collection and the printing of thousands of questionnaires and forms. uSurvey should also decrease data collection time, allowing an increase in the frequency of collection of more, decentralized, data.

Efficiency

The promise of uSurvey lies in its ability to create efficiencies in the process of large-scale surveys. These efficiencies should ultimately lead to faster collection and analysis of data, which, in turn, should lead to more relevant and timely government services. The main benefits of technology itself are realized by the Uganda Bureau of Statistics (UBOS) staff who administer the surveys. From inception to date, all uSurvey activity has been funded through UNICEF Regular Resources funding, with the exception of the off-line version, which was funded by the Global Innovation Centre.

The total expenditures up to the time of this review totalled \$263,104 USD. Costs associated with the early pilot amount to approximately 6% of the total. Because the review did not receive costs associated with staff or other line items, a comparative analysis is not possible. Within the larger context however, the total price tag for the development of the system reveals the massive efficiencies that are possible through the elimination of paper-based systems traditionally used for large-scale survey and census activities.

U-Survey has not yet been rolled out across Uganda; however, initial results suggest the solution will provide significant time and cost savings for the collection of statistically significant survey data. Should these continue to play out on a larger scale, the system could easily rival MobileVRS for the highest value for the money.

Impact

uSurvey is not intended to result in actively engaged beneficiaries. Rather, its goal is to create significant efficiencies in what is otherwise a standard and very costly government function. At the time of this review, the technology underpinning uSurvey is still in development and testing. Though a pilot survey was carried out successfully in early 2016 that is very promising, the impact the technology will have on programme-related results as of this report is unclear.

Sustainability

The uSurvey technology was piloted in early 2016, and the results are favourable. The intense contribution by UBOS to the development of the technology has ensured that it is a system well fitted for purpose and should be so for other statistics departments (or others who need to collect statistically significant data sets). In other words, if uSurvey performs as promised, there is certain to be high global demand for it.

There is sufficient technical capacity at UBOS to manage the technology and its associated programming. As such, what remains outstanding is a sufficient funding allocation from the GoU to ensure its continued maintenance and use.

Current Challenges

The recently completed pilot of the uSurvey system shows high potential for creating massive efficiencies for governments and other actors in large-scale survey activities. Its sustainability will ultimately rest in the hands of the governments that use it.

Initiative Specific Recommendations

- Complete piloting process.
- Complete handover of solution to UBOS.
- Offer ongoing consulting services paid for by the government.

3.10. WASH MIS (Zambia)

Description: The WASH Real-Time Monitoring MIS system is designed to provide real-time monitoring of water points and sanitation facilities and related human resources as along with providing data for monitoring progress towards Zambian policy goals.

People: The WASH MIS project is currently housed under WASH Section in the Zambia Country office. The government of Zambia (GoZ) partners include the Ministry of Local Government and Housing, Ministry of Chiefs and Traditional Affairs and the Ministry of Health. The implementing partners for WASH MIS are AKROS and SNV.

Process: At the village level, sanitation action groups (SAGs) act as the frontline in data collection, recording information on principal sanitation and hygiene indicators using paper forms that are handed to community volunteers, or “champions”, who in turn enter the data into low-cost simple Nokia feature phones. As soon as the data are entered, the real-time updating feature displays the information on the online Java-based DHIS2 platform.

Technology: DHIS2

Summary

Relevance	Effectiveness	Efficiency	Impact	Sustainability	Scale
High	Medium	High	Medium	Medium	Scaled

Relevance

Day-to-day sanitation and hygiene issues at the village level remain vital concerns and a focus for the National Rural Water Supply and Sanitation Programme. The WASH MIS system contributes to the improvement of sanitation and hygiene practices and the maintenance of water points and other sanitation indicators via a thorough and essentially real-time monitoring system of the same.

Effectiveness

The WASH MIS system’s objectives are to create a real-time monitoring system of water points across Zambia and to improve evidenced-based planning of the same. Currently, 53% (50 districts) of rural Zambian districts are covered by the initiative. There is now real-time monitoring of important WASH indicators (hygiene and sanitation status, water supply status and school-related WASH indicators) through the platform. The platform has also been used as a management tool for programming: feedback loops and course correction mechanisms have led to increasing numbers of people now using improved sanitation and practicing hand washing with soap or ash.

An end of project evaluation has not yet been reached to provide data regarding the uptake and results of the system’s implementation; however, anecdotal evidence suggests results will be positive.

An assumptive business case from documentation and interviews includes:

- *Enhanced mission delivery:* Using system information, UNICEF, Akros and Zambian government stakeholders can assist villages in increasing the number of their latrines, thus affecting their health.
- *Reducing expenditures:* The ability to acquire high-quality information on latrines efficiently via mobile networks has the opportunity to dramatically affect the financial resources required for this activity.

- *Intangibles:* The initiative could also potentially improve overall relations between the government and citizens through better service delivery.

Efficiency

Although the WASH MIS system has created efficiencies where it has been rolled out, the scope and breadth of the technological investment, and its ongoing maintenance, remain an unproven investment across the country.

Costs specific to the WASH MIS technology: The WASH MIS program is supported via a 23.1 million GBP grant from DFID. Twelve percent (or 2,772,000 GBP) of funds are allocated to running costs and 88% (or 20,328,000 GBP) are for capacity building.

