



The MAPS Toolkit

mHealth Assessment and Planning for Scale

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Cover photo: Nurse using D-tree International eNutrition application attending to a malnourished child in Zanzibar.

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Foreword

We are proud to present this mHealth Assessment and Planning for Scale (MAPS) Toolkit to help advance discussions on how to scale up mobile health (mHealth) innovations and maximize their impact on outcomes for women's, children's and adolescents' health.

To mobilize global commitment and spur progress towards the Millennium Development Goals, the United Nations Secretary General Ban Ki-moon launched the Global Strategy for Women's and Children's Health in 2010. The Strategy called all partners to action, resulting in the unprecedented movement *Every Woman Every Child* (EWEC), which generated hundreds of financial, policy and service delivery commitments from governments, civil society, donors, and the private sector. Innovation was among the key areas highlighted in the Strategy where action was urgently required. The EWEC Innovation Working Group (IWG) has been instrumental in taking this agenda forward, not least by supporting the adoption and scaling up of mHealth solutions that strengthen the availability of essential health interventions that save women and children's lives.

The ubiquity of mobile technology in low- and middle-income countries has triggered an unprecedented investment in mHealth tools that are designed to enhance clinical decision support, measurement and accountability, and strengthen the coverage and quality of life-saving interventions. Established by the Government of Norway in 2011, the IWG Catalytic mHealth Grant Mechanism has played an instrumental role in supporting such mHealth innovations. Through a collaboration between the United Nations Foundation and the World Health Organization, the grant mechanism has offered both financial resources and technical assistance to support the scaling up of these innovations across

15 countries. These grantees should be proud of the contributions they have made to building an evidence base, expanding the dynamics of partnerships with both governments and the private sector, and delivering impact.

Over the past four years, this Toolkit has benefited from the insights gathered through these pioneering mHealth projects. The Toolkit harnesses the learnings that the IWG Catalytic mHealth Grant Mechanism has contributed to scaling up mHealth innovations and maximizing their impact on women's, children's and adolescents' health.

The Toolkit arrives at a critical juncture, coinciding with the launch of the renewed Global Strategy for Women's, Children's, and Adolescents' Health. As we transition from the Millennium Development Goals to the Sustainable Development Goals, digital innovations will need to play an even greater role in meeting the commitments to improve the well-being of women, children and adolescents globally.

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The MAPS Toolkit was developed by Jessica Rothstein and Tigest Tamrat, with guidance from Garrett Mehl, WHO, and Alain Labrique, Johns Hopkins University Global mHealth Initiative (JHU-Gml), with technical input from Patricia Mechael, UNF; Francis Gonzales, UNF; Carolyn Florey, UNF; Marion McNabb, Pathfinder International; Barbara Birch Lamphere, John Snow, Inc. (JSI); Nicki Ashcroft, Institute of Reproductive Health (IRH); Amnesty LeFevre, Johns Hopkins School of Public Health (JHSPH); Courtney Chang, JHSPH; and James Bon Tempo, Johns Hopkins University Center for Communication Programs (JHUCCP).

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Executive summary

The mHealth Assessment and Planning for Scale (MAPS) Toolkit is a comprehensive self-assessment and planning guide designed to improve the capacity of projects to pursue strategies that increase their potential for scaling up and achieving long-term sustainability. MAPS is designed specifically for project managers and project teams who are already deploying an mHealth product, and who are aiming to increase the scale of impact. External parties seeking to understand the maturity and value of mHealth projects may also find value in using the Toolkit jointly with projects.

The Toolkit covers six major areas (referred to as the “axes of scale”) that influence the scaling up of mHealth: Groundwork, Partnerships, Financial health, Technology & architecture, Operations, and Monitoring & evaluation. The axes of scale reflect the key concerns, activities and decisions that relate to these six areas.

MAPS allows users to assess where projects stand in relation to each of the axes of scale, and to track progress as activities evolve and progress. The Toolkit will help project teams to identify areas that require further attention, and then to devise strategies to overcome any challenges or obstacles to progress. MAPS is designed to be used periodically at several time points throughout a project’s trajectory, guiding projects through an iterative process of thorough assessment, careful planning and targeted improvements. These steps facilitate successful scaling up of mHealth products.



Acronyms and abbreviations

AeHIN	Asia eHealth Information Network	m4RH	Mobile for Reproductive Health
ANC	antenatal care	M&E	monitoring and evaluation
ANDH	African Network for Digital Health	MAMA	Mobile Alliance for Maternal Action
API	application programming interface	MAPS	mHealth Assessment and Planning for Scale
CBO	community-based organization	mHealth	mobile health
CHAI	Clinton Health Access Initiative	MNCH	maternal, newborn and child health
DFID	Department for International Development (United Kingdom)	mNDCC	mobile Nutrition Day Care Centre (India)
DHIS	District Health Information Software	MNO	mobile network operator
eHealth	electronic health	MOH	Ministry of Health
eLMIS	electronic logistics management and information system	MOTECH	Mobile Technology for Community Health (Ghana)
GPRS	general packet radio service	MoU	memorandum of understanding
GPS	Global Positioning System	MOHSW	Ministry of Health and Social Welfare (United Republic of Tanzania)
GSMA	Groupe Speciale Mobile Association	N/A	not applicable
HIPAA	Health Insurance Portability and Accountability Act	NGO	nongovernmental organization
HIS	health information system	Norad	Norwegian Agency for Development Cooperation
HIV	human immunodeficiency virus	OCL	Open Concept Lab
HL7	Health Level 7 (data standard)	OpenHIE	Open Health Information Exchange
HMIS	health management information system	OpenSRP	Open Smart Register Platform
HRIS	human resource information system	PMNCH	The Partnership for Maternal, Newborn & Child Health
HRP	The UNDP/UNFPA/UNICEF/WHO/World Bank Special Programme of Research, Development and Research Training in Human Reproduction	PMP	Performance Monitoring Plan
ICD	International Classification of Diseases and Related Health Problems	RE-AIM	Reach Effectiveness Adoption Implementation Maintenance
ICT	information and communication technology	RMNCH	reproductive, maternal, newborn and child health
IICD	International Institute for Communication and Development	SAQ	self-assessment question
INN	International Nonproprietary Name	SERP	Society for the Elimination of Rural Poverty (India)
IRD	Interactive Research and Development	SMS	short messaging service (also known as text messages)
IRH	Institute for Reproductive Health (Georgetown University, United States of America)	SNOMED CT	Systematized Nomenclature of Medicine – Clinical Terms
ISO	International Organization for Standardization	SOP	standard operating procedures
ITU	International Telecommunication Union	TextIT	Texting to Improve Testing (KEMRI programme)
IVR	interactive voice response	TCO	total cost of ownership
IWG	Innovation Working Group	TWG	Technical Working Group (Rwanda)
JHUCCP	Johns Hopkins University Center for Communication Programs	UNDP	United Nations Development Programme
JHU-Gmi	Johns Hopkins University Global mHealth Initiative	UNF	United Nations Foundation
JSI	John Snow, Inc.	UNFPA	United Nations Population Fund
KEMRI	Kenya Medical Research Institute	UNICEF	United Nations Children's Fund
LMICs	low- and middle-income countries	USAID	United States Agency for International Development
LMIS	logistics management and information system	USSD	unstructured supplementary service data
		WHO	World Health Organization
		Wi-Fi	wireless local area network

Key terminology

Architecture: A description of how the different pieces of a technology and/or information system work together.

Champions: Charismatic opinion leaders who advocate for a particular programme, policy or technology. Champions are characterized by their “passion, persistence, and persuasiveness”.¹

Client beneficiaries: The individuals who benefit from improvements in health as a result of a given mHealth product.

Core partners: Those partners that are essential to the pursuit of the project’s endgame. For example, government adoption calls for close partnering with the ministry of health or other government entities, while commercial adoption will require projects to place a stronger emphasis on private sector partners, such as a mobile network operator (MNO) or technology vendors.

Data dashboard: A user interface that organizes and presents information and data in a way that is easy to read. User-friendly dashboards facilitate real-time system tracking and decision-making.¹

Data dictionary: A description about a data set that details features such as meaning, relationships to other data, origin, usage, and the format of specific data elements.²

Data privacy: The capacity to guarantee that patients’ personal data will be protected against intentional and unintentional exposure.²

Data quality assurance: Mechanisms for evaluating data within the mHealth system for inconsistencies, errors or missing elements.²

Data standards: Methods, protocols, terminologies and specifications for the collection, exchange, storage and retrieval of information associated with health-care applications.³

eHealth: The use of information and communication technologies in support of health and health-related fields.⁴ mHealth is a sub-domain within eHealth.

Enabling environment: The attitudes, actions, policies and practices that stimulate and support effective and efficient functioning of organizations, individuals, and programmes or projects.¹

End-users: Health workers or other clients who interact directly with the technology.

Endgame: A project’s long-term approach to scaling up and sustaining the mHealth product once it has proven the effectiveness of its core strategy and technology.^{5,6} An mHealth product may pursue sustainability through the following endgame strategies: government adoption, commercial adoption, or a hybrid of the two.

Evaluation research: Assessment of the product’s effects and outcomes, with the emphasis on research protocols that include rigorous methods.

Formative research: The use of primarily qualitative research methods to inform the development of effective intervention strategies. Formative research helps programme planners and researchers understand the factors that influence health outcomes, including the traits of target populations, such as their behaviours, attitudes and needs, in order to develop mHealth products that are appropriate to a particular context.

Hardware: Any physical device that people are able to touch, such as a mobile handset, tablet, sensor or computer monitor.

Health system constraints: The specific challenges and barriers that impede optimal health promotion, prevention and care.⁶ Constraints take the form of failures in availability, cost, efficiency, quality, utilization, information and/or acceptability that impede optimal provision of specific health interventions.

Implementers: Individuals that are involved in the development and deployment of an mHealth product.

Information and communication technology (ICT): The integration of information systems, telecommunications systems, and components of a system related to the capture, storage, retrieval and transmission of data.²

Interoperability: The ability of different information technology systems and software applications to communicate, exchange data, and use the information that has been exchanged.⁷ Interoperability is enabled by the use of common data standards.

Latency: The amount of time or delay for data to travel from the source (mobile device) to the data centre. Latency, along with bandwidth, determines the speed of a network connection.

mHealth strategy: The application of a technology for a defined health purpose (e.g. text message to deliver messages for antenatal care follow-up) in order to address specific health system challenges.

Mobile aggregator: A company that serves as an intermediary between application/content providers and MNOs in order to provide message traffic throughput to multiple MNOs or other aggregators. Mobile aggregators also often rent out virtual numbers and short codes to application/content providers, and may provide mobile initiative campaign oversight, administration and billing services.

Mobile health (mHealth): The use of mobile and wireless technologies to support the achievement of health objectives.²

Mobile money: A cash management service available on a mobile device or the Internet that facilitates money transfer by allowing customers to convert cash to and from electronic value (“e-money”), and perform transfers or make payments.

Mobile network operator (MNO): A telephone company that provides wireless communications services for mobile phone subscribers. An MNO must own or control all of the components necessary to sell and deliver services, such as network infrastructure and radio spectrum allocation.

Payers: Payers are entities that are willing and able to pay for or reimburse specific products or services. This differs from a funder, which provides financing to set up or grow programmes. For example, MNOs who subsidize short messaging service (SMS) or text messaging costs can be considered as payers of the mHealth product.

Pilot testing: A small-scale study that allows project managers to assess implementation factors such as feasibility, acceptability and cost. For mHealth products, the results of a pilot study are generally used to inform decisions surrounding scaling up.

Process monitoring: Routine and ongoing monitoring of the implementation of the product to track programme processes, review implementation milestones, and make course corrections throughout the scaling-up process.

Product: In the context of mHealth, this term refers to the combination of technology components, software, and the strategy of their use to address particular challenges related to the health system.

Programme fidelity: The degree to which the product is implemented as it was intended.

Scaling up: Scaling up consists of deliberate efforts to increase the impact of innovations successfully tested in pilot or experimental projects so as to benefit more people and to foster policy and programme development on a lasting basis.^{8,9}

Secondary users: Individuals who derive benefit from end-users' input into mHealth products, but do not themselves directly enter data (e.g. supervisors).

Short messaging service (SMS): SMS allows mobile phone users to directly send and receive personal text messages that can be up to 160 characters long. SMS is supported by all mobile phones, and the messages can be delivered between users of different MNOs.

Software: A set of code and instructions that can be installed onto hardware. Examples of software include mobile phone applications, client and server-side platforms, and computer and mobile-device operating systems.

Standard operating procedures (SOPs): Written instructions intended to document the steps required for project staff to perform a particular activity.

Stress test: An assessment of how well the entire mHealth system functions when tested by extreme conditions (e.g. maximum data requests).

Sustainability: A process that enables individuals, communities and organizations to decrease their dependence on insecure resources and maintain the health gains of the intervention beyond the specific/initial project period.¹⁰ For an mHealth product to be sustainable, it must be supported by stable and secure financial and technical resources, as well as enduring partnerships. In addition, sustainability depends on the project's capacity to continually adapt the product to meet the demands of users and the ever-evolving operational environment.¹¹

Total cost of ownership (TCO): A financial estimate that accounts for the long-term direct and indirect costs of a product or service. The total cost of an mHealth product will include costs associated with software development, training, implementation, and other related costs for the project as well as for end-users.

Value chain analysis: An evaluation of the relationships between relevant stakeholders based on the product's value proposition ("the promoted utility of the product") from each stakeholder's perspective.¹²

Value proposition: The promoted utility of the product for a given stakeholder.



INTRODUCTION

Background: scaling up mHealth

Mobile technologies have shown incredible potential for improving our capacity to overcome barriers to the optimal performance of health systems. Since the early 2000s, enthusiasm surrounding the use of mobile digital wireless technologies for health (mHealth) has surged along with the rapid adoption of mobile devices throughout low- and middle-income countries (LMICs). Short-term evaluations suggest that the use of mHealth offers opportunities for improving health and health system outcomes. In particular, mHealth is appropriate for addressing many of the health system constraints that currently inhibit services for reproductive, maternal, newborn and child health (RMNCH) in LMICs, and critical strategies for catalysing the potential for achieving universal health coverage goals.^{6, 13, 14}

Recent health interventions incorporating mHealth consist largely of pilot projects or small-scale implementations, many of which have focused on establishing evidence of feasibility and effect, without extensive exploration of the infrastructure needed for **scaling up** and sustaining the mHealth product. As a result, there is limited understanding of what may be required to translate these projects into larger-scale deployments that can be sustained over the long term.

ENDGAME

A project's long-term approach to scaling up and sustaining the mHealth product once it has proven the effectiveness of its core strategy and technology.^{5, 6} An mHealth product may pursue sustainability through the following endgame strategies:

Government adoption

A model with potential for high coverage and seeking integration into public sector programmes.⁵

Commercial adoption

A model with potential for profit and seeking to be delivered through the private sector.⁵

Hybrid

Models that entail elements of both the public and private sectors also exist.

Note: Government adoption, commercial adoption, and hybrid models are discussed in greater detail under Axis 1.

Growing concern with the number of mHealth products that have failed to become integrated into the national health system or to achieve **sustainability** has triggered research on barriers to scale.^{15, 16} The current

literature surrounding scaling up mHealth offers many recommendations for addressing identified challenges, yet these are weighted heavily towards broad, systems-level changes. These publications emphasize issues beyond the immediate control of a project, operating at the ecosystem level, such as the creation of robust data standards, national electronic health (eHealth) policies, and the adoption of mHealth by ministries of health.^{8, 17, 18} While important, such recommendations may not be readily actionable from the perspective of mHealth project teams.

In response to this need, the **mHealth Assessment and Planning for Scale (MAPS) Toolkit** was designed to help project teams conduct self-assessments, review progress and develop plans to improve their ability to scale up and achieve sustainability of their mHealth products. Uniquely, the MAPS Toolkit emphasizes that scaling up is a dynamic process and that projects will need to be responsive to the changing circumstances defining health systems in LMICs.¹⁹ In this Toolkit, there is no discrete marker or threshold numbers for achieving scale. To this end, the MAPS Toolkit approaches scaling up as a continuous process and offers insights that will prove useful throughout the ongoing stages of mHealth project goals for scaling up and sustainability, whether projects are focused on government adoption, commercial adoption, or a hybrid model.



SCALING UP

Scaling up consists of deliberate efforts to increase the impact of innovations successfully tested in pilot or experimental projects so as to benefit more people and to foster policy and programme development on a lasting basis.^{8, 9}

SUSTAINABILITY

A process that enables individuals, communities and organizations to decrease their dependence on insecure resources and maintain the health gains of the intervention beyond the specific/initial project period.¹⁰ For an mHealth product to be sustainable, it must be supported by stable and secure financial and technical resources, as well as enduring partnerships. In addition, sustainability depends on the project's capacity to continually adapt the product to meet the demands of users and the ever-evolving operational environment.¹¹

The MAPS Toolkit

WHAT IS THE PURPOSE OF THE TOOLKIT?

The MAPS Toolkit provides **actionable information** that will help project teams to consider and address diverse concerns relating to scaling up and sustaining their mHealth product. The Toolkit has two overarching goals:

1. **Assess:** MAPS helps project teams to critically evaluate the progress of scaling up their mHealth product through a detailed set of self-assessment questions (SAQs). Scoring their answers will allow project teams to measure and track their position along the pathway of scale.
2. **Plan:** The outcomes of the self-assessment process will help project teams to define their priorities and plan their next steps. In addition, the Toolkit offers separate planning and guidance features that will help devise strategies to address and overcome the challenges inherent in scaling up.



Figure 1. Conceptual model for the MAPS Toolkit

The self-assessment and planning components together will advance the progress of project teams. Since scaling up is an ongoing process, teams are encouraged to use the Toolkit at multiple time points. MAPS guides projects through an **iterative cyclical process** of thorough assessment, careful planning and targeted improvements. These steps will facilitate the successful scaling up of mHealth products and help to establish a foundation for sustainability (see Figure 1).

WHAT ARE THE AXES OF SCALE?

MAPS provides a structure for organizing the specific activities and considerations that will determine a successful journey through the process of scaling up. The key determinants or **axes of scale** are **Groundwork, Partnerships, Financial health, Technology & architecture, Operations, and Monitoring & evaluation** (see Figure 2). These areas are considered to be relevant to all projects that have the goals of increasing scale and ensuring sustainability.



Figure 2. Axes of scale

Each axis is divided into **domains**, which capture the specific drivers of increasing scale. The domains comprise various **factors**, which represent the specific criteria used for the purpose of self-assessment (see Figure 3).