Capacity building includes: Training of Community Champions (CC), environmental health technicians (EHT), district personnel and central personnel on usage of reporting tools, analysing data in DHIS2, troubleshooting reporting incompleteness and ensuring data quality. Routine support visits to districts—these visits often involve additional training. Staff costs for partner AKROS.

Running costs include: maintaining the DHIS2 server, maintaining mobile phones and district laptops/computers, SMS messaging, talk-time top-ups given to CCs for timely reporting, spot checks to validate data and support visits in wards and villages and to ensure that management meetings are occurring as planned (e.g. CC and EHTs, chiefs and headmen, districts and EHTs).

Impact

As a system of real-time monitoring of water points in Zambia, at the time of this review, 53% of all rural Zambian districts (50 total) are covered by the WASH real-time monitoring (RTM) system. Although the expected impact of the program is a 20% reduction in the incidence of diarrhea for children under five, this review is unable to verify whether this has been realized. Impact is measured through a household cluster survey. The baseline value in June 2013 was 20.4%, and data collection for the end line is scheduled for June 2016.

Sustainability

Although the project has shown promising interim outputs in terms of real-time monitoring, it has only been rolled out to a limited number of provinces across Zambia, and funding is only slated to continue through 2016. As such, a lack of government funds is likely to become a major impediment. If this situation does not change, it is unlikely the program will be sustained.

Current Challenges

The WASH MIS initiative has delivered a system that efficiently reports relevant information about water points and hygiene practices. However, the ultimate effectiveness and impact of this initiative remain unclear until an end line survey is completed in 2016, and the sustainability of the initiative remains in question until then as well.

Current challenges faced by the initiative include:

- The complexity of coordinating donor agencies;
- Marketing sanitation practices in rural areas;
- Limited MIS capacity in the associated government counterpart;
- The ongoing expansion of traditional leaders to support the initiative.

Initiative Specific Recommendations

Continue roll out with focused attention on programmatic issues.

4. Summary

Using the detailed discussion above for each of the reviewed initiatives, this section provides a summary of what has been learned by the review.

4.1. Relevance

The holistic ownership of government partners varies widely across the initiatives. In the case of U-Report, the initiative was never intended to be owned by the government to ensure its ability to remain an independent reporting mechanism for everyday citizens (although, to be fair, the specificity of the U-Report implementation in Zambia has the opportunity to be completely government owned). On the other end of the spectrum, MobileVRS and mTrac have become the de facto communication channels for reporting within their respective programmes/areas and have been absorbed (i.e. MobileVRS is completely owned, and mTrac is essentially owned) by their government counterparts. Other initiatives fall in the middle of this spectrum.

With regard to government partner engagement, the review has found that in all cases in which the government is engaged—even in the case of U-Report in Uganda, which is intended to be an independent reporting initiative, where all members of Parliament have used U-Report at some time. The level of engagement, like ownership, varies among initiatives. However, in cases where engagement is diminished, this appears to be mostly driven by availability of financing for project materials and staff, rather than a genuine lack of interest. Indeed, in the case of BackPack+, a project that has been effectively discontinued by UNICEF, the government is trying to engage to take the project forward on its own.

Several of the initiatives have a stated theory of change. However, none of these theories align well with a more traditional understanding of the theory of change model, which is underpinned by extant research and experiences from other similar programme activities. That said, as noted above, all the initiatives seek to create efficiencies by becoming or creating a communication pathway for data that have not existed before. As such, each of the initiatives is essentially underscored by the grand theory of change, or promise, associated with information technology in general: the provision of higher quality data, at a fraction of the cost, and time to allow better management decisions at the programme level.

Finally, as with the above, there is a spectrum across each of the initiatives regarding whether stakeholders and rights holders are being engaged in new or different ways. In the case of U-Report, individual citizen engagement with issues that concern them is truly game changing; the system has provided a communication pathway that, heretofore, simply did not exist in these settings. In a similar fashion, mTrac, with its help desk functionality, has provided everyday citizens with an opportunity to have a voice in the management of the facilities they rely on for health care. In addition, a case could be made that citizen engagement has changed with the CVSU project as well, where legal case management for youth are increasingly being resolved outside the formal legal system because of improved access to information.

On the other end of the spectrum, some of the initiatives have created significant efficiencies while the delivery of programming/assistance remains essentially the same—this is the case for MobileVRS, Anthrowatch, Results 160, Project Mwana, RapidSMS and uSurvey.

4.2. Effectiveness

With the exception of BackPack+, all the initiatives reviewed achieved the major objective they set out to achieve: creating efficiencies by removing bottlenecks presented by traditional paper-based

government reporting systems. However, the extent to which this “opening” ultimately contributed to improved programme performance varied.

mTrac, MobileVRS, Project Mwana and Results160 were the most effective initiatives reviewed. In the case of mTrac and MobileVRS, the technologies have become the default communication channel related to health care centre services and birth registration. In the case of Mwana and Results160, the reduction in time-to-delivery of HIV test results has been profound. In all of these cases the benefits realized through the removal of paper-based systems was so significant that buy in and support has been received at all levels.

Only slightly more modest success has been realized by Anthrowatch, RapidSMS, WASH MIS and U-Report. As with the above, each of these initiatives has realized important efficiencies for the programmes they support. However, comparatively speaking, they have not yet had the game-changing effect of other initiatives. In the case of WASH MIS, this result may very well be possible as the technology continue to scale across Zambia. Similarly, for U-Report, a more profound contribution to programme outcomes may be realized as the technology is specifically integrated into day-to-day programme activities and monitoring.

In the case of CVSU, the complexity of the system and its uptake by the user base have limited its contribution to programme outcomes. This has been acknowledged by the Malawi CO and they are actively seeking ways to evolve the solution.

Finally, BackPack+ never made it to the stage where it would contribute to programme outcomes and uSurvey was not operational to an extent that it could contribute at the time of the review.

4.3. Efficiency

It is noteworthy that specific financial data was the most difficult to come by for this review. The review received comparatively little specific financial data compared to data regarding outputs and outcomes. This is not because the data doesn't exist, but rather, UNICEF does not currently prioritize tracking investments and programme costs associated with ICT4D initiatives. As such, sufficient time and resources were not available to the review to comprehensively tease this information out of current tracking systems.

With the exception of BackPack+, which attempted to completely re-imagine the CHW experience, the ICT4D initiatives in this review have focused on replacing traditional, paper-based data collection and reporting systems with digital solutions. While the costs of development and ongoing maintenance of an ICT4D solution can appear steep at first glance, when compared to the costs associated with the human resources, printing, paper, transportation, etc. of a traditional system, the ICT4D systems look like fantastic deals. As a stark example, consider the mTrac system, which is working to replace the paper forms used in the Ugandan health information management system (HIMS). At the time of this review the estimated annual printing costs for HIMS related forms was approximately \$17,629,844 USD.⁵ If even a fraction of these forms could be eliminated by a system such as mTrac, the investment would be more than justified, with further efficiencies realized through reductions in human resource, transportation and other related costs.

It is also important to note that with the exception of CVSU (Malawi), all the other solutions reviewed have been implemented on an open source technology stack where the total cost of ownership is reduced because there are no recurrent licences for the source code, middleware and database.

⁵See *Summarized Cost Estimates For Printing Revised HMIS Tools_13 03 2014.xlsx* from the desk review documentation.

The opportunity costs associated with the ICT4D initiatives appear essentially inconsequential. In all cases, the ICT4D initiatives require development of technology (which is essentially a use of funds consideration) and human resources for support and capacity building. Because the funding necessary for development, maintenance and support are relatively minor (e.g. in no case does the ongoing annual maintenance fee for any of the initiatives eclipse \$60,000 USD, and most are well below this level), the opportunity costs for other uses of these funds is truly nominal. In regard to human resources, in all cases, these staff are contributing to the same programming that they would (likely) otherwise be working on were the ICT4D initiatives not present; the innovations have simply provided an opportunity for a new way of delivering. Seen in this light, the opportunity costs in terms of human resources also appear nominal.

Except in rare cases (e.g. the funding of MobileVRS technology via a corporate social responsibility in-kind donation by Ugandan Telcom), the ICT4D initiatives in this review have been funded through traditional means –using either donor funding or internal UNICEF funds. This could be one of the greatest areas of unrealized opportunity for the future of ICT4D initiatives.

The review is not able to measure, in quantitative terms, the costs of not implementing the ICT4D initiatives. However, because of the obvious gains that have been made with the solutions, a thumb-in-the-air approximation should suffice. As examples:

- The MobileVRS system has literally transformed birth registration in Uganda. Were it not available, the costs associated with the inability of rights holders not having proper access to services – education, legal, health care – especially in times of acute need (e.g. serious health issues, victims of abuse) and, of course ongoing corruption/fraud related to faking a birth certificate to get access to services, would be staggering.
- Systems like Project Mwana, Results 160 and Anthrowatch have provided the opportunity to rapidly detect, and therefore provide treatment, for HIV/AIDS and malnutrition in children. If one considers the healthcare costs associated with not providing this detection and rapid treatment, again, the costs become significant immediately; these costs are all the more staggering when you consider loss of life.

There are other, much more tangible examples of what “could have been” had the ICT4D initiatives not been implemented. For example, in the case of the Ugandan outbreak of Banana bacteria, U-Report was used to map the outbreak and inform communities in ways that resulted in, literally, hundreds of millions of USD in averted disaster.⁶ That one incident alone could be used to justify the implementation and operation of the system.

In a similar fashion, the review suggests that the access to real-time information and the engagement of citizens has provided UNICEF and its partners with real benefit in terms of reduced monitoring and implementation costs. Again, as examples, consider the MobileVRS or mTrac initiatives. Were UNICEF to attempt to replicate the outputs of either of these systems without the use of ICT4D solutions, the costs would be staggering and, potentially, the outputs, especially aggregated analysis provided by dashboards and other reporting, impossible to achieve with the same rapidity. Indeed, the costs associated with the necessary human resources, transportation, etc. to provide these results without technology are the very foundation of the theories of change for the solutions in this review.