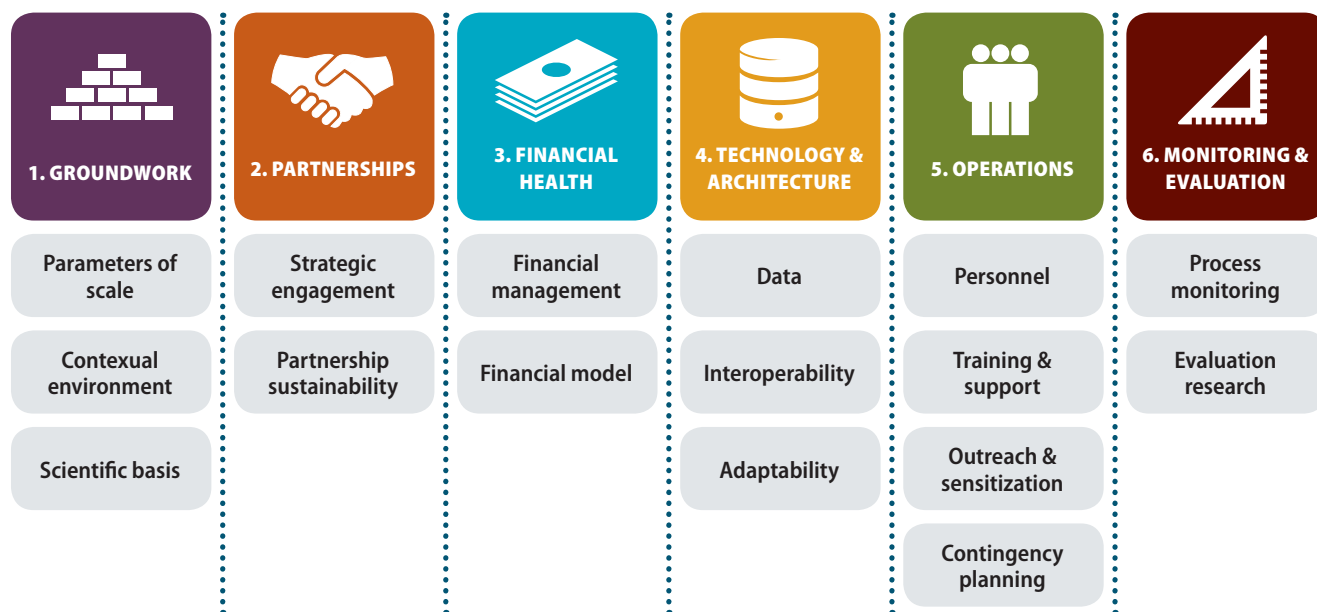


Figure 3. Axes and domains

HOW WAS MAPS DEVELOPED?

Development of the MAPS Toolkit was initiated within the context of the World Health Organization (WHO) and United Nations Foundation (UNF)-led Innovation Working Group (IWG) Catalytic mHealth Grant Mechanism initiative, which provides financial, technical and joint learning support to RMNCH projects. The team developed MAPS over several years, engaging with numerous mHealth projects and drawing on the experience of experts in the mHealth, implementation science, and maternal and child health fields. Additionally, Toolkit authors facilitated technical workshops and conducted field research at country level, using key informant interviews to explore and understand the different factors affecting the scaling up and sustainability of projects. The network of IWG mHealth project grantees played a fundamental role in informing and validating the Toolkit throughout its development.

The development of MAPS included:

- joint learning and technical assistance workshops with IWG grantee mHealth projects and technical experts;
- literature review;
- site visits and interviews with mHealth projects and key partners;
- consultations with technical experts in the areas of mHealth, health information systems, health policy, implementation research, health financing, health systems and RMNCH;
- review panel;
- pre-testing.

Additional information regarding the development of the Toolkit is provided in Annex 1.

IWG CATALYTIC MHEALTH GRANT MECHANISM

The IWG Catalytic mHealth Grant Mechanism is a UNF-WHO collaboration funded by the Norwegian Agency for Development Cooperation (Norad), and is part of the UN Secretary General's Every Woman Every Child initiative. This grant mechanism has served as a strategic investment for accelerating mHealth innovations that focus on strengthening health systems in developing countries in order to improve RMNCH. Between 2011 and 2015, the programme supported the scaling up of 26 mHealth projects by providing funding, technical assistance and joint learning opportunities.

WHAT DOES THE TOOLKIT CONTAIN?

The Toolkit has six chapters pertaining to the axes of scale. Each chapter is divided into three sections to meet the assessment and planning needs of projects.

A. Thematic overview: This section provides definitions and descriptions of key concepts, and highlights their relevance to scaling up and sustainability. It also includes diagrams to illustrate the conceptual framework underlying the Toolkit.

B. Self-assessment: This section presents a series of SAQs, which represent a set of tangible indicators based on the concepts outlined in the thematic overview.

C. Planning and guidance: The final section in each chapter builds on the SAQs by offering examples and resources to help project teams plan their future efforts and undertake corrective actions. These are highlighted using three features:



Tips and considerations: Harnesses the collective experiences of projects vetted through the IWG mHealth catalytic programme and implementers in the field to offer suggestions and considerations.



Lessons from the field: Specific examples demonstrating how different implementers have approached and addressed some of the major challenges to scaling up. This includes experiences from a variety of projects (see Annex 2 for brief descriptions of the projects).



Resources: Provides links to relevant websites, reports and other tools that project teams may find useful.

WHO IS MAPS FOR?

MAPS was designed specifically for managers and/or project teams that are already deploying an mHealth product and aiming to increase its impact through scaling up; the mHealth product has already undergone an initial proof-of-concept or has been “successfully tested”^{8,9}. The Toolkit is not intended for organizations that are in the early stages of designing an mHealth product, although certain pieces of information may prove useful for such teams.

Projects using MAPS should meet the following basic criteria:

- The project uses software and hardware technologies developed in-house, or as provided by an external company, for the purposes of improving health.
- The mHealth project can describe the use of the technology as an **mHealth strategy**
- The project team has plans to increase scale by using the endgames discussed above, i.e. government adoption, commercial adoption or a hybrid model.



mHEALTH STRATEGY

The application of a technology for a defined health purpose (e.g. text message to deliver messages for antenatal care follow-up) in order to address specific health system challenges.

How to use MAPS

HOW DO I CONDUCT THE SELF-ASSESSMENT?

The mHealth project manager and other relevant members of the project team should use the Toolkit to conduct a process of self-assessment. There are two suggested approaches for completing and responding to the self-assessment questions (SAQs):



Individual assessment: Different members of the team complete different sections. While the project manager will probably be able to answer the questions in most areas, certain sections will require input from specialists with a particular skill set within the project; e.g. the financial manager for Axis 3 (Financial health) and the information technology team for Axis 4 (Technology & architecture). Once MAPS has been completed, it is recommended that project managers hold a meeting with the entire team to review the results.



Team assessment: The whole team completes each section in turn. This could involve a series of meetings organized over the course of a month, with the entire team tackling one or two chapters during each meeting.

Since every team has different needs, dynamics and organizational structures, project managers should choose the approach that makes most sense to them. Regardless of the route chosen, the self-assessment process will create a space for critical internal reflection, and for team discussions about future course corrections.

The Toolkit should take approximately 1.5–2 hours to complete in its entirety. Determining the next steps needed to address any project shortfalls highlighted by MAPS may be a more extensive process.

WHEN SHOULD I USE THE TOOLKIT?

The Toolkit is first and foremost intended to be used as a baseline assessment of where a project stands, and to inform planning for advancement through the scaling-up process. Projects are also strongly encouraged to use the Toolkit periodically after the initial assessment to help the project track its progress, ensure it is on the intended path, and continue to make adjustments throughout its life cycle. During repeated use of the Toolkit, projects may choose to focus on a select number of chapters based on their priority areas.

HOW DO I RESPOND TO THE SELF-ASSESSMENT QUESTIONS (SAQs)?

Each SAQ has a series of sub-statements that capture the particular activities, considerations and procedures reflecting the relevant topic. Each sub-statement is accompanied by a set of response options. Some questions have the basic response options of **No** and **Yes**. However, the majority of the SAQs have four response options: **No**, **In progress**, **Performed** and **Documented**.

Projects should use the guidelines shown in Table 1 to select the most appropriate response for each of the four options. The table includes examples showing how particular project experiences would align with the various response options.

In addition, a small number of questions have the option **Not applicable (N/A)**, which means that the particular item does not apply to a project due to the context or the product. Finally, a few questions have a unique set of response options that are self-explanatory based on the content provided.

Table 1. Guidelines to selecting the most appropriate response (example from SAQ 14-1)

RESPONSE OPTION	DEFINITION OF RESPONSE OPTION	EXAMPLE OF INTERPRETATION FOR SAQ 14-1. (PROCEDURES FOR ADDRESSING LACK OF/ INCONSISTENCIES IN ELECTRICITY HAVE BEEN ESTABLISHED)
No	You have not addressed this item at all.	You have not considered the issues associated with electricity coverage at all.
In progress	You have begun to address this item, but further steps are needed.	You have gathered information about the access to and the consistency of electricity in the settings where the product will be scaled up, but you have not yet decided on how you will deal with these issues.
Performed	You have addressed this item fully, leaving no remaining uncertainties.	You have decided that you will provide health workers with solar chargers to enable them to charge their mobile phones when in the field.
Documented	There is written documentation or evidence demonstrating that this item has been completed. This may include a report, or involve the development of standard operating procedures (SOPs).	You have documented the information needed for the provision of solar chargers, including how many chargers will be necessary for each group of health workers, the name of the vendor that will supply the chargers, and the total cost.

HOW DO I SCORE THE TOOLKIT?

After completing the MAPS Toolkit, you will be able to calculate scores on three levels:

1. the overall score (total score combining all axes)
2. axis scores (a separate score for each of the six axes of scale)
3. domain scores (specific scores for the domains within each axis of scale).

The scoring mechanisms allow project teams to use quantitative terms to describe their overall progress through the process of scaling up, as well as their internal strengths and weaknesses. The opportunity to compare scores across axes and domains will help project teams determine which areas need further development.

Allocation of points: Points are allocated at the level of the sub-statements within each question. Each response option is worth a specific point value, as indicated in the check boxes. For example, No = 0 points, In progress = 1 point, Performed = 2 points, and Documented = 3 points.

Therefore, each question is worth a certain number of points depending on the number of sub-statements accompanying the question. The maximum number of points that can be allocated is indicated beside each question and each domain title (see Figure 4).

Scorecards: Six scorecards – one for each axis of scale – are provided to help users calculate their scores. The specific steps entailed in the scoring process are detailed in these scorecards.

Final scorecard: Ultimately, the calculations will yield a percentage for each axis of scale as well as for each domain. The final scorecard will allow users to compare scores across the axes of scale and the domains. As the Toolkit is used by more projects, we will gain a greater understanding of the range of scores and their implications. This will eventually allow projects to categorize their progress as they increase their scale, and allow users to compare their scores to other similar projects and to a defined average.



STANDARD OPERATING PROCEDURES (SOPs)

Written instructions intended to document the steps required for project staff to perform a particular activity.

14-1. Have procedures been developed for addressing infrastructural constraints? (9 points)

	NO	IN PROGRESS	PERFORMED	DOCUMENTED	POINTS EARNED
i) Procedures for addressing lack of/inconsistencies in connectivity have been established (e.g. provision of several SIM cards so health workers can use different networks when necessary)	0	1	2	3	1
ii) Procedures for addressing lack of/inconsistencies in electricity have been established (e.g. provision of solar chargers, setting up charging stations in communities)	0	1	2	3	1
iii) Information regarding these strategies is included within the standard operating procedures/job aids provided to end-users and secondary users	0	1	2	3	2
Total points earned (out of a possible 9)					4

Use the guidelines given in Table 1 to select the most appropriate response. In this example the team has selected “In progress” for questions (i) and (ii); and “Performed” for question (iii).

Write the appropriate points value in the “Points earned” column. Then add up your total and write it in the “Total points earned” box.

Figure 4. Sample SAQ

WHAT SHOULD I DO WITH THE RESULTS?

The results obtained from the SAQs can be applied in several different ways. First, the axis and domain scores help to shed light on the particular areas that may require additional consideration, activities and strategies from project managers and teams. Projects may consult the tips, lessons from the field, and resources provided in the planning and guidance section of each axis in order to plan efforts to address problem areas. In addition, since the Toolkit can be used periodically, projects can employ it to assess and correct the course of their progress regarding scaling up and the pursuit of their endgame.

Project overview sheet

Please complete the following information before beginning the self-assessment process. These questions may be used as a baseline document recording the current features of your project and your goals for the process of scaling up.

PROJECT DETAILS

Date

Name of project

Name of organization

What is your mHealth project strategy to address the health need (e.g. text messaging or SMS to deliver reminders for antenatal care [ANC] follow-up, to address low ANC population coverage levels)?

What technologies and communication channels (e.g. software platform, such as RapidPro, and communication via text message or SMS) are the strategy based on?

CURRENT PROJECT STATUS

What is the current coverage of your project? (e.g. numbers of health workers, clinics and/or client beneficiaries reached)

When was this project started, and for how many years has it been running?

List the geographies in which the project is currently operating

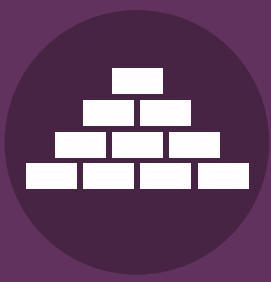
VISION FOR SCALE

What are your goals for scaling up (e.g. number of health workers, clinics and/or client beneficiaries reached; number of districts)?

What is your anticipated time frame to meet these goals?



AXIS 1. GROUNDWORK



AXIS 1.
GROUNDWORK

AXIS 2.
PARTNERSHIPS

AXIS 3.
FINANCIAL HEALTH

AXIS 4.
TECHNOLOGY & ARCHITECTURE

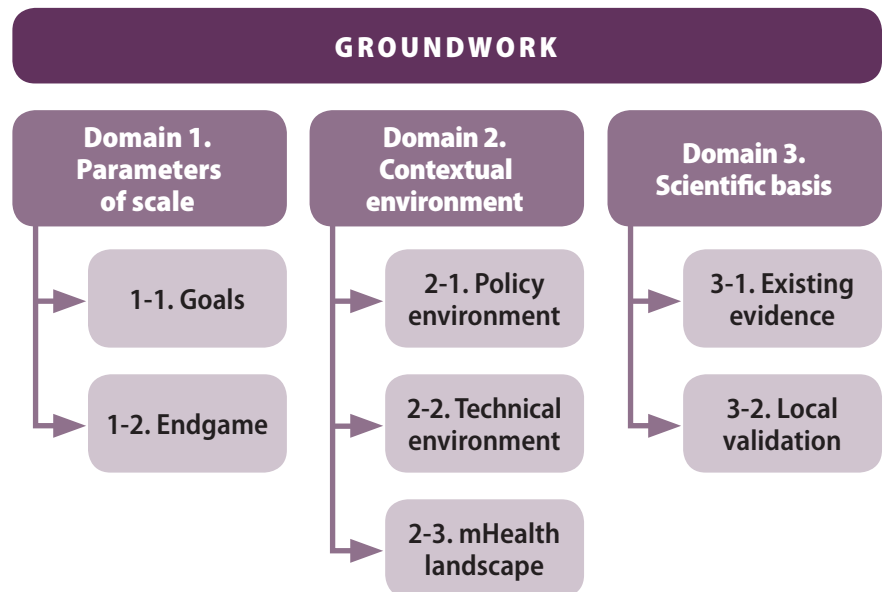
AXIS 5.
OPERATIONS

AXIS 6.
MONITORING & EVALUATION

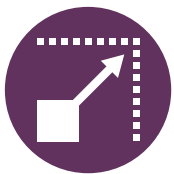
A. Thematic overview

Groundwork: The initial steps of specifying the key components of the project’s approach to scaling up, assessing relevant contextual influences, and taking stock of the scientific basis for the product

Before initiating the complex process of scaling up, a project must have a solid foundation, including scope, goals and basis of need. Axis 1: Groundwork describes three domains that need to be addressed before a project should move through the next axes. These cover: (a) the scaling-up goals and endgame, (b) the contextual environment of the target setting, and (c) the underlying scientific basis for the mHealth product itself. Describing these domains will lay the groundwork for subsequent strategic planning decisions along the entire scaling-up pathway.



▶ DOMAIN 1: PARAMETERS OF SCALE



Project teams should begin by specifying the basic foundational elements that will guide the scaling-up process, which includes setting goals and defining the endgame for the mHealth product. To outline the mHealth product **goals** for scaling up, project teams should articulate the health outcomes and priorities (e.g. reduce stock-outs of contraceptives, improve coverage of routine immunization among children under 5 years) and the **health system constraints** (e.g. delays in care, low demand for services) that are being targeted by the mHealth product. Delineating the health system problem areas that are a focus of the mHealth product will strengthen the project’s capacity to articulate “value” and appeal to potential partners and attract financing.

Next, project teams should detail how they wish to measure their goal of scaling up. This involves two steps:

1. Define the metrics (e.g. growth, adoption, or expansion of geo-political area, as described in Table 2).
2. Specify the quantifiable target or targets (e.g. 100 000 users or 40 clinics).

For the second step, project teams should keep in mind the need to gather adequate data to estimate the denominator for each of their targets. The project team will need to estimate the total potential numbers of health workers, clinics, client beneficiaries, etc., that represent the target population that can be reached (i.e. the eligible population) with the mHealth product, in order to have a complete picture of current and future impact.



HEALTH SYSTEM CONSTRAINTS

“The specific challenges and barriers that impede optimal health promotion, prevention and care”.⁶ Constraints take the form of failures in availability, cost, efficiency, quality, utilization, information and/or acceptability that impede optimal provision of specific health interventions.

Table 2. Metrics for measuring success of scaling up

UNIT OF SCALE	DESCRIPTION	EXAMPLE
Growth (client)	Increase in number of users or client beneficiaries	FHI 360: Goal of scale-up is to achieve 300 000 unique users for Mobile for Reproductive Health (m4RH) in the United Republic of Tanzania
Adoption (institutional)	Increase in number of institutions that have adopted the product	Kenya Medical Research Institute: Goal of scale-up is to increase the number of health-care facilities using Texting to Improve Testing (TextIT) in Kenya to 20
Expansion (geo-political)	Increase in number of districts, regions or countries of deployment	John Snow, Inc., Malawi: Goal of scale-up is to achieve nationwide coverage of cStock to all 29 districts in Malawi

Specifying the **endgame**, or the long-term approach that will be used to scale up and sustain the product, is also important.⁵ The two primary endgames for mHealth are government adoption and commercial adoption.

Government adoption: The integration of the mHealth product into a regional or national health system to be supported largely by the public sector. With this strategy, the mHealth product is adapted for and integrated into the structure and systems of the ministry of health (MOH) or equivalent institution, and is absorbed into practice as a routine “standard of care”. Here, a proportion of the costs related to technology, training and support are reflected in the MOH operational budget.¹¹ For example, the John Snow, Inc. (JSI) cStock initiative in Malawi is a short messaging service (SMS)-based logistics management and information system (LMIS) for health products. It has been endorsed formally by the Malawi MOH and achieved nationwide coverage in 2014. This initiative reflects a government adoption endgame strategy.

Commercial adoption: Development of the product to be commercially viable. Here, the mHealth product (as a ready-to-use technology or service with defined functionality) is available to end-users through financing from private partners or payment schemes. An example is Changamka’s Linda Jamii micro health insurance programme for maternal health care, which has been supported through a partnership with Safaricom in Kenya.

Hybrid models that entail elements of both the public and private sectors also exist. Recent years have seen a growing trend in public–private partnerships, which involve an arrangement between a government entity and a private company, and which result in shared costs while maintaining an orientation towards health system goals.

Pilot mHealth projects will over time need to work to shift from a support model that relies mostly on grant funding functioning independently of ministries of health or the commercial sector financial models, to become mHealth programmes that are guided by their endgames goals.

► **DOMAIN 2: CONTEXTUAL ENVIRONMENT**



The second step of scaling up involves conducting a thorough assessment of the contextual elements that may facilitate or impede implementation in the areas in which scaling up will occur. Commonly referred to as the **enabling environment**, policy frameworks are the:

(1) regulations surrounding country health priorities and (2) national health information systems (HIS) and information and communication technology (ICT), including eHealth/mHealth. An understanding of the **policy environment** will help project teams identify how their product may fit in and gain traction, particularly among public sector partners.¹⁵

The **technical environment** shapes an mHealth project’s prospects of being scaled up. Assessment of network coverage and electricity throughout the areas in which scaling up will occur, in terms of both reach and reliability, will have fundamental implications for the operational procedures required throughout the process of scaling up – impacting the fidelity of the product in real-world use. Project teams should consider how potential infrastructural constraints may complicate the wider use of the product, and determine strategies to overcome such challenges.



ENABLING ENVIRONMENT

The attitudes, actions, policies and practices that stimulate and support effective and efficient functioning of organizations, individuals, and programmes or projects.¹

Lastly, project teams should assess the **mHealth landscape** in the targeted regions by investigating other deployed mHealth products, reviewing their target market, functionality and success. Such considerations will help the project team to define the similarities, differences and potential advantages of their own compared with other local projects, thus paving the way for strategic planning and alignments.

► DOMAIN 3: SCIENTIFIC BASIS



The final piece of groundwork involves reviewing the effect of the mHealth product on known health system challenge areas and the effect on health interventions. This will help to identify the extent to which additional evaluation activities are needed. Project teams should be able to demonstrate:

- that the mHealth product is aligned with scientifically validated health interventions;
- general evidence of the effect of the mHealth product on identifiable problems;
- context-specific evidence supporting the appropriateness of the tool for a certain setting (e.g. the content has been adapted and validated for local use).

The mHealth project team should be able to reference the specific scientific basis for the health intervention that is associated with the mHealth strategy. This may include, for example, the validity of the specific information content contained in the mHealth product, or the alignment of the mHealth product with medical guidelines such as a vaccination schedule or family planning methods.

The second element requires consideration of **existing evidence** and whether it adequately supports the four **stages of evaluation** to assess the mHealth product's **functionality, usability, efficacy** and **effectiveness**. The pilot stage of introducing an mHealth product will often demonstrate its functionality, usability and efficacy. Gathering evidence of effectiveness, however, is far more challenging and may not be possible until the product reaches a certain degree of scale.²⁰

It is important to note that these stages of evaluation do not refer to gathering evidence on the health intervention itself (e.g. the effect of antenatal care [ANC] visits on reducing the risk of maternal mortality), as it is assumed that such evidence is already in place. As such, mHealth products should be viewed as tools that enhance the delivery of health interventions that are already validated (e.g. providing SMS reminders for ANC visits improves uptake of ANC services).⁶

Demonstrating evidence for the mHealth product also requires support for key components of its strategy, including its content, key activities and operational features (e.g. the timing and frequency of the activities). These elements should be drawn ideally from reliable evidence-based sources. If sufficient evidence supporting the product is lacking, then additional evaluation activities are advised before initiating the scaling-up process.

In addition to the general evidence supporting the mHealth product, local validation of the product in the setting or settings in which it will be scaled up is essential. Evidence of the effectiveness of a product in one location does not guarantee that it will take hold in another area with different sociocultural, geographic and institutional characteristics. Thus, formative research and assessment of the cultural context of the specific setting are needed to ensure the product will be appropriate to the new setting. For example, the product would need to reflect the specific needs as well as workflows and information flows of targeted end-user health workers; and when clients are involved, the product should address cultural beliefs, motivations and barriers to accessing services and following treatment guidelines.

STAGES OF EVALUATION

The four different stages of evaluation for mHealth products answer the following questions:²¹

Functionality

Does the technology work as intended?

Usability

Can the mHealth product be used effectively by the intended users?

Efficacy

Does the mHealth product demonstrate the intended effect in an ideal or controlled setting?

Effectiveness

Does the mHealth product demonstrate the intended effect in a non-controlled setting?

B. Self-assessment questions

► DOMAIN 1: PARAMETERS OF SCALE (8 POINTS)

The articulation of the basic features of the scaling-up process, including the endgame strategy, which will guide decision-making in other arenas

1-1. Have the overall goals for scaling up been articulated? (6 points)

	NO	YES	POINTS EARNED
<p>i) The health outcomes and the specific health interventions for which the mHealth product is targeted have been detailed. This may include health outcomes/priorities that occur at the following life stages (examples of specific outcomes or health interventions are given in brackets):*</p> <ul style="list-style-type: none"> ■ Adolescence/before pregnancy (e.g. family planning, prevention of sexually transmitted infections) ■ Pregnancy (e.g. ANC, pregnancy complications) ■ Birth (e.g. transport, skilled attendance at birth) ■ Postpartum mother and postnatal newborn (e.g. postnatal care, newborn illnesses) ■ Maternal health and infancy/childhood (e.g. exclusive breastfeeding, routine immunizations, growth monitoring and nutrition). <p>Please define the life stage (e.g. childhood), health outcome (e.g. reduced childhood measles) and specific health intervention (e.g. measles vaccination) that are being addressed by the mHealth product:</p> <hr/>	0	2	—
<p>ii) The health system constraint(s) (i.e. challenges) that the mHealth product targets are articulated. This may include the following types of constraints:*</p> <ul style="list-style-type: none"> ■ Availability (e.g. limited supply of goods, limited availability of health services) ■ Cost (e.g. expenses related to production, expenses related to delivery) ■ Efficiency (e.g. unnecessary delays in care, difficulties in stock management) ■ Quality (e.g. lack of supportive supervision, low skill levels of health workers) ■ Utilization (e.g. low demand for services, low adherence to treatments) ■ Information (e.g. lack of population enumeration) ■ Acceptability (e.g. individual beliefs and practices) ■ Other: _____ <p>Please use the terms above to define the health system constraint(s) that the mHealth product addresses:</p> <hr/>	0	2	—
<p>iii) The metric(s) for measuring scale-up are defined. Draw from the following metrics to operationalize the project's parameters of scale:</p> <ul style="list-style-type: none"> ■ Increase in number of health workforce users, and/or number of client users, and number of affected beneficiaries (Growth) ■ Increase in number of institutions using the product (Adoption) ■ Increase in number of districts, regions or countries of deployment (Expansion of geo-political area) ■ Other: _____ <p>Please define your units of scale here, including the type(s) of metric used, the targeted number and the time frame(s):</p> <hr/>	0	2	—
<p>Total points earned (out of a possible 6)</p>			<div style="border: 1px solid black; width: 30px; height: 30px; margin: 0 auto;"></div>

* Source: Adapted from WHO mHealth TERG²¹

1-2. Has the endgame for scaling up and sustaining the mHealth product been determined? (2 points)

	NO	YES	POINTS EARNED
i) The endgame has been specified. This may include the following:			
<ul style="list-style-type: none"> ■ Government adoption (adoption and integration with government as a standard) ■ Commercial adoption (incorporation into the private sector) ■ Hybrid model 	0	2	___
Please define your endgame strategy here using these terms: _____			
Total points earned (out of a possible 2)			<input type="checkbox"/>

► DOMAIN 2: CONTEXTUAL ENVIRONMENT (22 POINTS)

The assessment of the environmental elements that may facilitate or impede implementation of mHealth in the setting or settings targeted for scaling up

2-1. Has the policy environment in the local setting(s), where scaling up will take place, been assessed? (6 points)

	NO	YES	POINTS EARNED
i) We can describe how the product fits into national health or health system priority area(s)	0	2	___
ii) We can describe how the product fits into the principles and/or guidelines of the national eHealth/mHealth strategy if one exists (or the national health policy priorities related to the health information system (HIS), if a national eHealth/mHealth strategy does not exist)	0	2	___
iii) We actively participate in existing eHealth/mHealth working groups (e.g. a community of practice) or eHealth/mHealth national-level meetings	0	2	___
Total points earned (out of a possible 6)			<input type="checkbox"/>

2-2. Has the technical environment in the local setting(s), where scaling up will take place, been assessed? (8 points)

	NO	YES	POINTS EARNED
i) We have assessed the reach of network coverage, and can articulate it in terms of daily operational requirements for the mHealth product and deployments	0	2	___
ii) We have assessed the reliability of network coverage, and can articulate it in terms of which networks offer needed coverage for which users	0	2	___
iii) We have assessed the reach of electricity, and can articulate it in terms of the functional requirements of the users	0	2	___
iv) We have assessed the reliability of electricity, and can articulate it in terms of the offline/online requirements of the users and the server(s)	0	2	___
Total points earned (out of a possible 8)			<input type="checkbox"/>

2-3. Has the mHealth landscape in the local setting(s), where scaling up will take place, been assessed? (8 points)

	NO	YES	POINTS EARNED
i) We have assessed other mHealth projects in the local settings(s) or in the country (via working on the ground and/or via reviewing online repositories)	0	2	—
ii) We can articulate our product's differences and similarities in comparison with other projects	0	2	—
iii) We can articulate our product's advantages in comparison with other projects in the mHealth landscape, and the added value of our product	0	2	—
iv) We have developed strategies for either aligning with or differentiating ourselves from those other projects at this stage or in the future	0	2	—
Total points earned (out of a possible 8)			<input type="checkbox"/>

▶ DOMAIN 3: SCIENTIFIC BASIS (30 POINTS)

The assessment of general and context-specific evidence supporting the innovation, in order to identify whether there is a need for additional evaluation activities prior to scaling up further

3-1a. Has sufficient evidence been gathered or previously produced in support of the mHealth product? (8 points)

This includes evidence that your project team has collected through pilot and early implementation stages, or evidence that was gathered previously through other projects and/or studies.

	NO	YES	POINTS EARNED
i) The functionality of the technology has been demonstrated (Does the technology work as intended?)	0	2	—
ii) The usability of the mHealth product has been demonstrated by carrying out user testing with anticipated user groups (Can the mHealth product be used effectively by intended users?)	0	2	—
iii) The efficacy of the mHealth product has been demonstrated (Does the mHealth product have the effect that was intended in an ideal/controlled setting?)	0	2	—
iv) The effectiveness of the mHealth product has been demonstrated (Does the mHealth product have the effect that was intended in a non-research setting?)	0	2	—
Total points earned (out of a possible 8)			<input type="checkbox"/>

3-1b. Have the key components of the product's strategy (or health purpose) been validated? (4 points)

	NO	YES	POINTS EARNED
i) The content and key activities are drawn from evidence-based guidelines (e.g. WHO guidelines) or national operational procedures (e.g. from existing MOH documentation), and we are able to list these sources	0	2	—
ii) Operational procedures for the mHealth strategy (e.g. timing, frequency or actions defining the mHealth activities) have been informed by credible external sources and/or a pilot study, and we are able to list these sources	0	2	—
Total points earned (out of a possible 4)			<input type="checkbox"/>

3-2. Has the product's appropriateness in the local setting(s) been demonstrated? (18 points)

	NO	IN PROGRESS	PERFORMED	DOCUMENTED	POINTS EARNED
i) Formative research has been conducted in this setting to assess needs (e.g. using qualitative methods such as focus group discussions)	0	1	2	3	—
ii) A pilot study has been conducted in this setting (or in settings that are similar in terms of sociocultural, geographic and institutional features)	0	1	2	3	—
iii) We have assessed local health system constraints in relation to the mHealth product	0	1	2	3	—
iv) We have assessed the availability and capacity of local health services in relation to the mHealth product	0	1	2	3	—
v) We have assessed how the mHealth product will integrate with existing workflow, behaviours and needs of health workers or other health system staff	0	1	2	3	—
vi) We have assessed local sociocultural norms (including gender norms), and can describe them in terms of barriers and opportunities for the use and scaling up of the mHealth product	0	1	2	3	—
Total points earned (out of a possible 18)					<input type="text"/>



Axis 1. Groundwork scorecard

▶ DOMAIN 1: PARAMETERS OF SCALE (8 POINTS)

SAQ 1-1. Have the overall goals for scaling up been articulated?	_____ / 6 points
SAQ 1-2. Has the endgame for scaling up and sustaining the mHealth product been determined?	_____ / 2 points
Domain 1 total	_____ / 8 points
Domain 1 percentage: Domain total divided by 8, then multiplied by 100	_____ %

▶ DOMAIN 2: CONTEXTUAL ENVIRONMENT (22 POINTS)

SAQ 2-1. Has the policy environment in the local setting(s), where scaling up will take place, been assessed?	_____ / 6 points
SAQ 2-2. Has the technical environment in the local setting(s), where scaling up will take place, been assessed?	_____ / 8 points
SAQ 2-3. Has the mHealth landscape the local setting(s), where scaling up will take place, been assessed?	_____ / 8 points
Domain 2 total	_____ / 22 points
Domain 2 percentage: Domain total divided 22, then multiplied by 100	_____ %

▶ DOMAIN 3: SCIENTIFIC BASIS (30 POINTS)

SAQ 3-1a. Has sufficient evidence been gathered or previously produced in support of the mHealth product?	_____ / 8 points
SAQ 3-1b. Have the key components of the product's strategy (or health purpose) been validated?	_____ / 4 points
SAQ 3-2. Has the product's appropriateness in the local setting(s) been demonstrated?	_____ / 18 points
Domain 3 total	_____ / 30 points
Domain 3 percentage: Domain total divided by 30, then multiplied by 100	_____ %

Domain 1 percentage _____ %

Domain 2 percentage _____ %

Domain 3 percentage _____ %

Add percentages together and divide by 3 for your Axis 1 score.

**AXIS 1
SCORE:** _____ %

C. Planning and guidance



This section can assist in planning next steps by . . .

- ✓ Presenting frameworks to articulate a project's endgame strategy and establish links between mHealth strategies and health system constraints
- ✓ Consolidating various repositories and resources that may inform landscape mapping of mHealth deployments
- ✓ Offering resources for planning and designing an mHealth project, including ways to assess the contextual environment, to ensure the project has a solid foundation

► DOMAIN 1: PARAMETERS OF SCALE



Tips and considerations

Articulate the health goals of the mHealth strategy

The fundamental value of mHealth is to contribute to health system goals and health outcomes. Project teams should not lose sight of this underpinning driver and should be able to articulate the role of their mHealth strategy in overcoming health system constraints. The use of frameworks is one way to help understand and demonstrate how to articulate the ways in which your mHealth product might be able to address priority health areas. Some framework examples include:

■ mHealth Innovations as Health System Strengthening Tools: 12 Common Applications and a Visual Framework (Labrique et al., 2013)

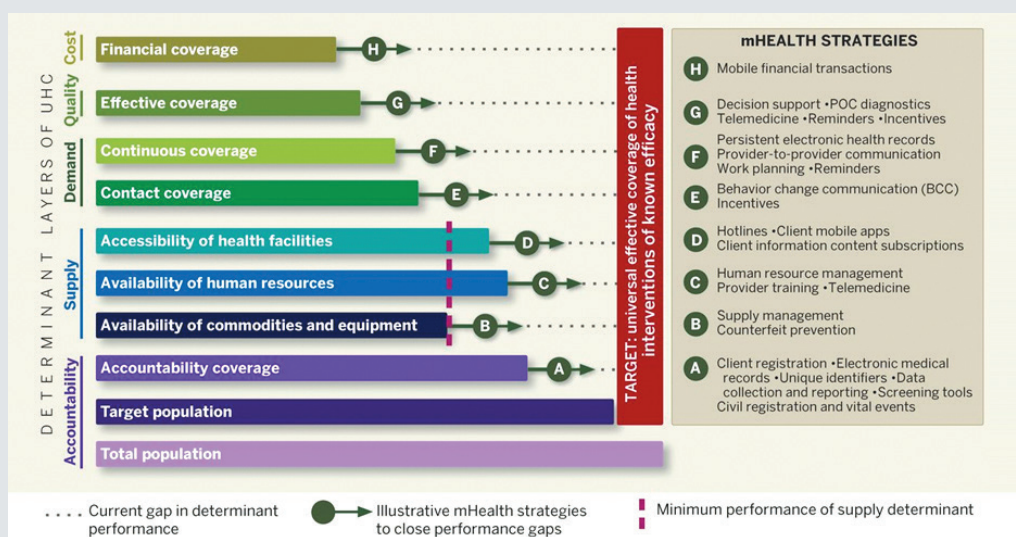
Project teams can use this framework to synthesize what the mHealth product does, the target population it serves, the essential health services it integrates, and the health system constraints that it addresses.

<http://www.ghspjournal.org/content/1/2/160.full.pdf+html>

■ Prioritizing Integrated mHealth Strategies for Universal Health Coverage (Mehl & Labrique, 2014)

Project teams can use this framework to map how their intervention fits into the context of the broader health system constraints and articulate the role of the product towards advancing universal health coverage.

<http://www.sciencemag.org/content/345/6202/1284.full>



Framework for articulating the linkages between health system constraints and mHealth strategies for overcoming identified gaps.

Source: Mehl & Labrique (2014)²²

► DOMAIN 2: CONTEXTUAL ENVIRONMENT



Tips and considerations

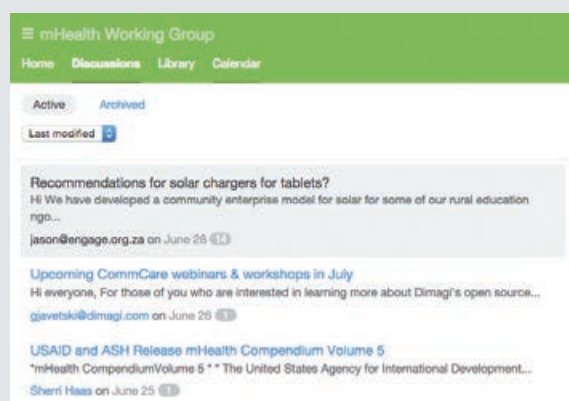
Join working groups to network and access resources

Working groups (online and in-country) provide useful networks and resources, helping implementers to exchange information and improve their understanding of the contextual environment. In addition to country-specific technical working groups, communities of practice for networking and joint learning include:

- mHealth Working Group
- Asia eHealth Information Network (AeHIN)
- African Network for Digital Health (ANDH)
- HealthEnabled Africa
- Information and communications technology for community health workers (ICT4CHW) Google Group

The **mHealth Working Group** provides networking and joint learning opportunities for mHealth implementers around the world to share ideas, ask questions and disseminate learning. The working group also hosts an online inventory of projects.

<https://knowledge-gateway.org/mhealth>



Discussion board on mHealth Working Group portal

AeHIN serves as a peer-to-peer assistance and knowledge-sharing group targeting national-level engagement across Asia to strengthen national systems for health information and civil registration and vital statistics (CRVS).

<http://www.aehin.org/>

ANDH uses a model similar to that of AeHIN to promote standards and interoperability, and strengthen the digital health governance system across Africa.

<http://andh.hinx.org/Home/About>

HealthEnabled serves as a brokering institution for peer-to-peer networks. It focuses on national integration of digital health systems, particularly for countries in Africa.

<http://healthenabled.org/en/expert-network>

ICT4CHW is a forum for implementers using digital technology to support community health workers, primarily in low-income settings.