4.4. Impact

Each of the ICT4D initiatives has made a difference towards achieving programme results in one way or another. However, these contributions vary dramatically – from massive differences realized by

⁶For more information, see <http://blogs.worldbank.org/ic4d/the-power-of-mobile-saving-ugandas-banana-crop>

mTrac and MobileVRS to very limited difference in the case of Backpack+ (because it has been discontinued) and uSurvey (because it remains in the pilot stage as of this review).

With the exception of Backpack+, where the initiative is also the programme, each of the ICT4D initiatives contribute to programme delivery or implementation by providing a more efficient communication pathway for reporting data and receiving feedback. In the cases of mTrac, U-Report and WASH MIS, the initiatives have radically repositioned beneficiaries from passive recipients to active participants. Indeed, in the case of U-Report, the initiative would not exist save for the participation of U-Reporters. In the other cases (i.e. Anthrowatch, CVSU, MobileVRS, Mwana, Results 160 and uSurvey) the ICT4D technology has acted as an enabler for the more efficient and effective delivery of programming and is not used/engaged by the ultimate beneficiaries of aid delivery.

4.5. Sustainability

As with other areas of the review, the financial stability of individual ICT4D initiatives ranges across a spectrum. On one end, in the case of Backpack+, the initiative is essentially dead in the water and doesn't require further financing. At the other extreme, initiatives such as MobileVRS or mTrac have become so ingrained and adopted by their government counterparts that sustainability seems nearly assured. The most interesting conversations, as such, are with those initiatives that fall somewhere in between. While they provide efficiencies that improve health outcomes, save lives and give access to rights, Anthrowatch, CVSU, and WASH MIS need to continue to make the case that they added enough value for ongoing investment. Project Mwana and Results 160 simply need to find a way to become a part of regular funding streams. The outlier in this conversation is U-Report. While focused on a particular programme in Zambia, and therefore having the potential to lead to financial sustainability (assuming it also shows corresponding results), the same initiative in Uganda needs to find a programmatic home (or homes) to remain in play for the long term.

In cases where country level funding has become available for an ICT initiative, the following factors are present:

- The ICT initiative has become the de facto communication channel for data (e.g. MobileVRS); and
- The country has official policies and/or laws in place that allow for appropriation of funds for the initiative (e.g. Uganda).

The review finds there is a basic understanding of total cost of ownership within government counterparts regarding ICT4D initiatives. Further, there is generally a genuine desire to shoulder the burden of the total cost of the implementation and ongoing maintenance of the ICT4D initiatives. However, the in country realities of the slow process of change across large, bureaucratic institutions and ingrained cultural expectations keep the realization of total ownership elusive.

4.6. Conclusion – Towards An Enabling Environment

In its simplest terms, an enabling environment exists for the adoption and flourishing of ICT4D initiatives in all four countries that were a part of the study. The learning within each of these environments can be applied by other UNICEF COs as a way to determine which, or whether, ICT4D initiatives are appropriate for their particular context.

Foundational factors

In ESAR, as a foundation for an enabling environment, each of the countries that are a part of this review contain:

- One or more specific problems whose solution can be enabled (or outright solved) through an ICT4D solution;
- The availability of local talent (i.e. UNICEF staff, individuals or partner organizations) who either already have, or have the ability to acquire, the necessary skills and experience to design, develop and maintain ICT4D solutions;
- Government or other official counterparts who are interested and engaged in the implementation of ICT4D solutions; and
- Adequate technological infrastructure to enable the transmission, collection and storage of data.

The absence of any one of the factors above would severely inhibit the ability for an ICT4D initiative to flourish and, as such, form the basis of a necessary analysis in determining whether the same should be pursued. The critical point here is that you want to have these four factors to have a truly enabling environment, but the first is the only necessary condition that cannot be, and never should be, manufactured, hacked or otherwise “created”.

When considering the other three factors, there is good news – of the 190 countries in which UNICEF currently works, it is difficult to find one where the other factors are not present. Even in the most remote areas (e.g. island nations, extremely rural) or those experiencing the most severe challenges (e.g. Syria, Central African Republic) mobile phones work, there is talent and there are engaged partners. Perhaps more importantly, crises may actually be optimal for the leveraging of the types of ICT4D initiatives UNICEF develops.

People and culture

The learning from the review does not suggest that there are particular cultural factors or social constructs that inhibit the implementation of ICT4D initiatives. Indeed, commercial ICT solutions (e.g. mobile devices, apps, network providers, Facebook, Whatsapp) are found, literally, in every corner of the world and offer opportunity for all players who are willing to invest in their development and deployment.

The review indicates the human factors related to ICT4D initiatives remain the largest expense and the most significant bottleneck. Staffing remains the biggest challenge both because of the need to find or train people with relevant skills and to secure funding for their employment. Unfortunately, on the other side of this coin, brain drain is also a challenge, and will continue to be, until government employers can compete with private sector companies that are hungry for the same talent.

An additional human resources challenge is the underlying tension or perception that individuals will be replaced by, or simply not be able to “keep up” with implemented technology. This is especially the case in senior-level positions in government partners, NGOs and UNICEF itself. This tension can be addressed by making sure UNICEF also invests in the capacity building, training and general hand holding necessary to make sure these individuals know how they can contribute to add value as work and service realities evolve.