<https://groups.google.com/forum/#!forum/ict4chw>

► DOMAIN 3: SCIENTIFIC BASIS



Tips and considerations

Use the existing evidence base to bolster interventions

Project teams should remember that mHealth is a catalytic tool and not often a health intervention in itself. These tools are most effective when they aim to strengthen health interventions of known efficacy (e.g. ANC, skilled delivery, vaccines). Therefore, mHealth research efforts should not focus on generating evidence for the interventions themselves, since these areas have a well established scientific basis. Instead, projects should direct their resources towards demonstrating how the mHealth strategy can improve the coverage or quality of the existing health interventions, as compared to the conventional standard of care (e.g. paper-based systems) that are being replaced by the mHealth strategy.



Lessons from the field

Conduct formative work to understand your context

Formative research is critical for local validation and contextualization of mHealth implementation. The Kenya Medical Research Institute (KEMRI) designed their TextIT messaging programme for the prevention of mother-to-child HIV transmission (PMTCT) by using qualitative research to inform the content, timing and frequency of SMS or text messages sent to their clients. After conducting focus group discussions with a sample of potential clients, KEMRI established key thematic areas for message content, recognized the need for a two-way interactive system, and identified strategies to gain clients' trust, such as personalizing messages with their names. This local validation exercise also revealed that adherence to early infant HIV testing would benefit greatly from the inclusion of the fathers in the TextIT programme. As a result, KEMRI is exploring ways to incorporate messages for male partners in order to enhance the reach and effectiveness of their intervention.



Resources

The resources below provide relevant planning information for projects pursuing the endgame pathway of government adoption.

The Pathway to Supply Chain Sustainability: A Planning Tool for Scaling & Institutionalizing Innovations within Public Sector Supply Chains (JSI's Supply Chain for Community Case Management, 2012)

This document details the considerations for collaborating with the MOH to facilitate the use of the m/eHealth product as a "standard business practice".

Useful features: The tool features a series of worksheets that list metrics for measuring progress towards institutionalization (government adoption), such as organizational capacity, technology infrastructure, staff capacity and funding stability.

<http://sc4ccm.jsi.com/files/2012/11/Pathway-to-Supply-Chain-Sustainability-Tool.pdf>





The mHealth Planning Guide: Key Considerations for Integrating Mobile Technology into Health Programmes (K4Health, 2014)

This comprehensive online guide provides key considerations and resources based on three thematic phases of mHealth planning: concept development, product design and testing, and planning for implementation. The guide features a glossary, clarifications on commonly used mHealth terminology, resources and expert tips based on interviews with mHealth implementers.

Useful features: Tools, such as visual canvasses, checklists, logic model templates and worksheets, accompany each of the planning sections in the document. Projects can complete these to guide reflection on the areas of technology functionality and usability, and to demonstrate the efficacy of their mHealth product. These tools can help projects to answer fundamental questions, such as drafting and validating the mHealth content (Key considerations worksheets), deciding which technology to use (Technology decisions worksheet) and understanding how the mHealth project can lead to changes in health outcomes (Logic model).

<https://www.k4health.org/toolkits/mhealth-planning-guide>



How to Approach mHealth (Keisling, HealthEnabled, 2015)

This publication consolidates important considerations from other planning guides related to the design and implementation of mHealth projects. The guide features targeted questions on deciding among technology vendors, conducting user-centred design and developing implementation plans, among other areas.

Useful features: The recommendations under “defining user needs”, “developing and adapting content” and “monitoring and evaluation” offer helpful pointers on methods for designing contextually appropriate implementations.

http://healthenabled.org/resources/mhealth_approaches.pdf

The publications below provide consultative resources for assessing various aspects of the contextual environment, such as e-government policies, technical infrastructure and the distribution of mHealth deployments.

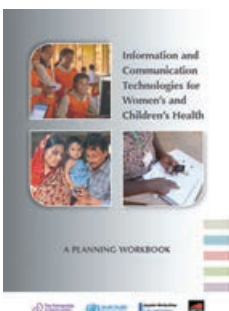


World Health Organization (WHO)–International Telecommunications Union (ITU) National eHealth Strategy Toolkit (WHO–ITU, 2012)

This globally recognized resource assists governments and national stakeholders to develop and implement a national eHealth strategy and framework.

Useful features: Although the primary intended audience includes health and information technology ministries, this Toolkit flags important issues for eHealth/mHealth projects to take into account, such as computing infrastructure and connectivity, availability of health information datasets, data structure and standards, autonomy and fragmentation of the health system.

https://www.itu.int/dms_pub/itu-d/opb/str/D-STR-E_HEALTH.05-2012-PDF-E.pdf



Information and Communication Technologies (ICT) for Women's and Children's Health: A Planning Workbook (Partnership for Maternal Newborn and Child Health, PMNCH, 2014)

This tool prepares a comprehensive list of considerations to be used during dialogues with government stakeholders in order to highlight potential bottlenecks related to policy, sustainability, infrastructure, etc. This will help project teams understand how these constraints may affect their deployment.

Useful features: This workbook contains sections on assessing the technical policy environment and includes a specific section related to questions on the national health system infrastructure and e-government policies.

http://www.who.int/pmnch/knowledge/publications/ict_mhealth.pdf



GSMA Country Feasibility Reports (Groupe Speciale Mobile Association, 2014)

This series of country-specific mobile landscape reports gathers key information on the mobile network infrastructure and opportunities for mHealth based on national RMNCH priorities. Currently, GSMA has published 10 country-specific feasibility reports: Côte d'Ivoire, Ghana, Kenya, Malawi, Mozambique, Nigeria, South Africa, Uganda, United Republic of Tanzania and Zambia.

Useful features: Project teams can search by country to gain an overview of the ICT infrastructure using information on mobile phone penetration, unique mobile subscribers and technology channels available (e.g. unstructured supplementary service data or USSD, SMS, etc.), availability of mobile network operators (MNOs) and existing mHealth deployments.

<http://www.gsma.com/mobilefordevelopment/programmes/mhealth/resources>



Health Enabled African Digital Dashboards (HealthEnabled, 2015)

These one-page country dashboards highlight the national eHealth systems of selected countries in Africa.

Useful features: This resource provides a snapshot of key information related to eHealth policies, strategic priorities and in-country deployments and resources.

<http://healthenabled.org/en/about-healthe-africa/country-dashboards>

The links below provide online resources that can be used to map the mHealth landscape across geographic areas in order to plan strategically and identify areas for collaboration and differentiation.

mHealth Database (United States Agency for International Development, African Strategies for Health)

This database presents an electronic version of the mHealth Compendium series and contains information on mHealth deployments, with a heightened focus on those operating in Africa.

Useful features: mHealth project teams can filter through projects based on geographic location, specific health areas or problems, and important results or evaluation findings.

<http://www.africanstrategies4health.org/mhealth-database.html>

Center for Health Market Innovations (CHMI) Health Program Database

This platform contains information on more than 1400 innovative (although not necessarily mHealth) health enterprises, non-profit organizations, public-private partnerships and policies.

Useful features: Project teams can add their own details to the repository by creating a programme profile; they can also search for other initiatives by country and health focus.

<http://healthmarketinnovations.org/programs>

mHealth Working Group Inventory (mHealth Working Group)

This online inventory registers mHealth projects globally with the aim of strengthening collaborations across members of the working group.

Useful features: Project teams can download a spreadsheet containing all compiled projects while also easily submitting their projects for addition to the inventory.

<https://www.mhealthworkinggroup.org/projects/mhealth-working-group-inventory-projects>

The GSMA mHealth Tracker (GSMA)

The GSMA mHealth Tracker lists planned and existing mHealth deployments globally.

Useful features: This site has an interactive map – projects can directly select a country to view the different deployments registered for that country.

<http://www.gsma.com/mobilefordevelopment/programmes/mhealth/mhealth-deployment-tracker>

ITU Global eHealth Projects Repository (WHO–ITU)

This joint effort presents information on validated eHealth projects that demonstrate the effective use of ICT for health.

Useful features: Project teams can view details on submitted projects and can also submit projects to the repository.

<http://www.itu.int/en/ITU-D/ICT-Applications/eHEALTH/Pages/gehealthprojects.aspx>

mRegistry.org (WHO HRP, JHU-GMI, UNICEF, mPowering Frontline Health Workers)

This repository lists mHealth projects with the primary objective to assist government decision-makers to identify and coordinate existing implementations in their countries.

Useful features: Users can submit projects using a standard framework and can view implementations in their geographic areas.

<http://www.mRegistry.org>

The mHealth Compendium

This document is an annual technical publication providing case studies on selected mHealth initiatives, focusing primarily on deployments in Africa but also extending to other regions.

http://www.africanstrategies4health.org/uploads/1/3/5/3/13538666/mhealthvol5_final_15jun15_webv.pdf



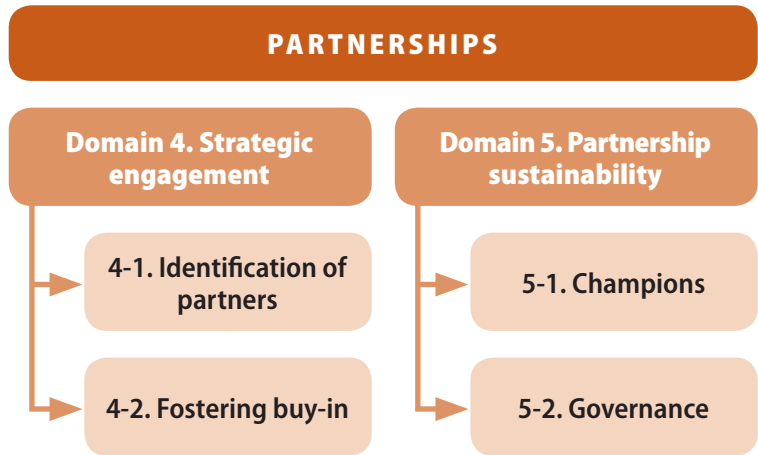
AXIS 2. PARTNERSHIPS



A. Thematic overview

Partnerships: Collaborations with external groups to support the process of scaling up, including strategies for identifying, developing and sustaining fruitful partnerships

Strong, sustainable partnerships are essential for successfully scaling up an mHealth product, and for determining its capacity to make lasting improvements in the health system. Since mHealth represents the intersection of the health, technology and business sectors, increasing its scale will involve a wide range of external groups. Successful partnerships will bring together diverse skills, services, strategies, lessons learnt, audiences and ideas; all with a common goal in mind.²³ However, the process of achieving and maintaining dedicated, productive collaborations is no easy task. Strategic decision-making is required at many stages throughout the partnership's development to avoid the fault lines that threaten a project's trajectory.



▶ DOMAIN 4: STRATEGIC ENGAGEMENT



When engaging with strategic partners, the first step involves **identification of partners** that have the diversity of expertise and services to complement project needs. Such decisions demand careful reflection on the types of competencies held by the project team itself,

and the areas requiring external guidance or resources. Collaborations often involve one or two **core partners** that are critical to pursuing the chosen endgame strategy. A range of additional strategic partners will fill important roles; examples include local community-based organizations (CBOs) to provide implementation support, and research partners to assist with monitoring and evaluation.²⁴ Additional partners will also include local stakeholders, e.g. community councils or leaders, whose approval is critical to build the credibility needed to scale up the programme.

A central feature of establishing partnerships involves **fostering buy-in** for scaling up the mHealth product. This will involve critically assessing each potential partner's notion of value, and then determining the **value proposition** of the product for each one. For example, government officials will be more inclined to adopt and integrate an mHealth product that offers efficiency and coverage improvements relative to the status quo approaches, and that addresses priorities in the national health strategy. MNOs may define value as a product that has potential to increase financial revenue through enhancing brand awareness or attracting new customer segments. Project teams must make an effort to link the anticipated outcomes of the mHealth product to the organizational goals of their partners, thereby fostering greater buy-in and paving the way to mutually beneficial collaborations. Table 3 outlines additional examples of partners' distinct notions of value.



CORE PARTNERS

Those that are essential to the pursuit of the project's endgame. For example, government adoption calls for close partnering with the ministry of health or other government entities, while commercial adoption will require projects to place a stronger emphasis on private sector partners, such as a mobile network operator (MNO) or technology vendors.

VALUE PROPOSITION

The promoted utility of the product for a given stakeholder.

Table 3: Examples of value propositions

POTENTIAL PARTNER	NOTION OF VALUE
MOH or other government entity	Relevance to national health strategy, value for money, health, system benefits, reduced health expenditure
MNO	Return on investment, brand awareness, new customer segments
Field-level NGO/CBO	Alignment with mission, clinical outcome, cost-effectiveness, problem-solving
End-users	Perceived benefit, usability
Donors	Potential for health outcome or population benefit, sustainability
Academia	Notable outcomes, potential for publication
Insurers	Reduced health expenditures

► **DOMAIN 5: PARTNERSHIP SUSTAINABILITY**



Once partnerships have been established, it is critical that project teams establish mechanisms to help sustain the partnership over the long term. One particularly effective strategy includes cultivating **champions** in different partner organizations. By advocating for the mHealth product internally, champions will help to increase the commitment of their organizations to its scaling up, and help to maintain momentum when challenges emerge. It is critical that champions are aware of their scope of work during the scaling-up process; this may require the project team to provide training, orientation, clear mandates, support for organizing meetings and/or relevant policy support, as needed.

Another key element that underpins partnership sustainability is the establishment of effective **governance** structures. Mechanisms for ensuring an inclusive planning process should be established formally early on; this is likely to involve a representative steering committee or decision-making board, a regular schedule of meetings, and mechanisms for transparency and accountability. The committee or board will help to build trust among key partners, foster a sense of ownership and ideally preclude disagreements or power struggles down the line. Another imperative of good governance involves the documentation of partnership terms. This includes formal collaboration agreements (e.g. a memorandum of understanding or MoU) to define the distribution of roles and responsibilities within a partnership, and contracts for vendor relationships.



CHAMPIONS

Charismatic opinion leaders who advocate for a particular programme, policy or technology. Champions are characterized by their “passion, persistence and persuasiveness”.¹

B. Self-assessment questions

► DOMAIN 4: STRATEGIC ENGAGEMENT (48 POINTS)

The development of partnerships with external groups that contribute the skill sets, expertise, services and/or other essential components needed for scaling up

4-1a. Have the types of collaboration that will be necessary during the scaling-up process been determined? (9 points)

	NO	IN PROGRESS	PERFORMED	DOCUMENTED	POINTS EARNED
i) We can clearly define our project team's internal competencies, and based on these considerations, can identify our external need for partners	0	1	2	3	___
ii) We have decided on the types of individuals and institutions that we will need to partner with to meet those needs	0	1	2	3	___
iii) We have determined the stages in the scaling-up process or timing when those outside partners are relevant or necessary	0	1	2	3	___
Total points earned (out of a possible 9)					<input type="text"/>

4-1b. Have relationships been developed with partners/vendors that fulfil the following needs, as appropriate? (27 points)

	NO	IDENTIFIED	INFORMAL PARTNERSHIP	FORMAL PARTNER WITH AGREEMENT	N/A	POINTS EARNED
i) MOH/government entities	0	1	2	3	X	___
ii) Financing partner(s)	0	1	2	3	X	___
iii) MNOs or aggregator	0	1	2	3	X	___
iv) Implementation partner(s) (e.g. NGO, CBO)	0	1	2	3	X	___
v) Technology partner(s) (e.g. software developer)	0	1	2	3	X	___
vi) Service provider(s) (e.g. hardware vendor)	0	1	2	3	X	___
vii) Marketing/communications partner	0	1	2	3	X	___
viii) Evaluation or research partner	0	1	2	3	X	___
ix) Partner/advisor for health content	0	1	2	3	X	___
Total points earned (out of a possible 27)						<input type="text"/>

4-2. Has the value of the mHealth product been communicated to partners? (12 points)

	NO	IN PROGRESS	PERFORMED	DOCUMENTED	POINTS EARNED
i) We are able to articulate the value proposition (i.e. the advantages of the mHealth product compared with alternatives) specifically to each partner	0	1	2	3	___
ii) We have communicated the ways in which the mHealth product is aligned with partner priorities (e.g. evidence, cost-effectiveness, financial returns, brand equity)	0	1	2	3	___
iii) We have communicated the relevance of the mHealth product to local health needs and government priorities	0	1	2	3	___
iv) We have communicated the relevance of the mHealth product to global health concerns (e.g. Millennium Development Goals, Sustainable Development Goals, universal health coverage, etc.) or multicountry donor initiatives	0	1	2	3	___
Total points earned (out of a possible 12)					<input type="text"/>

► DOMAIN 5: PARTNERSHIP SUSTAINABILITY (50 POINTS)

The establishment of mechanisms will help to sustain partnerships as new challenges emerge during scaling up

5-1a. Have specific champions been fostered and developed among core partners, as needed? (9 points)

	NO	IN PROGRESS	PERFORMED	DOCUMENTED	POINTS EARNED
i) We have identified the areas in which champions will be valuable to scaling up	0	1	2	3	___
ii) We have developed relationships with those champions	0	1	2	3	___
iii) We have identified the times at which support from champions will be most essential	0	1	2	3	___
Total points earned (out of a possible 9)					<input type="text"/>

SAQs 5-1b and 5-1c elaborate on the development of champions, as identified in the previous question. If the responses to either of the first two items in 5-1a is "No" (0 points), then 5-1b and 5-1c should be skipped. The total number of possible points earned will be adjusted on the scoring sheet to account for these changes.