It is easy to remain focused on one side of the coin when considering an ICT4D initiative – building the system that collects and makes available large amounts of data. However, collecting data is truly only half of the game, and it is ironically also the easiest part. When considering the human factor, as commonly acknowledged, if the majority of people are mystified by the workings of IT devices and services themselves, the prospect of coping with large datasets is overwhelming. The result is simple: limited, if any, actual demand for the data produced. Unfortunately, this is where the real power and promise of ICT4D solutions lie. The usage of, or demand for, collected data remains an ongoing challenge for even the most successful initiatives in ESAR (i.e. mTrac and MobileVRS). And in less successful initiatives, (e.g. Anthrowatch, CVSU), limited demand is directly related to ownership and sustainability. As with the use of technology itself, the review suggests this limited demand for data is, in general, related to decision makers' personal limitations with understanding how to:

- Ask questions of large data sets;
- Interpret the answers they receive from the data; and (perhaps most importantly)
- Take action to revise services when answers are gleaned.

These areas are worthy of much more attention, support and advocacy as transition is made to automated ways of data collection and processing. Importantly, in areas where automation is possible, success for uptake and sustainability is more likely (e.g. standard reports, data aggregation and analysis). At the same time, feedback loops have traditionally been limited in results data ecosystems; hence it is important that beneficiaries (whether as individuals or groups) are given opportunities to also obtain feedback to gauge performance.

Finally, the review suggests that there remains a general unpreparedness—at both UNICEF and with local counterparts—for the frustrations of technology (e.g. service outages, electricity issues, software bugs, updates, glitches). It was clear to the review team that the “culture of digital” has not matured yet in ESAR, and it would be a worthy pursuit to build capacity and awareness around this issue.

Processes

The process of defining, piloting, scaling and replicating ICT4D solutions is a good fit for the types of ICT4D programming pursued by UNICEF. The review suggests a nuanced understanding of this process would go far in helping to create success for future initiatives.

Defining. At the front end of this process is the definition of the problem. Although it may seem textbook obvious, clearly defining the problem to be solved is a critical first step that is still overlooked or even ignored in many cases. Within this review:

- An example of failure would be BackPack+, where the problem was nebulously defined as the “plight of the CHW”. This definition was answered with an extraordinarily complex answer that had so many points of failure that the initiative never got past its initial pilot.
- An example of success would be mTrac. A very clear and narrow problem/solution pair (i.e. tracking Malaria tracer drugs) brought this system to life. mTrac is also a case study in how a system can sustainably evolve as it identified other related problems that could be addressed via the technology platform.

Although again it may seem textbook, including partners at the beginning of defining process is critical. Ensuring partners are engaged not only contributes to creating systems that are valuable, but also to building systems that have a better chance of being used in the future. One critical stakeholder that could be better wrapped in this process is the donor community. As noted above, engagement during the defining process should always focus on the use of the data produced.

Seeking to create simple, easily adopted systems that provide immediate tangible value to all users of the system is crucial. In cases where bottlenecks encountered due to traditional paper-based reporting systems related to distance, transportation, and the input of significant human resources are removed, clear, substantial efficiencies are realized nearly immediately (e.g. mTrac, MobileVRS,

Mwana, Results 160). Indeed, these cases are where we also see the greatest uptake by government counterparts and the highest likelihood for sustainability. In systems that push complexity with multiple points of potential failure (e.g. CVSU, Backpack+), initial excitement appears to be quickly replaced by apathy and, in the case of Backpack+, abandonment.

Piloting. If the process of defining the problem is done properly, the piloting phase can be effectively used to determine whether expected results are possible. Accomplishing this is a matter of (a) defining a specific timeframe for the testing of an ICT4D solution and (b) the criteria by which its success (or not) will be judged.

One note of caution: the review suggests there is high potential for ICT4D/innovation overwhelm (i.e. the well-known Measles Mapin Uganda). Consideration should be given to better coordination of ICT4D pilots, labs, studies, and so on to limit confusion and to ensure that the focus remains on use cases that have the highest chances of scalability – rather than just the “testing of technology to see whether it works”.

Scaling. There is a temptation to believe that, after a pilot is deemed successful, the move to scale the solution to the greater population should be a matter of simply turning it on or making it available to a wider audience. The learning from the review, however, points to a more iterative process – similar to the technology’s development itself, whereby a solution is rolled out across a population in phases and adjustments/revisions are made along the way.

Replicating. Replication, or going global, is the embodiment of success for an ICT4D solution. However, the review suggests that there is likely a disconnect between what is perceived to be possible and what is actually possible. The only initiative in the review that could be taken “global” tomorrow across the whole UNICEF platform without modification is the base U-Report system. In every other case, the initiatives would need to be modified and adapted to their local contexts and, indeed, for U-Report to be truly relevant, it too needs to be made context specific. The rule of thumb here is to be patient and invest for the long term. Unsurprisingly, except in one or two cases, although the distribution of ICT4D solutions is substantial, gaps still exist in ensuring country-wide coverage (e.g. Zambia and Malawi). This is especially true in the most difficult to reach areas (i.e. rural). The review concedes that this may be because of limitations in mobile network availability, but it is an important issue to continue to push.