5-1b. For one of the champions identified in SAQ 5-1a, does he/she have the capacity necessary to advocate for the mHealth product? (10 points)

	NO	YES	POINTS EARNED	N/A
i) Champion(s) have decision-making capabilities and authority	0	2	___	If SAQ 5-1b is not applicable, write "0" in box below.
ii) Champion(s) have stability in current position	0	2	___	
iii) Champion(s) have organizational support and relevant resources (e.g. financial, political, in-kind human resources)	0	2	___	
iv) Champion(s) are aware of their responsibilities and scope of work during the scaling-up process	0	2	___	
v) Champion(s) have demonstrated their commitment to the product and ability to advocate for it through previous efforts	0	2	___	
Total points earned (out of a possible 10)			<input type="text"/>	<input type="text"/>

5-1c. For a second champion identified in the previous question, does he/she have the capacity necessary to advocate for the mHealth product? (10 points)

	NO	YES	POINTS EARNED	N/A
i) Champion(s) have decision-making capabilities and authority	0	2	___	<i>If SAQ 5-1c is not applicable, write "0" in box below.</i>
ii) Champion(s) have stability in current position	0	2	___	
iii) Champion(s) have organizational support and relevant resources (e.g. financial, political, in-kind human resources)	0	2	___	
iv) Champion(s) are aware of their responsibilities and scope of work during the scaling-up process	0	2	___	
v) Champion(s) have demonstrated their commitment to the product and ability to advocate for it through previous efforts	0	2	___	
Total points earned (out of a possible 10)			<input type="text"/>	<input type="text"/>

5-2a. Have mechanisms for inclusive planning been established with partners? (12 points)

	NO	IN PROGRESS	PERFORMED	DOCUMENTED	POINTS EARNED
i) A steering committee or decision-making board that is representative of partners, as appropriate, has been created	0	1	2	3	___
ii) There is a regular schedule of meetings among committee/board representatives	0	1	2	3	___
iii) Terms of reference have been established to guide the structure and decision-making processes of the committee/board, and these terms are understood by all	0	1	2	3	___
iv) Mechanisms are in place to consistently elicit feedback from partners	0	1	2	3	___
Total points earned (out of a possible 12)					<input type="text"/>

5-2b. Has a common understanding of the key components of the scaling-up process been established with core partners? (9 points)

	NO	IN PROGRESS	PERFORMED	DOCUMENTED	POINTS EARNED
i) Agreement has been reached on the project vision	0	1	2	3	___
ii) Agreement has been reached on the scope and goals of scaling up (as specified in SAQ 1-1)	0	1	2	3	___
iii) Agreement has been reached on the general approach and timeline of activities for scaling up (e.g. joint workplan)	0	1	2	3	___
Total points earned (out of a possible 9)					<input type="text"/>



Axis 2. Partnerships scorecard

► DOMAIN 4: STRATEGIC ENGAGEMENT (48 POINTS)

SAQ 4-1a. Have the types of collaboration that will be necessary during the scaling-up process been determined?	_____ / 9 points
SAQ 4-1b. Have relationships been developed with partners/vendors that fulfil the following needs, as appropriate? <i>If you responded N/A to any of the response items, you should deduct 3 points per response item from the total possible denominator of 27. For example, if you responded N/A twice within this question, your denominator would be 21 (3 multiplied by 2 [6], subtracted from 27).</i>	_____ / 27 points
SAQ 4-2. Has the value of the mHealth product been communicated to partners?	_____ / 12 points
Domain 4 total	_____ / 48 points
Domain 4 percentage: Domain total divided by 48 or less (see note above), then multiplied by 100	_____ %

► DOMAIN 5: PARTNERSHIP SUSTAINABILITY (50 POINTS)

SAQ 5-1a. Have specific champions been fostered and developed among core partners, as needed?	_____ / 9 points
SAQ 5-1b. For one of the champions identified in SAQ 5-1a, does he/she have the capacity necessary to advocate for the mHealth product? <i>If you responded N/A to this question, the denominator is 0 points.</i>	_____ / 10 or 0 points
SAQ 5-1c. For a second champion identified in the previous question, does he/she have the capacity necessary to advocate for the mHealth product? <i>If you responded N/A to this question, the denominator is 0 points.</i>	_____ / 10 or 0 points
SAQ 5-2a. Have mechanisms for inclusive planning been established with partners?	_____ / 12 points
SAQ 5-2b. Has a common understanding of the key components of the scale up process been established with core partners?	_____ / 9 points
Domain 5 total	_____ / 50 points
Domain 5 percentage: Domain total divided by 50 or 30, then multiplied by 100	_____ %

Domain 4 percentage _____ %

Domain 5 percentage _____ %

Add percentages together and divide by 2 for your Axis 2 score.

**AXIS 2
SCORE:** _____ %

C. Planning and guidance



This section can assist in planning next steps by . . .

- ✓ Highlighting how to alleviate the challenges inherent in developing partnerships, such as the protracted processes of engagement and ambiguity of roles and responsibilities
- ✓ Flagging commonly encountered obstacles, such as time constraints, when negotiating hierarchies within different organizations to obtain decisions, and balancing the demands of project implementation with the time needed to manage evolving networks of partners
- ✓ Offering guidance on strategic moves, such as conveying the value of the mHealth product and securing effective champions
- ✓ Providing resources that elaborate on strategies for engaging with core partners, such as MNOs and government stakeholders

► DOMAIN 4: STRATEGIC ENGAGEMENT



Tips and considerations

Map landscape of partners based on competencies and strategic interests

When identifying the skill sets that need to be met by external individuals or groups, project teams should carefully review the local landscape to assess which partnerships will best address their needs. It is important to remember that a valuable partner should be assessed for both their competencies and their more nuanced strategic assets. Such assets include visibility, brand equity, reputations, track record, links to established networks (e.g. in-country technical working groups) and access to critical gatekeepers (e.g. authorities whose approval is required).



Lessons from the field

Engage continuously

Ongoing, sustained efforts are critical to active engagement with partners, as the lengthy negotiations involved often require enormous time commitments on the part of dedicated staff. This includes time for maintaining dialogue on implementation activities and conducting regular visits to core partners' offices, when possible. The Mobile Alliance for Maternal Action (MAMA) South Africa team (consisting of Cell-Life, Praekelt Foundation, and Wits Reproductive Health and HIV Institute) pursued this strategy by making a consistent effort to raise awareness of their stage-based SMS service as the initiative was being rolled out across South Africa. The team discussed their various projects continually with representatives from the National Department of Health. When the Department was eventually searching for a national maternal mHealth programme, the MAMA project was readily identified. While this process required a significant investment of staff time, these efforts paid off when the MAMA project became institutionalized into the national MomConnect initiative.





Tips and considerations

Start early

The engagement process can be complicated by unpredictable time frames related to staff turnover in partner organizations, delays related to formalizing the partnerships, navigating regulatory policies and reviewing legal documents such as vendor contracts and MoUs. For example, one project reported waiting six months for an institutional decision to establish a formal partnership. Such external dependencies can make it difficult for projects to dedicate sufficient time and resources to align with proposed budget constraints and project plans. Allocating contingency funds to building partnerships or establishing a specific position to fulfil this role may alleviate some of these constraints. Another strategic move is to start the negotiation process early in order to shorten the time lag between obtaining formal agreements and launching the service.

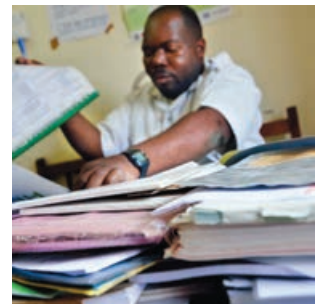


Lessons from the field

Convey the value to your partners: What will they get? What will they give?

Articulating the value of the mHealth project and the benefits of collaboration will help foster buy-in from potential partners. The notion of value can be thought of as a combination of gives and gets; i.e. an understanding of what a partner will be expected to give, and what a partner may expect to receive in return. While value is commonly interpreted as financial returns, it may take many other forms. For government partners, the value can derive from improving the reliability and timeliness of data for monitoring health service delivery and demonstrating a health impact. Other private sector partners (such as MNOs) see value in establishing brand awareness and gaining loyalty from existing customers.

For example, India's Society for the Elimination of Rural Poverty (SERP) developed its mobile Nutrition Day Care Centres (mNDCC) tool to compile updates on immunizations, antenatal care, postnatal care, nutrition and growth monitoring. The mNDCC appealed to the government since it enabled health workers to collect essential nutrition and growth monitoring information in real-time and feed that data automatically into dashboards and reports accessible to supervisory bodies. After observing the discrepancies between paper reports and the frequently updated mNDCC, the Social Empowerment Mission of the government, headed by the health department, proposed to adopt the mNDCC as the sole data source for monitoring progress towards health indicators. From July 2015 and in collaboration with the World Bank, the government has promoted the expansion of mNDCC to 6000 additional villages in Andhra Pradesh.



Tips and considerations

Evaluate the political dynamics and capacity among partners

The strength and sustainability of partnerships during scaling up hinges on a shared understanding of the project's direction and the capacity of the partners involved. Implementers should consider carefully the features of long-term partners, including political dynamics, the strengths and weaknesses of stakeholders and their competing interests, especially in relatively new domains such as eHealth and mHealth. For example, disagreements may occur within a ministry as to which department will be responsible for overseeing the process of scaling up. If projects do not understand and address such issues, they may find the chosen department lacks the proper resources or mandate, and this will ultimately reverse the progress of previous efforts.



Tips and considerations

Diversify partners to reduce over-reliance

Diversification is encouraged as a way of facilitating a wide range of skill sets and promoting synergies in implementation. In addition, such diversification will reduce over-reliance on a single partner. Project teams must keep track of any potential dependencies on any one external vendor since this may create a dependency that could have negative repercussions on the programme. For example, some projects may have their financing source linked to their technology vendor, making the project completely dependent on this partnership and limiting the project's capacity to objectively determine the type of technical capacity required. While these types of arrangements may not be entirely avoidable, projects seeking to increase their scale should be cautious of the potential limitations.

▶ DOMAIN 5: PARTNERSHIP SUSTAINABILITY



Tips and considerations

Identify effective champions

Although projects may not have complete control of the types of champions that are accessible within partner organizations, it is critical to assess factors such as the champion's degree of authority, decision-making ability and the stability of his or her position. For example, if a champion was politically elected or appointed, then the possibility of term limits must be acknowledged. Often, there may be a trade-off between the position's permanence and the champion's level of influence, and projects must consider such variables. In this context, identifying a backup or team of champions is one way of limiting the potential disruptions to the partnership that may follow staff turnover or structural changes within the institution.



Lessons from the field

Position government at the forefront of in-country coordination

Steering committees and decision-making boards are one means of ensuring coordination across different partners, and these mechanisms may be strengthened further through government leadership. Experiences from the Clinton Health Access Initiative (CHAI) Malawi's Rapid SMS programme recommend positioning the MOH as the convener of meetings and the lead for partner coordination. CHAI Malawi recalls that this government representation encouraged other partners, including CBOs and local implementers, to be accountable to a central institution. A government-led steering committee effectively used the ministry's hierarchal structures to facilitate partnerships at the local (district) level.

A similar approach was used by Rwanda's MOH eHealth Technical Working Group (TWG). The eHealth TWG is convened by the national eHealth coordinator and is composed of technical staff members from the MOH, implementing partners, nongovernmental organizations (NGOs), donors and other government stakeholders including the ministry responsible for youth and ICT, and the Rwanda Development Board. The TWG meets twice a month and serves as a forum to plan, discuss and approve current eHealth initiatives and revise any new implementations proposed to the MOH. These meetings include discussions on how the new eHealth and mHealth efforts relate to national strategies and systems, the technology to be introduced and, most importantly, the implementation plan and partnerships involved.



Tips and considerations

Outline the terms of engagement carefully

A clear delineation of the terms of engagement can potentially offset challenges to the stability of the partnership and improve the likelihood of sustainability throughout many years of scaling up. A general recommendation is to create documentation (such as an MoU) that carefully articulates the following features of a partnership:

- mutual roles and responsibilities (e.g. what is expected from each party)
- ownership of the product (e.g. clarity on the intellectual property and licensing)
- commitment of human and/or financial resources
- guidelines on branding, if appropriate.

Private sector partnerships, such as those involving technology vendors and MNOs, may require legal review to clarify details on billing agreements and the scope of work. For example, some partners may operate on a fixed deliverable schedule, in which payment is made based on the agreed finalization of the product, while others prefer payments based on the time and materials invested. Legal review of these kinds of terms will help to prevent disagreements that could jeopardize the sustainability of the partnership.



Resources

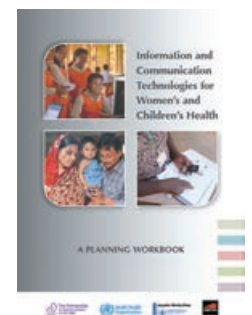
The following resources provide greater detail on strategies for engaging with key partners, such as government stakeholders and MNOs.

Information and Communication Technologies (ICTs) for Women's and Children's Health: A Planning Workbook (PMNCH, 2014)

This workbook aims to facilitate multistakeholder discussions by identifying and planning for the key considerations and barriers in the use of ICT for RMNCH from the government perspective.

Useful features: The tool offers a series of assessment questions to gauge the country's readiness to adopt eHealth/mHealth strategies, and outlines areas for dialogue with government stakeholders for negotiating implementations and partnerships.

http://www.who.int/pmnch/knowledge/publications/ict_mhealth.pdf

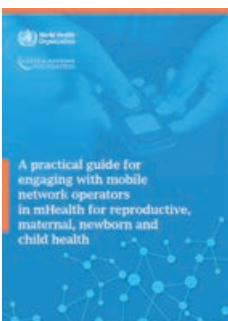


A Practical Guide for Engaging with Mobile Network Operators in mHealth for RMNCH (WHO & UNF, 2015)

Written with perspectives from MNOs and mHealth service providers, this guide aims to help the global health community assess whether and how to engage with MNOs.

Useful features: This resource contains a set of targeted considerations (proof points) on how mHealth service providers should articulate the value of the project to MNOs.

http://www.who.int/reproductivehealth/topics/mhealth/digital_health_products/en/





Mutual Value, Mutual Gain: Best Practices from Successful Social Sector Partnerships with Mobile Network Operators (GSMA mWomen, 2014)

This resource highlights lessons and best practices for non-profit and social sector organizations to negotiate partnerships and establish a shared value proposition with MNOs.

Useful features: Along with other general guidance on engaging MNOs, this document provides insights on how to decide whether to partner with MNOs or with aggregators, and offers practical strategies for making the initial contact with the sought partner.

http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2014/06/mWomen_Partnerships_Insights_Paper_v3_FINAL.pdf



Scaling Up Mobile Health: Developing mHealth Partnerships for Scale (Advanced Development for Africa, ADA, 2013)

This compilation of case studies documents projects that have scaled up mHealth across Africa and lists factors that contributed to the strengthening of their partnerships.

Useful features: The varied experiences from projects is used to inform recommendations for how to address common challenges to partnerships, such as weak or absent eHealth/mHealth policies, and limited guidance on technology integration and financing mechanisms.

http://www.adaorganization.net/uploads/2/3/7/1/23713723/developing_mhealth_partnerships_for_scale_printer_friendly_low.pdf

Although guidance for developing sustainable partnerships is context-specific, a few of the resources listed below provide useful overviews of the different coordination mechanisms and suggestions for how to outline the terms of engagement.



Fifty Tips for Your Statement of Work (Miller, 2007)

This contract management brief is not mHealth specific, but it provides a detailed list of general questions and considerations for developing terms of engagement with partners.

Useful features: Implementers can use the checklist of practical recommendations to draft a scope of work and highlight issues that need to be discussed when delineating roles and responsibilities.

<http://www.gokremtekir.com/wp-content/uploads/2014/06/SOW-Sample.pdf>



ICT4SOML: Leveraging ICTs to Save the Lives of One Million Women and Children in Nigeria Situation Analysis (UNF, 2013)

This publication explores the enabling environment in Nigeria and provides an example of a coordination structure used to identify gaps in health services and the role of ICT in overcoming the outlined challenges.

Useful features: Although this document focuses on a single country, the chapter on the mHealth Alliance provides a generic description of the roles and responsibilities that can be expected from a neutral coordinating body.

http://wiki.hl7.org/images/5/5c/SOML_Situational_Analysis_FINAL_20130909.pdf



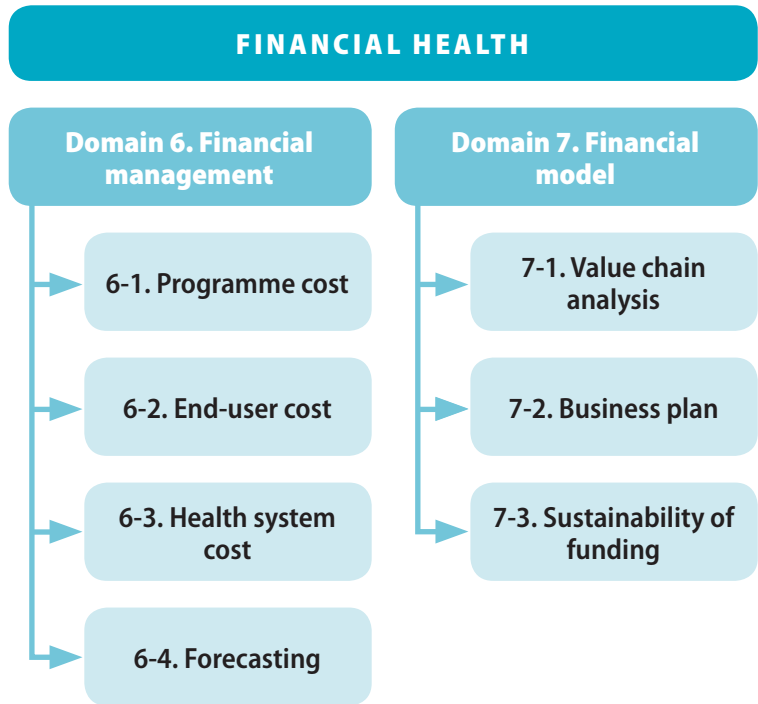
AXIS 3. FINANCIAL HEALTH



A. Thematic overview

Financial health: The projection of scale-up costs, and the development of a financial plan for securing and managing funds over the long term

Sustainable financing is fundamental to the capacity of an mHealth project to increase its scale, yet it is often the most difficult part of the process. The considerations and skills involved in developing sustainable financing mechanisms are complex, and require project team members with robust financial skill sets to plan for and execute viable financial models. When thinking through financial health, project teams should first begin with a thorough assessment of the diverse types of costs associated with scaling up, especially those that are not readily observable. In addition, project teams must create a business model that adds value to all stakeholders, and attracts reliable financing streams to sustain project activities.



▶ DOMAIN 6: FINANCIAL MANAGEMENT



The first step to managing a project’s financial health is to understand the costs of operating at the current level of implementation, and then to forecast future costs. Project teams must consider the costs of the mHealth product from a programme perspective, a user perspective and a health system perspective in order to fully capture the costs that will be associated with scaling up.

In terms of **programme cost**, strong financial management entails the ability to track expenditures, categorize costs and estimate how costs during scaling up will vary from pilot phase costs. The project team should differentiate between **recurring fixed costs**, **variable costs** and one-time **capital costs**, and create a budget that reflects these categories. Furthermore, projects should attempt to quantify any in-kind contributions they may receive from other organizations, and identify cost-share opportunities (i.e. differentiating between costs that will be covered by the project team itself and costs that may be covered by other stakeholders). Project teams should also keep in mind that drafting a budget should not be a one-off event. Budgets should be revisited regularly since funding, assumptions and activities can all change. Regular review will assist project teams to plan appropriately for increasing their scale and managing resources efficiently.

Next, the project team must consider **end-user cost**, or the cost incurred by the user, which includes technology costs (e.g. mobile devices, airtime) and non-technology costs (e.g. costs associated with seeking services promoted by the mHealth product, or cost savings resulting from receiving information through a mobile device). These end-user costs have implications for the feasibility of scaling up, and calculating them will help project teams anticipate any economic barriers to widespread user adoption.



PROGRAMME COSTS

Recurring fixed costs

Overhead expenses that are not dependent on the scale of the operation (e.g. general administrative costs, rent).

Variable costs

Costs that change according to the level of scale (e.g. training, maintenance, community mobilization activities).

Capital costs

Fixed, one-off expenses that are necessary to bring a project to operational status (e.g. software development, purchase of office space, equipment, licenses).

Finally, from the perspective of **health system cost**, it will be important for the project team to collaborate with stakeholders in the health sector. This will help them anticipate changes in the demand for services that may follow when the product is scaled up. Such changes will have a ripple effect and are likely to affect the workload of health workers and additional providers (e.g. clinicians may need more time for additional antenatal care visits) as well as the supplies and commodities required to meet increased demand. By capturing these anticipated changes within the health system and service/care delivery, project teams will build a more precise picture of the costs and benefits of scaling up.