Platforms

Although UNICEF subscribes to principles that place a priority on the use of open source solutions for the development of ICT4D initiatives, the review finds the use of open source platforms to be a “nice to have” rather than a necessary condition for success. Indeed, within the initiatives reviewed, CVSU was created and maintained on a proprietary technology that UNICEF licenses. Further, at a deeper level, UNICEF relies on licensed software for its day-to-day activities (e.g. operating systems, Microsoft Office products). As such, considering all options available, providing the best solution for children remains the best approach.

Altogether, as noted above, the review does emphasize that the pursuit of ICT4D initiatives requires a long-term, evolutionary mind-set. Although current initiatives have thrived using the RapidSMS platform, they should all evolve to RapidPRO to keep pace with current technology trends and requirements.

Partnerships and Ownership

Three of the foundation factors described above are realized through partnerships – with organizations, private companies, individual contractors and government. There are a number of exciting partnerships found throughout the reviewed initiatives – from large companies to local NGOs. However, the coordination and collaboration of partnerships on the part of UNICEF could be both more extensive. In terms of breadth, the review finds a very limited selection of private sector partners—especially those in the IT sector—involved in the solutions, their funding and continued

viability. Similarly, whereas network providers have been involved, their intimacy with the projects could be greater as could UNICEF's negotiating power to limit, or completely remove, the cost of SMS (and in the future, data, for RapidPRO) for what are lifesaving initiatives. Finally, those involved in ICT4D initiatives know how easy it is to become caught up in the culture of rapid deployment and fail fast. This culture can, at times, supersede the need to dive deeper in relationships with local partners and beneficiaries, who know their needs best.

Although it may seem counterintuitive, the review does not consider funding a required element for an enabling environment. Whereas highly unlikely, the fact exists that a willing government, open source communities, volunteer labour and in-kind corporate gifts could achieve equivalent outcomes to those that are donor funded. Instead, funding should be considered an accelerator or amplifier of the potential effect of each of the interventions. That said, in cases where funding has been secured, the adoption, implementation and scale up of ICT4D initiatives has been well received.

There is currently a significant push within UNICEF to move ICT4D solutions towards "ownership" by government partners. As of this review, none of the initiatives are wholly "owned" by government partners. The closest examples of government ownership in found in MobileVRS and Project Mwana, where the GoU and GoZ, respectively, have essentially absorbed these technologies and their operation. However, UNICEF still contributes greatly to the programmes overall. All other initiatives are some degree further away. It is understood by the review that the push for transferring the technologies to government is based in the desire to shift financial and operational risk responsibilities away from UNICEF. Yet it is not clear that such a shift would necessarily equate with better functionality, efficiencies, effectiveness or sustainability. UNICEF could consider different kinds of business models and contracting requirements, such as public-private partnerships to bring together different players to serve children better.

Finally, there is also a case to be made whereby government ownership of an ICT4D solution is precisely the wrong outcome to pursue. The model case here is U-Report, which is used by hundreds of thousands of people but is not government owned by definition to ensure transparency and independence.

To conclude, the identification of an enabling environment that supports the development and flourishing of ICT4D initiatives by UNICEF COs should be approached as a chef would any recipe or a craftsman the blueprint for a house. Some factors, such as the presence of network providers, are absolutely necessary but have essentially become public utilities in almost every part of the world. Other factors, such as the availability of locally savvy talent, are nice to have and would accelerate adoption but also can be built or created if necessary. As such, each CO should be intimately engaged in its local community to understand what factors are already available and how they can be carefully combined and cultivated to ultimately produce data leading to decisions that better serve children around the globe.

5. Recommendations

Continue to invest in and evolve UNICEF's ICT4D practice. As the review has shown, there is clear value realized by each of the solutions reviewed. In some cases, the return on investment has been game changing for rights holders while also providing massive financial and time efficiencies for government partners. It is worthwhile to continue to pursue these opportunities. Indeed, the review suggests that, because technology, specifically mobile technologies, has become pervasive in almost every part of the globe, it would be prudent for UNICEF, when designing any programme or initiative, to ask the question: "Is there a way we can leverage one or more ICT4D solution to create efficiencies, improve effectiveness, or both to ensure children are better served?"

Focus on technology that enables solutions to problems. Because ICT4D services are demand driven, ensure there is a clear, specific narrow problem they are built to help solve. In terms of one area to focus on, UNICEF has found considerable success replacing traditional, paper-based systems with digital solutions. To that end, avoid ICT4D initiatives that ultimately create "more work" for the end user by simply being an "add on". Ensure all initiatives have associated training, tangible incentives and clear demonstrations of productivity increases. The ultimate pursuit should be to introduce technology that completely replaces old methods and becomes the de facto way of doing business. Finally, UNICEF should create avenues for feedback loops directly to line workers and beneficiaries where possible to maximize the positive perceptions around the initiatives and engender buy-in.

Address the realities of a digital culture, broadly speaking. In places where a digital culture has taken hold, there is an underlying understanding of issues such as software updates, service outages, bug fixes, connectivity issue, and the general potential for ICT to be a constant part of our lives for systems of record. This does not currently exist across ESAR, and it would be worthwhile for UNICEF to be a guiding light in this regard with partners and counterparts.

Promote a deep understanding of technology as a living organism. There is a sense across UNICEF COs and partners that once an ICT4D solution has been developed that it is "done". All technology requires constant care (i.e. updating and evolution) and feeding (i.e. funding) across UNICEF, at COs and with local partners. To that end, as an initial next step in this process, UNICEF should replace all old technology (RapidSMS) with RapidPRO.

Develop acuity for innovation overwhelm. As demonstrated with the Ugandan moratorium on new ICT4D pilots, UNICEF would do well to develop a keen acuity on the amount of new technology it can introduce in any one setting and seek to coordinate with other entities better.

Create technology your mother would love. It is incredibly easy to operate with a mind-set that technology is something that is understood by few, but used by many. This often creates situations where coders and developers are given the responsibility for creating the solutions that non-IT professionals will use. The result of these situations is all too often solutions that are overly complex or simply just not user friendly. UNICEF should seek to implement "big button" solutions that "wow" non-tech staff and partners, as these remain by far the largest set of users for any ICT4D solution. Create a process during programme design that actively seeks out and questions complexity and identifies points of failure. Solve one problem at a time, completely and satisfactorily, and grow from there.

Ensure ICT4D solutions offer an opportunity for everyone. The implementation of ICT4D solutions and the move to a digital culture require transparency and accountability. UNICEF should ensure that processes and procedures eliminate the possibility of data gatekeepers. UNICEF should also proactively address the tension, internally and (especially) with government partners, that people will lose their jobs (or simply be left behind) if IT solutions are adopted.

Specifically track financials related to ICT4D. UNICEF should be able to clearly and easily make the case for the financial efficiencies realized by ICT4D initiatives. This is currently not possible because of insufficient tracking processes of funding for the same.

5.1. UNICEF as an ICT4D implementer

This review was tasked with examining a cross section of ICT4D initiatives in ESAR. Although our findings focus on those initiatives, there is also value in considering UNICEF as an organization (i.e. structure, culture, processes) to understand how it might better enable similar ICT4D initiatives. Examples include:

Structure and Culture

Consider how UNICEF's current organizational structure and culture could be evolved to better embrace ICT4D initiatives and promote consistent application of the same. UNICEF is an organization rich with processes, regulations and systems that seek to remove risk and demonstrate accountability. However, these same systems (e.g. procurement) also have the unintended effect of limiting the risk taking necessary for identifying, creating and cultivating ICT4D solutions. Although outlets such as the Global Innovation Centre are a best practice, UNICEF should also encourage responsible risk taking at the CO level.

Leadership, Management and Talent

Invest in ensuring that UNICEF's leadership, decision makers and line managers actively embrace ICT4D initiatives, promote digital culture, and are able to attract, and retain, appropriate talent. Especially important is the identification and support of acquiring and developing leadership, management and staff who fundamentally understand how ICT4D technology works and contributes to programme outcomes.

Business model

Determine whether 100 percent ownership by government partners is appropriate for UNICEF's long-term business model. Although the requirement for open source technology, adopted as one of UNICEF's innovation principles, is commendable, there are numerous examples of business models that allow for relationships that include licensing, technical support and ongoing development.

Technology is alive. There is a general feeling at UNICEF that technology ultimately results in less expensive programming and provides complete solutions to problems. Although technology provides high productivity, efficiencies and scale, it also brings forth new problems, skill requirements and the need for constant funding to fuel its never-ending evolution.

Partnerships

Seek to align and deeply integrate the UNICEF brand with other global leaders of ICT4D initiatives for long-term support, partnerships and possible force/scale multipliers. This should not be limited to the traditional development and humanitarian aid space.

6. Annex A: Documents Reviewed

Malawi

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Rwanda

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- 03_ SoP RWAA-RealTime Monitoring July 2015.docx
- 04_ UNICEF Rwanda RealTime supply monitoring pilot testing report at health facility.docx

- 05_ MoE UNICEF RealTime ECD kits Monitoring.pptx
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- Annex 6_Magpi Full Data_Pilot Phase 1.pdf
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Uganda

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- CHW_BackPackPLUS_FinalPresentation_09RT.pdf
- CHW_BackpackPLUS_Kick-off_20130416[1] copy.pdf
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- Draft_UNICEF_TalkingPoints_BPPLUS.docx
- ek commentsUNICEF Innovation v.11_20.pdf
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- DFID WHO UNICEF proposal March 29 1000
- FGM Survey Preliminary Results 23 feb 2016
- Household_Questionnaire 6Jan2016 (002)
- mTrac Update Feb 2016
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- mHealth Compendium 1 (mTrac).pdf
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- <https://www.dhis2.org/>

7. Annex B – Interviews Conducted

Malawi

- Michael Kavuma - Technical Specialist (Technology for Development) UNICEF
- Emmanuel Saka - HIV/AIDS Specialist UNICEF
- Simon Mwirigi – ICT Specialist UNICEF
- Judith Sherman - HIV/AIDS Chief of Unit UNICEF
- Benson Kazembe – Nutrition Specialist UNICEF
- Martin Nkuna – Child Protection Officer UNICEF
- Christopher Mwase – Deputy Program Manager for e-Health and ICT CHAI
- Felix Pensulo-Phiri - Director of Nutrition - Nutrition, HIV and AIDS - GoM-(OPC) Office of the President and Cabinet
- Sylvester Kathumba - Principal Nutritionist - GoM-MoH –Ministry of Health - Department of Nutrition
- Joseph Mtamila - Child Protection Officer Chikowi Victim Support Unit