Once the project team has defined these three levels of cost, they may harness this knowledge as the basis for **forecasting** the economic costs of scaling up. Forecasting first and foremost requires an analysis of the total cost of ownership (TCO), which estimates the total cost of the product, including raw materials, supplies, labour and other related overheads. Yet forecasting does not simply involve extracting figures from a budget. Instead, it calls for judicious and creative thinking to address several concerns. These include determining the key cost drivers, which are factors that cause programme, end-user or health system costs to change, such as mobile phone penetration and user demand. In addition, project teams must identify where cost savings could be achieved, and think through the assumptions and corresponding risks that could affect projects. Considerations like these will help project teams construct a more realistic view of the costs of scaling up, and prepare them better to avoid financial setbacks that may emerge over time.

► DOMAIN 7: FINANCIAL MODEL



The development of a strong financial model is the second step in ensuring the financial health of an mHealth product. This process begins with **value chain analysis** for relevant stakeholders. A sustainable financial model requires all stakeholders to derive some type of benefit or utility from their investments in order to incentivize the contribution of resources. A value chain analysis is a useful exercise for exploring and documenting the interests of potential **payers**. The perceived utility of the product, or value proposition, may be financial (e.g. increased revenue) or non-financial (e.g. improved brand recognition, more efficient delivery of services). An understanding of these key interests will help the project teams design a sustainable financial model within which all stakeholders believe that the benefits they get from contributing to scaling up outweigh the benefits they could get by investing resources elsewhere.²⁵

Next, project teams must develop a comprehensive **business plan** to guide project operations. In addition to articulating the value proposition, key components of an effective mHealth business plan include a goals statement, a resource mobilization plan, a marketing plan and a product improvement strategy. Just like the budget, the business plan should be a dynamic document that is revisited regularly and modified as the funding situation, policy context and other parameters change over time. A clear business plan will not only help to attract long-term financing partners from the public and private sectors, but will also serve as an internal management and planning tool to keep the project on track to meet its targets for scaling up.

Finally, to ensure the **sustainability of funding**, project teams will be required to seek out and secure different types of funders and payers (e.g. end-users, grants, government support, private sector support or public-private partnerships) to reduce over-reliance on a single payer. In addition to identifying key payers, projects should identify and engage alternative payers to cover themselves in the event that primary payer partnerships come to an end. In this way, project teams may build contingency plans to increase the likelihood of financial sustainability.



VALUE CHAIN ANALYSIS

An evaluation of the relationships between relevant stakeholders based on the product's value proposition ("the promoted utility of the product") from each stakeholder's perspective.¹²

PAYERS

Payers are entities that are willing and able to pay for or reimburse specific products or services. This differs from a funder, which provides financing to set up or grow programmes. For example, MNOs who subsidize SMS costs can be considered as payers of the mHealth product.

B. Self-assessment questions

► DOMAIN 6: FINANCIAL MANAGEMENT (45 POINTS)

The understanding, assessment and projection of costs that will be associated with scaling up the mHealth product

6-1. Is there a solid understanding of the costs, from a programme perspective, to execute the project at its current scale? (18 points)

	NO	IN PROGRESS	PERFORMED	DOCUMENTED	POINTS EARNED
i) A mechanism for tracking expenditures, according to the phase of implementation, is in place	0	1	2	3	—
ii) We have captured costs according to the phases of implementation (i.e. development, pilot, scaling up)	0	1	2	3	—
iii) We have categorized costs in terms of one-time capital costs, recurring costs and variable costs	0	1	2	3	—
iv) We have quantified in-kind contributions and other intangible assets (e.g. office space, Internet)	0	1	2	3	—
v) We have explored cost-share opportunities	0	1	2	3	—
vi) A protocol is in place to regularly revisit and revise budgets as funding, assumptions and/or activities change	0	1	2	3	—
Total points earned (out of a possible 18)					<input type="text"/>

6-2. Is there a solid understanding of the cost (if any) to the end-user or programme beneficiaries? (6 points)

	NO	IN PROGRESS	PERFORMED	DOCUMENTED	POINTS EARNED
i) We have considered technology costs incurred by users (e.g. mobile device, airtime, etc.)	0	1	2	3	—
ii) We have considered non-technology costs incurred by users (e.g. care-seeking and/or engagement)	0	1	2	3	—
Total points earned (out of a possible 6)					<input type="text"/>

6-3. Is there a solid understanding of the cost (if any) to the health system? (9 points)

	NO	IN PROGRESS	PERFORMED	DOCUMENTED	POINTS EARNED
i) We have estimated increased demand for care as a result of the mHealth project activities and the resulting additional workload on providers (e.g. time spent filling out electronic registers, etc.)	0	1	2	3	—
ii) We have estimated the increased cost of health workers' time as a result of mHealth project activities	0	1	2	3	—
iii) We have estimated the additional costs of commodities, equipment and/or supplies as a result of the mHealth project activities	0	1	2	3	—
Total points earned (out of a possible 9)					<input type="text"/>

6-4. Have the potential economic costs for scaling up the mHealth project been forecasted? (12 points)

	NO	IN PROGRESS	PERFORMED	DOCUMENTED	POINTS EARNED
i) We have identified the total cost of ownership (including hardware, software, equipment, training, support, marketing, staff, etc.) over the next five years, to reach our projected units of scale (Factor 1-1.)	0	1	2	3	___
ii) We have identified key drivers of cost associated with scaling up the project	0	1	2	3	___
iii) We have identified areas for achieving economies of scale or other means of cost savings	0	1	2	3	___
iv) We have outlined the key assumptions and corresponding risks in forecasting economic costs	0	1	2	3	___
Total points earned (out of a possible 12)					<input type="checkbox"/>

► DOMAIN 7: FINANCIAL MODEL (36 POINTS)

The analysis of the value proposition for each stakeholder and the identification of revenue streams capable of sustaining project activities

7-1. Has the value that the mHealth product delivers to stakeholders, as compared to existing alternatives, been demonstrated? (12 points)

	NO	IN PROGRESS	PERFORMED	DOCUMENTED	POINTS EARNED
i) We have completed a value chain analysis to identify the key interests of potential payer ¹²	0	1	2	3	___
ii) We have quantified the tangible/monetary costs and benefits of the status quo (e.g. cost of materials)	0	1	2	3	___
iii) We have quantified the intangible/non-monetary costs and benefits of the status quo (e.g. efficiency, access to care)	0	1	2	3	___
iv) We can articulate our project's value proposition to each potential payer	0	1	2	3	___
Total points earned (out of a possible 12)					<input type="checkbox"/>

7-2. Has a comprehensive and logical business plan been developed to guide project operations and resource mobilization? (12 points)

	NO	IN PROGRESS	PERFORMED	DOCUMENTED	POINTS EARNED
1) We have conducted a comprehensive analysis of the resources necessary for reaching the goals of scaling up (Factor 1-1.)	0	1	2	3	___
ii) We have consulted with partners and other local stakeholders to develop our resource mobilization plan	0	1	2	3	___
iii) We have developed a marketing plan that can be sustained over time	0	1	2	3	___
iv) The business plan is available in a format that can be shared with partners	0	1	2	3	___
Total points earned (out of a possible 12)					<input type="checkbox"/>

7-3. Have strategic choices been made regarding partners who offer sustainable funding for scaling up? (12 points)

	NO	IN PROGRESS	PERFORMED	DOCUMENTED	POINTS EARNED
i) We have explored diverse funding streams (including opportunities with non-health sectors), and chosen the most strategic option(s) for our project	0	1	2	3	—
ii) We have identified payers and alternative payers at each level of the value chain	0	1	2	3	—
iii) We have developed plans to engage with main and alternative payers	0	1	2	3	—
iv) We have identified and mitigated risks for a transition plan for changing from one payer to another	0	1	2	3	—
Total points earned (out of a possible 12)					<input type="checkbox"/>





Axis 3. Financial health scorecard

► DOMAIN 6: FINANCIAL MANAGEMENT (45 POINTS)

SAQ 6-1. Is there a solid understanding of the costs, from a programme perspective, to execute the project at its current scale?	_____ / 18 points
SAQ 6-2. Is there a solid understanding of the cost (if any) to the end-user or programme beneficiaries?	_____ / 6 points
SAQ 6-3. Is there a solid understanding of the cost (if any) to the health system?	_____ / 9 points
SAQ 6-4. Have the potential economic costs for scaling up the mHealth project been forecasted?	_____ / 12 points
Domain 6 total	_____ / 45 points
Domain 6 percentage: Domain total divided by 45, then multiplied by 100	_____ %

► DOMAIN 7: FINANCIAL MODEL (36 POINTS)

SAQ 7-1. Has the value that the mHealth product delivers to stakeholders, as compared to existing alternatives, been demonstrated?	_____ / 12 points
SAQ 7-2. Has a comprehensive and logical business plan been developed to guide project operations and resource mobilization?	_____ / 12 points
SAQ 7-3. Have strategic choices been made regarding partners who offer sustainable funding for scaling up?	_____ / 12 points
Domain 7 total	_____ / 36 points
Domain 7 percentage: Domain total divided by 36, then multiplied by 100	_____ %

Domain 6 percentage _____ %

Domain 7 percentage _____ %

Add percentages together and
divide by 2 for your Axis 3 score.

**AXIS 3
SCORE:** _____ %

C. Planning and guidance



This section can assist in planning next steps by . . .

- ✓ Revealing commonly under-budgeted costs in order to enable project teams to gather realistic cost estimates for the mHealth product
- ✓ Highlighting considerations for minimizing expenditures as a means to develop more sustainable programme costs
- ✓ Showcasing examples of how project teams are seeking to overcome the challenges of the complex transition from short-term, grant-based financing to long-term modes of sustainable financing, by exploring business models and opportunities for incorporating new payers
- ✓ Presenting resources that organize the different threads of financial health, including a costing tool, guides for defining value proposition, and tutorials on mapping out the components of a business model

► DOMAIN 6: FINANCIAL MANAGEMENT



Tips and considerations

Explore potential hidden inputs when forecasting costs

To develop a thorough projection of costs, project teams first need to determine all the potential inputs that may be required. One way to identify less apparent costs is to reflect on the question of what another entity (such as the government) would require to fully implement the mHealth system. This question will lead projects to consider the following commonly overlooked costs:

- Costs associated with transitions to a new owner (e.g. MOH): During the process of government adoption, projects may need to embed their own staff in the ministry to build internal capacity for absorbing and managing the mHealth system. Transferring ownership to a new institution will incur additional costs due to such activities as meeting coordination, training reinforcement, and shifting the system to new servers.
- Costs of technology adaptations and integration: This includes projecting the costs of developing and modifying application programme interfaces (APIs)* while allowing flexibility (if possible) to refine the application as systems evolve. Implementers should also consider the cost implications of customizing and adapting the technology to align with the changing needs of the health system. This may include adapting the product for new health domains or geographic areas or general software updates, if applicable.
- Costs for advocacy and negotiation: Projects should take into account the potential need for lawyers in negotiating contractual arrangements with partners such as MNOs. They may also need to allow for expenses associated with meetings and travel to advocate for the mHealth service (see Axis 2 for further details).

* Sets of codes and tools that specify how to exchange information across different systems.



Tips and considerations

Consider opportunities for minimizing expenditures

Technology and training costs represent significant sources of programme expenditures in mHealth, thereby offering potential opportunities to minimize costs. The key areas to consider when looking to streamline and reduce costs while scaling up an mHealth product include the following:

1. **Technology** can be a significant expenditure. Project teams can look for ways to minimize this cost by first conducting a landscape analysis of existing application platforms that may satisfy their needs. Understanding what already exists and how it can be adapted may help teams avoid spending money on creating new software. In addition, the team should assess the fixed versus variable costs associated with open-source and proprietary software options. While open-source software is not necessarily completely free of charge, it is likely to be less expensive, since ongoing licensing fees are not required (see <http://www.trellon.com/content/blog/proprietary-software-vs-open-source-hidden-costs>).

On the other hand, while proprietary software may have more upfront costs associated with software development and maintenance, it may allow for greater accessibility to technical support. Projects should weigh the full range of cost implications for both options in order to make an informed decision on minimizing resources (e.g. cost, technical support) for the technological inputs.

2. **Training** programmes can be another major cost, particularly for products centred on health workers. Exploring a variety of training delivery mechanisms can help project teams select the most cost-effective approaches to capacity-building. For example, blended training is a novel approach in which mobile or electronic learning modules (available online and offline) supplement face-to-face training.

While it is important to minimize cost, projects should consider the consequences carefully and aim to avoid compromising the quality of implementation.

COST MODEL					
Data Type	per user / CHC per month	per user / CHC per year	All users / CHCs		
			per month	per year	pilot
Incoming SMS			0.83	9.94	9.94
Registration & opt out requests			0.83	9.94	9.94
Outgoing SMS			460.95	5,531.41	8,267.00
Reminders for patients	0.01	0.18	1.97	23.68	23.68
PP messages for patients	0.53	6.42	20.72	248.69	2,984.28
Reminders for nurses	2.70	32.45	37.86	454.31	454.31
Query responses for nurses	27.46	329.50	384.42	4,613.02	4,613.02
Decision making messages for nurses	1.14	13.69	15.98	191.71	191.71
GPRS (KB)			7	8.16	97.91
Patient Encounter Forms	0.46	5.53	6.46	77.48	77.48
Forms Error Exchanges	0.09	1.11	1.29	15.50	15.50
Nurse Queries	0.03	0.35	0.41	4.94	4.94
Voice: Incoming & outgoing (minutes)			3,052	36,623	36,623
PP messages	0.70	8.36	2,912.75	34,952.96	34,952.96
Call center registrations			32.34	388.08	388.08
Nurses' Support	1.86	22.28	26.00	311.95	311.95
User Support		0.23	80.85	970.20	970.20
Voice Incoming (minutes)					14,649
Voice Outgoing (minutes)					21,974
TOTAL COST			3,522	42,262	44,998
Assumptions					
Average Cost of SMS	Incoming	GHS	0.042	USD	0.03
	Outgoing	GHS	0.042	USD	0.03

Example of costing exercise conducted by MOTTECH in Ghana to estimate differences in using voice versus SMS

► **DOMAIN 7: FINANCIAL MODEL**



Lessons from the field

Explore different routes to financial sustainability

The process of building financial sustainability requires projects to experiment with different cost structures and value propositions. As an example, the NGO VillageReach explored four different types of financial models to assess their suitability to support the scaling up of the Chipatala cha pa Foni (Health Centre by Phone) hotline service in Malawi:

1. Collaborate through partnerships (e.g. with MNOs) to share the costs of scaling up nationwide activities.
2. Sustain the service completely on their own, without sharing costs with partners.
3. Use a so-called freemium model, in which standard features of the hotline service would be free of charge while users pay for additional features.
4. Develop a toolkit that would enable partners (government, CBOs and NGOs) to take on the system and replicate it in other districts.

After comparing the sustainability and feasibility of these options, VillageReach settled on the partnership model and, as a result, worked closely with the MOH and private sector. With the assistance of GSMA, VillageReach began to negotiate a zero-rating (no charge to subscribers) agreement with Airtel, offering a cost-sharing business model for the service.

As another example, the NGO FHI 360 developed various decision trees to determine viable mechanisms for transitioning Mobile for Reproductive Health (m4RH) from grant-based financing to more self-sustaining operations. In this context, the team tested a few options including an assessment of “willingness to pay” in Kenya and issuing an Expression of Interest in the United Republic of Tanzania to solicit offers from partners who would be able to maintain the cost of operations and potentially generate revenue from the service. Insights from these explorations will be shared through publications towards the end of 2015.

The following resources should be consulted for assistance with managing costs and defining financial models.



Resources

Sustainable Financing for mHealth (Vital Wave Consulting/ mHealth Alliance, 2010)

This publication addresses the ways in which mHealth implementers can develop business models that demonstrate shared value with stakeholders. It provides a series of case studies describing these value chain drivers and demonstrates how to derive complementary financing resources.



Useful features: The resource highlights commonly cited value propositions for a variety of stakeholders including government, project implementers, private sector, health workers, and clients and individuals. It also provides a list of critical questions that can be used to establish value propositions, and it highlights important considerations for aligning the gives and gets of the product (see Axis 2 for more information on the gives and gets).

<http://www.vitalwaveconsulting.com/insights/articles/2013/Sustainable-mHealth.htm>

Dimagi CommCare's Total Cost of Ownership Model (Dimagi, 2014)

This spreadsheet-costing tool helps organizations to track the cost of adopting CommCare for community health workers over a five-year period.

Useful features: The Excel workbook provides a template for budgeting mHealth implementations and can be customized to adjust for appropriate cost categories.
<https://confluence.dimagi.com/display/commcarepublic/Budgeting+for+a+Project>

Scale of Operations	Year 1	Year 2	Year 3	Year 4	Year 5
Number of CHWs using CommCare	100	200	300	400	500
# People covered per CHW	1,000	1,000	1,000	1,000	1,000

ADDITIONAL staff and office needed for CommCare	Units	Per # workers
Number of Project Managers per 100 CHWs	1	100
Number of Field Staff per 100 CHWs	2	100
Number of Offices per 100 CHWs	1	100

DETAILED PROJECTED COSTS	Unit Type	# of Units	Cost / unit (USD)
Annual Training Costs			
- Per CHW	%	100%	
- Initial Training Cost	\$/CHW per year	2	8.00
- Recurring Training Cost	\$/CHW per year	1	8.00
- Per Project Manager	\$/CHW per year	4	10.00
- Recurring Training Cost	\$/CHW per year	1	10.00
- Per Field Staff	\$/CHW per year	4	12.00
- Recurring Training Cost	\$/CHW per year	1	12.00



Preparing the Next Generation of Community Health Workers: The Power of Technology (Dalberg Global Development Advisors, 2012)

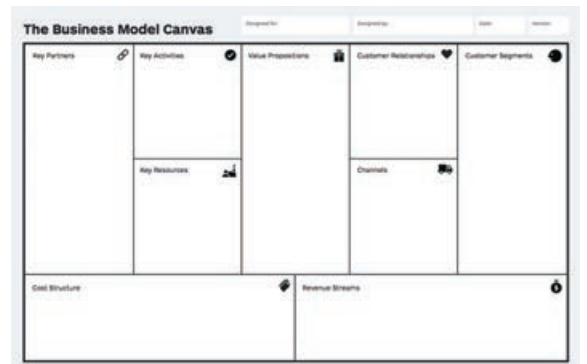
This technical report harnesses findings from more than 30 global health projects. It examines the opportunities for reducing training costs by using technology and alternative training methods.

Useful features: The document includes an appendix that compares the cost-effectiveness of different training methods and offers guidance on using blended training.
http://www.dalberg.com/documents/Power_of_Technology.pdf

Business Model Canvas (BMC) (Strategyzer, 2008)

This planning tool helps to organize the different components of a business model, which include key partners, activities, customer segments, revenue streams and cost structure.

Useful features: The poster canvas helps projects to articulate a goals statement and resource mobilization strategy in a way that can be fed into a business plan.
http://www.businessmodelgeneration.com/downloads/business_model_canvas_poster.pdf



The Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers (Osterwalder & Pigneur, 2009)

This handbook reflects the experiences of BMC users who have applied the planning tool and provides detailed descriptions of the key components on the canvas.

Useful features: For projects that have never undergone the process of generating a business plan, this resource breaks down the different concepts. For example, it defines key terms such as revenue streams and illustrates various options such as user fees, licensing, advertising, etc.
http://www.businessmodelgeneration.com/downloads/businessmodelgeneration_preview.pdf



The Value Proposition Design: How to Create Products and Services Customers Want (Strategyzer, 2014)

Created by the same set of authors, this resource expands on the BMC and provides a user guide explaining how to develop a value proposition.