- Mr. John Mugawa - Nutrition Coordinator GoM - Chikwawa District Hospital
- Mr. Joseph Bitilingu-Bangoh - Lab Director GoM - Queen Elizabeth Hospital (a referral hospital for the southern region)
- A focus group – team leader Llyson - Health Surveillance Assistants –HSAs Chipwaila Health Centre (one of the Health Centres in Chikwawa doing very well with RapidSMS)
- A focus group – team leader Marvin - Health Surveillance Assistants –HSAs –
 - Bereu Health Centre (in 2014 were competing with Chipwaila on RapidSMS usage, but the performance has now dipped)
- Mr. Francis P. Kudambwe – Health Surveillance Assistant Nkhoma CCAP Hospital – Department of Public Health

Rwanda

- Oliver Petrovic UNICEF - Deputy Representative
- Yumi Matsuda UNICEF - Chief, Planning, Monitoring and Evaluation
- Floris Ngungi Pelete UNICEF - ICT Specialist
- Frederik Leenknecht UNICEF - Education Officer

- Lilia Ormonbekova UNICEF – M&E Officer
- Dr. Manzi Emmanuel UNICEF - Health Specialist
- Diane Ingabire UNICEF - Operations Assistant.
- Denis Mupenzi UNICEF - Supply and Procurement Specialist
- Akiko Sakaedani Petrovic UNICEF - Communication for Development Specialist

Uganda

- Aida Girma Country Representative UNICEF Uganda
- Noreen Prendiville Deputy Country Representative UNICEF Uganda
- Alex Muhereza Health Systems Monitor UNICEF Uganda
- James Muwonge Director Socio Economic Surveys Uganda Bureau of Statistics
- Kizito Kasozi Director of ICT Uganda Bureau of Statistics
- Vincent Sseenono Head of Statistical Standards Uganda Bureau of Statistics
- Mutyaba Deogracious Information Technology Officer Uganda Bureau of Statistics
- Greg Lavender Country Director Restless Development
- Paul Bukuluki Consultant Backpack+
- Julius Nkugwa Designer Consultant Backpack+
- Cary McCormick Youth Engagement UNICEF Uganda
- Juliet Bataringaya Health Systems Cluster WHO Uganda

- Nasan Nataseri Data Management and M&E WHO Uganda
- Moses Bagyendera Public Health Informatics WHO Uganda
- John Kissa Biostatistician WHO Uganda
- Sean Blaschke Health Systems Specialist, T4D Coordinator UNICEF Uganda
- Olive Nabaja Human Africa U-report partner
- Purdence Girl Guides U-report partner
- Carolia Civil Society Youth Coalition U-report partner
- Sarah Human Africa U-report partner
- Lucia UNHCO U-report partner
- John Mark TMCG U-report partner
- John Silco RICNET U-report partner
- Patricia Uganda Scouts U-report partner
- Simon - UNAD UNAD U-report partner
- Dr. Eddie Mukooyo Assistant Commissioner, Resource Center MoH
- Dr. Jesca Sabiti Assistant Commissioner, Maternal & Child Health MoH
- Hilda Research Officer Backpack+
- Ronad Support Officer MoH
- Eisha Support Officer MoH
- Dr. Issa Makumbe Emergency Operations Center MoH
- Sam Kasuzi Emergency Operations Center MoH
- Simon Kyazze Emergency Operations Center MoH
- Augustine Wassage Child Protection Officer UNICEF Uganda
- Dr. Diana Atwine Executive Director State House's Health Monitoring Unit
- Juliet Deputy Director State House's Health Monitoring Unit
- David Lubuuka Chief Administrative Officer Bududa District
- Evelyn Focal Point Bududa District
- Richard UNICEF Zonal Office UNICEF Uganda
- Paul Member Bududa Town Council
- Watsemba Biostatistician Bududa District
- Tabitha Asago Midwife Bududa Health Facility
- Richard Data entry Bududa Birth Registration
- Sarah Kabaija Monitoring Officer UNICEF Uganda
- BP Panwar Head of IT UNICEF Uganda

Zambia

- Maswenyeho, Sitali Dr. - HIV/AIDS Specialist. Interview at UNICEF Zambia Country Office.
- Kashoka, Andrew – Head of IT. Interview at Ministry of Health
- Mbunda, N., Phiri, B, Kachakwale, J. and Zimba, M. U-Reporters from Lusaka
- Lesa, Andre. Software Developer. UNICEF Zambia
- Olson, Rick – HIV/AIDS Adolescents Specialist. UNICEF Zambia
- Mwiinga, J. Donor Coordinator and Public Relations Manager. National Aids Council
- Tiwari, A. (WASH Program Manager) and Nkhata, I. (Deputy WASH Program Manager). Interview held at AKROS
- Musonda, E. – MIS Officer. Interview held at Ministry of Local Government and Housing
- Hoehne, A. – WASH Specialist. Interview held at UNICEF
- Sapele, C. (Operations and Systems Director) and Mutale, C. (Operations Manager). Interview held at CHAMP
- Musanje, F. – Trained Clinical Counsellor. Interview held at Kanyama District Hospital