Useful features: Through instructive graphics and concepts such as “pain relievers” (how the mHealth product addresses a problem) and “gain creators” (how to differentiate the service), the tool explains how to develop and enhance value propositions.
<https://strategyzer.com/value-proposition-design>



AXIS 4. TECHNOLOGY & ARCHITECTURE



AXIS 1.
GROUNDWORK

AXIS 2.
PARTNERSHIPS

AXIS 3.
FINANCIAL HEALTH

AXIS 4.
TECHNOLOGY & ARCHITECTURE

AXIS 5.
OPERATIONS

AXIS 6.
MONITORING & EVALUATION

A. Thematic overview

Technology & architecture: Steps taken to optimize the mHealth product for scaling up based on its anticipated user base, purpose, integration with information systems and compatibility with other components of the information systems architecture

During the process of scaling up, several components of an mHealth product and its associated technologies will emerge. The challenges associated with technology and architecture tend to be unique to eHealth and mHealth deployments. These concerns involve the capacity of the technology to meet the demands of increasing volumes of data, to interoperate with external systems, and to adapt to changing conditions and needs.

► DOMAIN 8: DATA

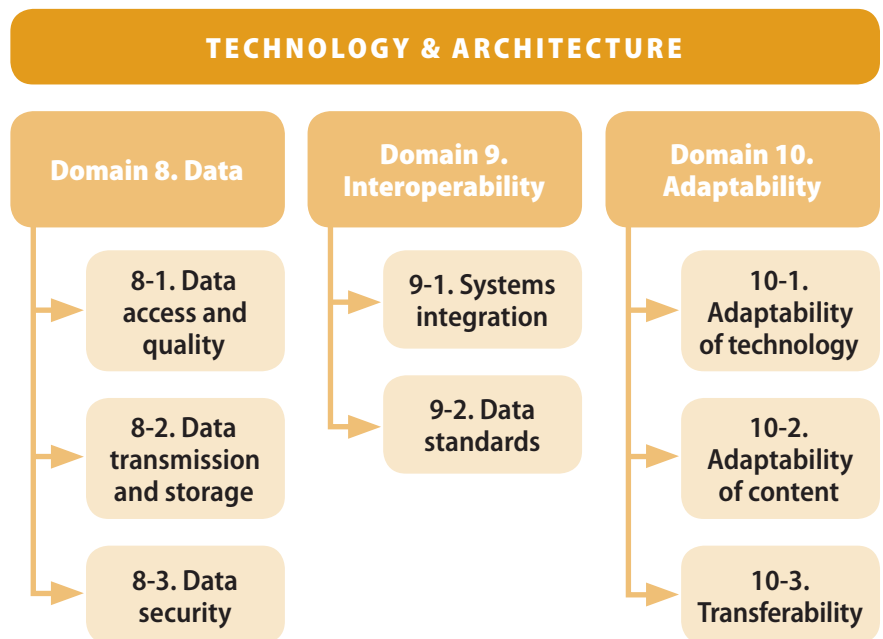


The most basic concern regarding technology is to ensure the mHealth system supports

data needs in terms of access, transmission, storage and security, throughout all levels of implementation.

Data accessibility and quality may be enhanced by different features of the mHealth application. These include a robust **dashboard** and automated data quality assurance measures that assess the data for inconsistencies, errors or missing elements (e.g. validation rules built into the application). Having mechanisms within the system to minimize data errors is of utmost importance.

In addition to improving data quality, project teams can also enhance the capacity of the data centre to support **data transmission and storage**. They will need to consider data flow (determined by the latency of the data centre), connectivity and throughput (determined by the bandwidth for data transmission) and storage capacity (determined by features of the data storage system). If the system is able to support all of these features at increasing levels of scale, then it will pass the decisive **stress test**.



DATA DASHBOARD

A user interface that organizes and presents information and data in a way that is easy to read. User-friendly dashboards facilitate real-time system tracking and decision-making.¹

DATA DICTIONARY

A description about a data set that details features such as meaning, relationships to other data, origin, usage and the format of specific data elements.²

DATA PRIVACY

The capacity to guarantee that patients' personal data will be protected against intentional and unintentional exposure.²

DATA QUALITY ASSURANCE

Mechanisms for evaluating data within the mHealth system for inconsistencies, errors or missing elements.²

LATENCY

The amount of time or delay for data to travel from the source (mobile device) to the data centre. Latency, along with bandwidth, determines the speed of a network connection.

STRESS TEST

An assessment of how well the entire mHealth system functions when tested by extreme conditions (e.g. maximum data requests).

ARCHITECTURE

A description of how the different pieces of a technology and/or information system work together.

Lastly, robust **data security** is a key element of an effective mHealth system, and may be facilitated through both hardware- and software-based mechanisms. **Data privacy** (a related concept) is also required to enforce measures to protect client data against being exposed accidentally or accessed by unauthorized individuals. Since patient privacy is an important legal issue, the product must adhere to any related national policies. This may have implications for data collection and processing within the mHealth product.

► **DOMAIN 9: INTEROPERABILITY**



Interoperability is being increasingly recognized as a crucial element of large-scale deployments, particularly those that aim for national health system adoption. The capacity of an mHealth product to transmit and receive information from external systems and/or applications

will greatly increase the value of the mHealth service and its potential for scalability as an **integrated system**. For example, interoperability with the national health management information system (HMIS) allows data collected by an mHealth product to be accessed and used by the MOH, which adds value to the product from the ministry’s perspective. This type of interoperability is a critical approach for integrating with health system structures.

Interoperability is gained by an application adhering to data (semantic) and technology standards, which prescribe the representations, definitions and formats for common data, to allow for different components of a system to share information and function together. There are three stages in the pursuit of interoperability: (1) recognizing which **data standards** must be adhered to; (2) using those standards in the mHealth product; and (3) demonstrating that the two systems can interoperate. Projects will encounter a number of different data and technology standards as they scale up; some common examples are described in Table 4.



INTEROPERABILITY

The ability of different information technology systems and software applications to communicate, exchange data and use the information that has been exchanged.⁷ Interoperability is enabled by the use of common data standards.

DATA STANDARDS

Methods, protocols, terminologies and specifications for the collection, exchange, storage and retrieval of information associated with health-care applications.³

Table 4: Data standards

TYPE OF STANDARD	DESCRIPTION
HL7 (Health Level 7)	Interoperability standards that facilitate the exchange of health data, particularly clinical data
ICD-10 (International Classification of Diseases and Related Health Problems)	A medical classification list published by WHO and used worldwide as a diagnostic tool and for epidemiologic and health management purposes
SNOMED CT (Systematized Nomenclature of Medicine – Clinical Terms)	A comprehensive collection of clinical terms that provides the basic terminology for electronic health records
INN (International Nonproprietary Name)	A set of generic names designated by WHO to identify pharmaceutical substances and ingredients
ISO (International Organization for Standardization)	An independent entity that publishes worldwide industry standards, including classifications of technology and medical devices

► DOMAIN 10: ADAPTABILITY



Another key feature of scalable technology is the extent to which various components are able to accommodate changes and improvements in response to needs that emerge during the scale-up process. The **adaptability of technology** involves changes in the usage of the product across different types of users and/or different health domains. This capacity to adapt to new health system needs requires processes to be defined and documentation to be in place for local developers.

The **adaptability of content** responds to the need to align an mHealth product with new sociocultural contexts, or to translate the content into new languages. Content adaptability is also important for products whose target population includes illiterate users, since information will need to be available via multimedia or interactive voice response (IVR). **Transferability** is a related concept that describes the capacity of an mHealth product to function across different types of mobile devices and operating systems. Ensuring hardware and system compatibility with technologies that are adaptable to a variety of needs will greatly facilitate the scaling up and sustainability of an mHealth product in new settings.



B. Self-assessment questions

► DOMAIN 8: DATA (43 POINTS)

Efforts to ensure that a number of elements of the mHealth technology and system are appropriate to data needs throughout all stages of the scaling-up process, including access, transmission, storage and security

8-1. Does the application have features that aim to improve data accessibility and quality? (9 points)

	NO	YES	DOCUMENTED	POINTS EARNED
i) The application includes data quality assurance measures, such as validation rules and logic checks, to reduce data entry errors and increase accuracy	0	1	3	—
ii) A user-appropriate dashboard allows the data to be accessed and monitored in real time	0	1	3	—
iii) There is a process in place for extracting and exporting the data that are appropriate to its users	0	1	3	—
Total points earned (out of a possible 9)				<input type="text"/>

8-2. Is the data centre (server and connectivity) appropriate for supporting increases in data flow, processing and storage during scaling up? (18 points)

	NO	YES	DOCUMENTED	POINTS EARNED
i) The processing capacity (i.e. the capacity to handle requests or deliver them through the data centre) is appropriate for the anticipated scope of scale	0	1	3	—
ii) The latency of the data centre based on its location is appropriate for the anticipated scope of scale	0	1	3	—
iii) The bandwidth for data transmission is sufficient for the anticipated scope of scale	0	1	3	—
iv) The data storage system has been configured to accommodate anticipated increases in data volume	0	1	3	—
v) The project operations adhere to government requirements on data storage/hosting	0	1	3	—
vi) The system as a whole has successfully passed a stress test	0	1	3	—
Total points earned (out of a possible 18)				<input type="text"/>

8-3a. Does the system include provisions for minimizing risk and maximizing data security? (12 points)

	NO	YES	DOCUMENTED	POINTS EARNED
i) There is a secure connection to the server	0	1	3	—
ii) There are security mechanisms in place for accessing the data (e.g authentication process)	0	1	3	—
iii) There are security mechanisms for using the device (e.g. passcode)	0	1	3	—
iv) A protocol is in place for responding to breaches in compliance and guaranteeing accountability	0	1	3	—
Total points earned (out of a possible 12)				<input type="text"/>

8-3b. Do components of the system adhere to relevant government standards and policies for data security and privacy? (6 points)

	NO	YES	DOCUMENTED	POINTS EARNED
i) The mHealth product meets relevant national eHealth security standards for data collection, transmission and storage	0	1	3	—
ii) The mHealth product adheres to national data privacy policies and standards for protecting client data (e.g. HIPAA in the United States)*	0	1	3	—
Total points earned (out of a possible 6)				<input type="checkbox"/>

► DOMAIN 9: INTEROPERABILITY (18 POINTS)

The technology's ability to work with other information systems and services within and across organizations

9-1. Have you taken steps to facilitate interoperability with relevant information systems and applications/software? (9 points)

	NO	IN PROGRESS	PERFORMED	DOCUMENTED	POINTS EARNED
i) We have identified the types of systems with which the mHealth product will need to interoperate (e.g. DHIS2, eLMIS, HRIS)*	0	1	2	3	—
ii) We have identified the types of applications/software/functions with which the mHealth product will ideally interoperate (e.g. mobile money applications)	0	1	2	3	—
iii) We have designed the application with the use of data dictionaries in order to adhere to data standards used by the appropriate systems	0	1	2	3	—
Total points earned (out of a possible 9)					<input type="checkbox"/>

9-2. Have you achieved interoperability with information systems based on adherence to relevant data standards? (9 points)

	NO	IN PROGRESS	PERFORMED	INTEROPERABILITY DEMONSTRATED	POINTS EARNED
i) The mHealth product meets the data standards (e.g. HL7) used by the government health information systems (e.g. DHIS2, eLMIS)*	0	1	2	3	—
ii) The mHealth product adheres to clinical terminology standards where appropriate (e.g. ICD-10, SNOMED CT)*	0	1	2	3	—
iii) The mHealth product adheres to other terminology standards where appropriate (e.g. INN)*	0	1	2	3	—
Total points earned (out of a possible 9)					<input type="checkbox"/>

* See list of acronyms and abbreviations for full forms

► DOMAIN 10: ADAPTABILITY (30 POINTS)

The extent to which various components of the product are able to accommodate improvements and changes as needs shift throughout the scaling-up process

10-1. Can the technology be adapted to meet emerging needs during scaling up? (12 points)

	NO	IN PROGRESS	PERFORMED	DOCUMENTED	POINTS EARNED
i) Processes for updating and replicating the application with new user groups have been defined	0	1	2	3	—
ii) Processes for adapting the application so it may address new health domains have been defined	0	1	2	3	—
iii) Documentation for guiding the adaptation of technology is available	0	1	2	3	—
iv) The application can be modified by locally available developers	0	1	2	3	—
Total points earned (out of a possible 12)					<input type="text"/>

10-2. Can the product's content be adapted for new user groups and/or settings during scaling up? (9 points)

	NO	IN PROGRESS	PERFORMED	DOCUMENTED	POINTS EARNED
i) Processes for translating the content into a new language have been defined	0	1	2	3	—
ii) Processes for making the content accessible to illiterate users have been defined	0	1	2	3	—
iii) Processes for modifying the content based on a new cultural context have been defined	0	1	2	3	—
Total points earned (out of a possible 9)					<input type="text"/>

10-3. Have you taken steps to facilitate the transferability of the product with different kinds of hardware/systems? (6 points)

	NO	IN PROGRESS	PERFORMED	DOCUMENTED	POINTS EARNED
i) The application can run on different types of mobile devices (e.g. basic phone, feature phone, smartphone, personal data assistant [PDA], tablet)	0	1	2	3	—
ii) The application is compatible with different types of operating systems (e.g. Android, Windows phone, iOS, Java)	0	1	2	3	—
Total points earned (out of a possible 6)					<input type="text"/>



Axis 4. Technology & architecture scorecard

► DOMAIN 8: DATA (45 POINTS)

SAQ 8-1. Does the application have features that aim to improve data accessibility and quality?	_____ / 9 points
SAQ 8-2. Is the data centre (server and connectivity) appropriate for supporting increases in data flow, processing and storage during scaling up?	_____ / 18 points
SAQ 8-3a. Does the system include provisions for minimizing risk and maximizing data security?	_____ / 12 points
SAQ 8-3b. Do components of the system adhere to relevant government standards and policies for data security and privacy?	_____ / 6 points
Domain 8 total	_____ / 45 points
Domain 8 percentage: Domain total divided by 45, then multiplied by 100	_____ %

► DOMAIN 9: INTEROPERABILITY (18 POINTS)

SAQ 9-1. Have you taken steps to facilitate interoperability with relevant information systems and applications/software?	_____ / 9 points
SAQ 9-2. Have you achieved interoperability with information systems based on adherence to relevant data standards?	_____ / 9 points
Domain 9 total	_____ / 18 points
Domain 9 percentage: Domain total divided by 18, then multiplied by 100	_____ %

► DOMAIN 10: ADAPTABILITY (30 POINTS)

SAQ 10-1. Can the technology be adapted to meet emerging needs during scaling up?	_____ / 12 points
SAQ 10-2. Can the product's content be adapted for new user groups and/or settings during scaling up?	_____ / 9 points
SAQ 10-3. Have you taken steps to facilitate the transferability of the product with different kinds of hardware/systems?	_____ / 6 points
Domain 10 total	_____ / 27 points
Domain 10 percentage: Domain total divided by 27, then multiplied by 100	_____ %

Domain 8 percentage _____ %

Domain 9 percentage _____ %

Domain 10 percentage _____ %

Add percentages together and divide by 3 for your Axis 4 score.

**AXIS 4
SCORE:** _____ %

C. Planning and guidance



This section can assist in planning next steps by . . .

- ✓ Addressing common difficulties relating to increases in data loads, facilitating ease of data storage and retrieval, and managing data exchange in low-connectivity settings
- ✓ Providing resources to improve understanding of the data policy environment, including links to a repository of eHealth strategies and flagging issues surrounding political ownership of data hosting products
- ✓ Offering resources with guidance on establishing data security procedures in order to address common gaps in adherence to data security and privacy requirements
- ✓ Designing for interoperable systems by defining the role of application programming interfaces (APIs) in health information systems, presenting tools for mapping data standards, and linking to global resources such as District Health Information Software 2 (DHIS2) and Open Health Information Exchange (OpenHIE)
- ✓ Overcoming challenges relating to systematic documentation, which is needed for the adaptation and replication of technology and content

▶ DOMAIN 8: DATA



Lessons from the field

Integrate user feedback to enhance data accessibility

User-centred design is a systematic approach that can be used to develop an interface for the mHealth product that is intuitive and reflects the needs and constraints of the end-users. JSI's experience in building dashboards and incorporating new features for the cStock supply chain management system reinforces this iterative approach to testing and integrating user feedback. The process began by consulting end-users and using their input to determine how to collate data received via SMS in a form that could be interpreted easily, defining specific functions (e.g. calculating the resupply quantities for health workers), and displaying the appropriate reporting needs on computer-based dashboards. The cStock team also solicited feedback through district teams to identify additional features such as reminders, alerts and group messaging functions that could be used to improve data use. These included enhanced training and supervision, advocacy and recognition, and motivation of staff. Other considerations for optimizing the dashboard design included an understanding of the frequency and scheduling of alerts, the number of clicks or steps required to access information, whether there should be capabilities to temporarily mute or turn off certain features, and the types of icons and graphics that are recognized most easily.



In addition to integrating the needs of end-users, projects should determine the costs of secondary features. Projects should identify which, if any, functions should be prioritized, simplified or removed in order to maintain mHealth products in a financially sustainable manner. The cost estimates for additional features should include development costs and system maintenance, implications for software upgrades and server hosting/data storage considerations.



Lessons from the field

Consider offline systems for low-connectivity settings

The quality of wireless (cellular or Wi-Fi) connectivity affects system design needs. Although outside the control of a project, connectivity should be a key consideration when designing functionality on the mobile client application and for managing data transmission between the mobile device and the server. Projects can take certain measures to overcome related constraints by allowing for offline data syncing and storage. For example, the Dristhi project in India initially faced challenges using the Open Smart Register Platform (OpenSRP) for downloading and uploading real-time client data from the server due to the intermittent general packet radio service (GPRS) network and unreliable Wi-Fi connections. To deal with this issue and the fact that many developing countries face similar infrastructural constraints, the OpenSRP system has integrated a feature for offline data collection and storage, as well as mechanisms to sync data when a connection is possible. Medic Mobile has taken a similar approach through the use of offline systems for low connectivity settings and gradually introducing online-dependent systems as local technical infrastructure develops.



Tips and considerations

Weigh the pros and cons of data hosting approaches

The location of data storage is becoming increasingly important in ensuring data security. WHO–ITU guidelines suggest that data should be stored in-country, and governments are increasingly pushing for stewardship of the data stored within their jurisdiction. However, the ICT infrastructure of some countries may lack capacity for in-country data storage. In these situations, projects have chosen to host their data on cloud-based servers, which is not recommended as a long-term solution, but can provide a temporary measure. In-country cloud storage is a better option than housing data completely outside the country, and can facilitate the transition to in-country servers. However, there may be limitations on the availability of services for in-country cloud storage. Long-term alternatives include allocating a budget to help build government capacity to host data. Such measures can include providing set-up and maintenance of servers, instalment of air conditioning to prevent overheating of equipment, and training of government staff on operating and maintaining the server system. Although this is a considerable financial and time investment, it can be cost-effective over the long term and will address the need to store data within the country.



Lessons from the field

Develop realistic projections for data transmission and storage needs

Well thought out projections will aid decision-making on data storage and transmission. It is important to avoid system overloads and reduce the time lag in querying the data. For example, JSI designed the cStock system to cope with increased data reporting as the system expands to new districts and accumulates more data. Projections on data storage were factored in to the team's decisions regarding how long the data need to be kept in the system, whether data from pilot phases will be kept, and whether data can be reprogrammed for storage in a warehouse or whether it will need to be maintained upfront for easier retrieval. JSI's experiences demonstrate that project teams should use well informed projections to plan with the technology team on the realistic needs and capacity limitations relating to data storage, processing and transmission.



Tips and considerations

Establish mechanisms for ensuring data security and privacy

One of the appeals of mHealth is the ease of collecting health information on mobile devices. Striking a balance between a technology that can be navigated during the collection and extraction of data while also protecting sensitive health information can be a difficult task.

Mapping the different end-users and secondary users is a critical first step towards distinguishing the appropriate data access privileges and security mechanisms for the different users of the system. Next, programme managers can tailor additional security mechanisms for the appropriate user group, such as requiring health workers and other primary users to supply passwords after a period of inactivity.



It is also instructive to review security measures internally with project staff that have access to the collected data (e.g. implementation staff accessing data for monitoring and reporting purposes). These individuals must be trained in and compliant with patient confidentiality procedures and/or laws in order to avoid security breaches. Project teams should also be aware of national-level data protection requirements when developing their organizational security protocols.

► DOMAIN 9: INTEROPERABILITY



Lessons from the field

Plan for interoperability from the outset

Interoperability is essential for consolidating and exchanging data across different systems and enabling aggregate tracking and centralized reporting. Digital products should be designed to be capable of interoperating with the national health information system (HIS) and/or other appropriate information systems, such as the electronic logistics management and information system (eLMIS). The process of integration into national systems relies on being interoperable with the data architecture framework and HIS. For example, where the OpenHIE standards are being deployed by countries (e.g. South Africa, United Republic of Tanzania), the mHealth product should assess requirements for compliance with the deployment, and make use of the embedded registries and standards. Even in the absence of mature HIS, projects can prepare for interoperability by adhering to existing data standards. These standards can include non-clinical areas such as logistics and human resources for interoperability in the logistics management and information system (LMIS) or human resource information system (HRIS), respectively.

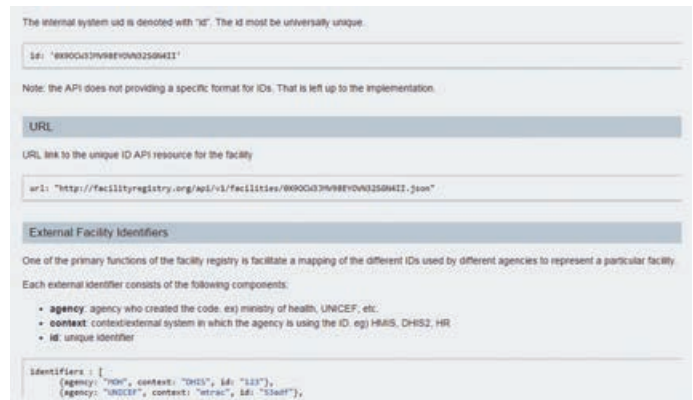


Lessons from the field

Use application programming interface (API) to facilitate systems interoperability

To promote integration with national systems such as DHIS2, some projects have begun to use API, which is a set of tools and protocols that facilitates links between a system and third-party software. The API can be viewed as the technological synapse or interface between the system and the project-specific software, and it includes the protocol and necessary codes for retrieving and exchanging data with another system (see <http://www.3scale.net/wp-content/uploads/2012/06/What-is-an-API-1.0.pdf>).

The use of standard APIs proved critical for the national mTrac system in Uganda. This monitoring and surveillance system facilitates the flow of the HMIS reports and tracks indicators relating to health service delivery. When the MOH, UNICEF and WHO first launched mTrac, they encountered challenges with DHIS2 interoperability due to the lack of a centrally managed database of health-care facilities.



Example of the mTRAC API codes used for integration with the central health facility registry system

The facility data used within both mTrac and DHIS2 over the first two years diverged significantly due to minor spelling changes in the names of facilities, as well as changes in the level of services provided. The lack of a common unique identification number compounded this problem. In Uganda, this made it impossible to match and exchange with certainty up to 40% of the data between these two systems. To overcome this obstacle, the Ugandan MOH advised that DHIS2 should serve as the temporary master facility registry and the reference health-care facility library for all other digital health applications. Subsequently, the OpenHIE Facility Registry Database API was adopted and integrated into both mTrac and DHIS2. This allowed other government-approved systems to sync with the centrally managed health-care facility registry and ensured they were reporting against the same health-care facility. (See https://facility-registry-api.readthedocs.org/en/latest/api_specifications.html for an example of the codes and protocol used.)

► DOMAIN 10: ADAPTABILITY



Tips and considerations

Foster a culture of documentation

Technology development is an iterative process requiring documentation of key steps from launch to testing to maintaining the identified product. This process is critical for updating the applications as well as facilitating their adaptability to and replication in new contexts. Routine and thorough documentation should be encouraged such that all inputs and changes are noted, and project teams should establish a systematic process for housing and maintaining these records. Wikis and web-based hosting services can be used to document these inputs and enforce their persistence. Wikis consist of websites or databases that can manage internal documentation information and allow users to contribute content housed within one common source. Wikis can be used internally or made accessible to the public. Online data hosting repositories, such as GitHub (<https://github.com/>), have similar functions in central storage of instructions across a community of users. However, GitHub also logs software code versioning and tracks troubleshooting efforts across different collaborators so they can document their processes and organize tasks in a way that allows them to be accessible for future use.



Resources

The following targeted resources provide additional information on data security, mechanisms for promoting interoperability and global guidance on data ownership policies.

Principles for Digital Development (Digital Development Principles Working Group)

These guiding principles represent endorsements from multilateral organizations, donors and implementing agencies on best practices for the use of ICT for health and other development programmes.

Useful features: The principles can be used as general tips to guide technology development with each principle linked to resources and cases for further elaboration.

<http://digitalprinciples.org/>



Choosing a Device Type (CommCare Help, 2015)

This online resource outlines what to consider when deciding between a feature phone or smartphone. The tool is geared towards implementers seeking to deploy Commcare; however, the outlined considerations can be generalized for other deployments.

Useful features: During the process of scaling up, project teams may have to reassess their selection of digital device and adapt to a changing environment of costs and availability.

This resource can assist implementers in selecting among possible devices, by examining factors such as battery life, user interface, required ICT literacy and cost for potential course correction.

<https://help.commcarehq.org/display/commcarepublic/Choosing+a+Device+Type>



Patient Privacy in a Mobile World: A Framework to Address Privacy Law Issues in Mobile Health (TrustLaw and mHealth Alliance, 2013)

Using a legal lens, this publication explores the diversity of privacy, security and confidentiality issues surrounding mHealth and the transmission of health content via ICT.

Useful features: The document includes a global landscape analysis of laws related to data security, breach notification obligations, data transfer and the enforcement of these measures.

<http://www.trust.org/contentAsset/raw-data/03172beb-0f11-438e-94be-e02978de3036/file>



DHIS2 Academy

This series of training workshops targets implementers working with DHIS2 to assist their efforts towards national interoperability and to assist them in accessing tools for linking to this external system.

Useful features: Users can browse the website for previously used training materials and tools. However, the workshops have fees, space limitations, and are only offered in specific locations which may have associated travel costs.

<https://www.dhis2.org/academy>

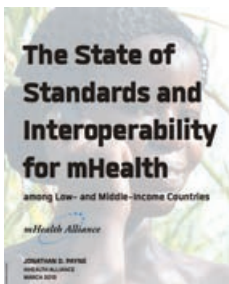


Open Concept Lab (previously Maternal Concept Lab)

OCL is a collaborative cloud-based platform for health terminology management. The initiative facilitates data interoperability by providing common standards for representing and exchanging health information. OCL consolidates different dictionaries from standardized terminology classifications such as ICD, SNOMED CT and the Columbia University International eHealth Laboratory interface dictionary.

Useful features: Project teams can use OCL to cross-check whether they are using the appropriate data standards, or to search for community-developed standards to represent the unique data needs of LMICs that may not be available in global standards such as ICD, which include access to potable water or the number of nights slept under an treated bed net the previous week.

<http://www.OpenConceptLab.com>



The State of Standards and Interoperability for mHealth among Low- and Middle-income Countries (mHealth Alliance, Payne, 2013)

This report provides an overview of the data standards and interoperability landscape among LMICs.

Useful Features: The document flags key barriers to achieving interoperability, such as the adoption of eHealth strategies, articulation of eHealth architecture and building national capacity for eHealth planning and management.

<https://www.k4health.org/toolkits/mhealth-planning-guide/state-standards-and-interoperability-mhealth-among-low-and-middle-income-countries>



Open Health Information Exchange (OpenHIE)

This community of practice provides a global resource on health information interoperability and national architectural frameworks. OpenHIE has various community partners and implementing groups that can provide direct technical support on the use of health information standards and exchange.

Useful features: Project teams can use the OpenHIE website to obtain further information on technical guidelines for planning health information exchange, as well as to contact the various communities for support.

<https://ohie.org/>



WHO's Global Observatory for eHealth's Directory of eHealth Policies (WHO, 2015)

This database stores the eHealth policies of all countries that have issued a national guidance document.

Useful features: Project teams can search directly by country to retrieve the relevant policy document.

<http://www.who.int/goe/policies/countries/en/>



AXIS 5. OPERATIONS



AXIS 1.
GROUNDWORK

AXIS 2.
PARTNERSHIPS

AXIS 3.
FINANCIAL HEALTH

AXIS 4.
TECHNOLOGY & ARCHITECTURE

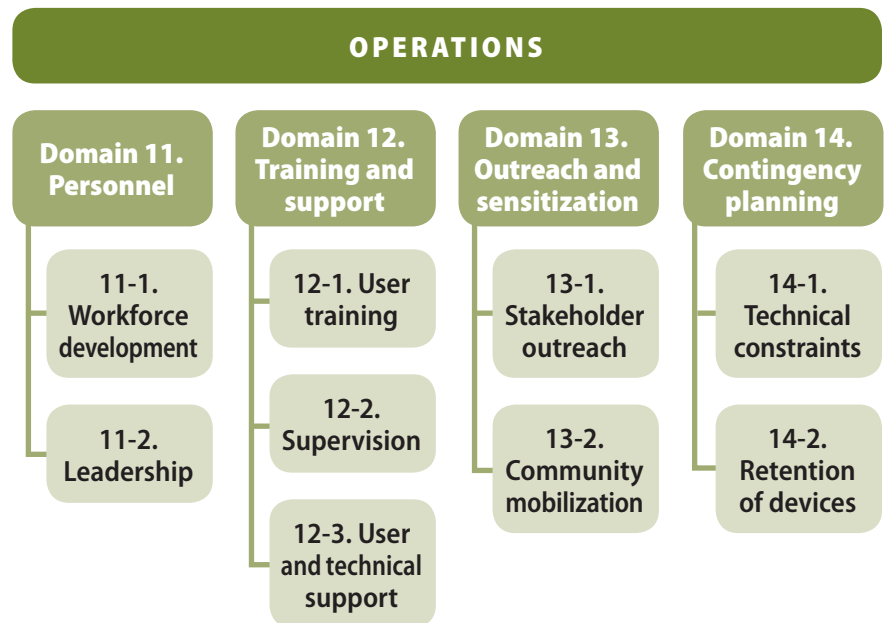
AXIS 5.
OPERATIONS

AXIS 6.
MONITORING & EVALUATION

A. Thematic overview

Operations: Organizational and programmatic measures for supporting implementation, use and maintenance of the product throughout the scaling-up process

Effective and reliable operations are essential for successful scaling up, and require human inputs and organizational procedures to respond to evolving conditions. As an mHealth product matures and increases its scale, it is critical that the size, structure and competencies of the project team continue to support operations at several levels. This requires a diversity of skill sets to address challenges such as systematic troubleshooting, management of devices, adaptations to the constraints of the technical environment, and other programmatic measures to orient communities and local partners.



► DOMAIN 11: PERSONNEL



Project teams must be careful not to underestimate the human resources required to successfully scale up and sustain mHealth products. Accurate projections are needed to determine the appropriate increases in staff numbers and capacities. Human resource investments including recruitment and capacity-building should involve general project staff, staff working directly with the mHealth product and staff in partner organizations. To meet changing needs, **workforce development** calls for strategic planning to increase personnel capacity, redefine roles and responsibilities, and implement new staff policies to align with anticipated changes in workflow. In addition to recruiting new staff, project teams should consider staff retention and knowledge management. Opportunities for promotion, benefits and incentive schemes will help build a stable team with the required training, experience and collective goals.

Another central consideration related to personnel involves defining the main **leadership** roles that will support operations as they scale up. In addition to having appropriate expertise, leaders need to possess authority and credibility with core partners.²⁵ Key leadership positions reflect the evolving needs of a project and generally include:

- a director or advisor to provide strategic oversight
- a manager to support organizational and personnel needs
- a systems administrator to manage the technology
- a financial manager to assess financial requirements, and track expenditures, profits and losses.



END-USERS

Health workers or other clients who interact directly with the technology.

SECONDARY USERS

Individuals who derive benefit from end-users' input into mHealth products, but do not themselves directly enter data (e.g. supervisors).

▶ DOMAIN 12: TRAINING AND SUPPORT



Project leaders and staff also need appropriate training, supervision and support. **User training**, which involves end-users and secondary users, must be tailored specifically to the needs and levels of experience of the participants. It is widely recognized that effective engagement with health workers and other end-users is the key to successful adoption of mHealth products. Training programmes should also aim to foster a sense of perceived value of the product among end-users. The scaling-up process will be hampered if health workers fail to see the benefits of the application on their workload, or if they feel overwhelmed by the complexity of the technology.²⁶

End-users' adoption of the product will also be influenced by the availability and quality of routine **supervision** for monitoring their activities and addressing any concerns or confusion that may emerge. Effective supervision needs an organizational structure and human resource management to oversee work in the field. This should also be accompanied by the allocation of resources to routine meetings (e.g. to cover the cost of transport and food). In addition, end-users should be trained on the steps to be taken when a question or point of confusion emerges.

Furthermore, **user and technical support** systems must be in place for identifying and troubleshooting hardware and software problems during implementation. Project leaders should assemble a technical support team with a strong understanding of user needs and operating constraints based in the local setting. There are many advantages to having a local first-line technical support team: it will minimize costs (compared with paying for external support), create local ownership of the project, and promote sustainability. However, it is also critical to have higher-level support available for technical issues that require greater expertise.

▶ DOMAIN 13: OUTREACH AND SENSITIZATION



In addition to user training, operations will benefit from outreach and sensitization activities with the stakeholder and community groups involved in the scaling-up process. **Stakeholder outreach** should engage the staff of implementing organizations (e.g. CBOs and NGOs), as well as government representatives, as appropriate. Furthermore, it is essential that project teams pursue **community mobilization** activities to sensitize the communities that will benefit from the services provided by the product. Such activities involve raising awareness of the benefits of the product, familiarizing community members with its purpose and related procedures, and engaging with the community council or other leadership body to obtain any necessary approval for implementing the product.

▶ DOMAIN 14: CONTINGENCY PLANNING



Finally, successful scaling up will call for appropriate contingency planning, or procedures to maintain the continuity of use of the product in the event of infrastructure or programme obstacles. First, procedures must be established to address **technical constraints** related to connectivity and electricity (see Axis 1: Groundwork), for users to operate the application during network shortages, power outages or other unforeseen issues. In addition, promoting the **retention of devices** requires strategic planning and the adoption of procedures to prevent loss, theft, breakage and the misuse of mobile devices. In many settings, it will be necessary for these procedures to be vetted by the community or other local stakeholders to ensure they are appropriate.

B. Self-assessment questions

► DOMAIN 11: PERSONNEL (33 POINTS)

Considerations surrounding the restructuring and expansion of human resources, including project team members (staff and health workers) and leadership positions

11-1. Are appropriate mechanisms in place to allow the project to adapt to changing human resource needs? (21 points)

	NO	IN PROGRESS	PERFORMED	DOCUMENTED	POINTS EARNED
i) Future personnel needs have been projected based on the scope/goals of scaling up	0	1	2	3	___
ii) The job descriptions of existing project team members have been restructured or adjusted to meet the needs of scaling up	0	1	2	3	___
iii) Mechanisms for expanding human resource capacity have been developed, as needed	0	1	2	3	___
iv) The roles and responsibilities of all project team members have been defined and communicated for scaling up	0	1	2	3	___
v) Strategies for project team member retention have been developed	0	1	2	3	___
vi) Mechanisms are in place to maintain institutional knowledge in light of project team member turnover	0	1	2	3	___
vii) New policies have been created to respond to estimated changes in workload and salary structures while scaling up	0	1	2	3	___
Total points earned (out of a possible 21)					<input type="checkbox"/>

11-2. Have the key leadership positions required to guide scaling up and support operations been filled? (12 points)

	NO	IN PROGRESS	PERFORMED	DOCUMENTED	POINTS EARNED
i) An advisor/director to provide strategic oversight has been appointed	0	1	2	3	___
ii) A manager for supporting organizational and personnel needs has been appointed	0	1	2	3	___
iii) A systems administrator for managing the technology has been appointed	0	1	2	3	___
iv) A financial manager for tracking costs and expenditures has been appointed	0	1	2	3	___
Total points earned (out of a possible 12)					<input type="checkbox"/>

► DOMAIN 12: TRAINING AND SUPPORT (45 POINTS)

The availability of appropriate training activities to ensure that users have the necessary skills and capacity required to support scaling up, and the presence of reliable assistance and supervisory structures to address emerging issues while scaling up

For health-worker-focused products, questions 12-1a, 12-1b and 12-2 refer to training programmes. For client-focused products, questions 12-1a, 12-1b and 12-2 refer to tools used to inform clients about product use.

12-1a. Have training programmes for end-users and secondary users of the product been developed? (15 points)

Items (iii) to (v) below do not apply to client-focused products, and therefore project teams should select N/A if appropriate.

	NO	IN PROGRESS	PERFORMED	DOCUMENTED	N/A	POINTS EARNED
i) Initial training is in place for end-users of the application (e.g. health workers using the product, and clients)	0	1	2	3	N/A not a response	—
ii) Operational guides (e.g. standard operating procedures [SOPs], job aid) with instructions for managing the application is available and accessible to all project team members	0	1	2	3	N/A not a response	—
iii) Refresher training for end-users of the application is in place	0	1	2	3	X	—
iv) Training for secondary users (e.g. district-level managers and supervisors) is in place	0	1	2	3	X	—
v) The resources required for conducting the training are available	0	1	2	3	X	—
Total points earned (out of a possible 15, or 6 if it is a client-focused product)						<input type="text"/>

12-1b. Are the tools developed for end-users and secondary users appropriate? (12 points)

	NO	IN PROGRESS	PERFORMED	DOCUMENTED	POINTS EARNED
i) The training programme has taken account of users' literacy and relevant content knowledge	0	1	2	3	—
ii) An appropriate delivery mechanism for training (e.g. internal versus external training; training-of-trainers) based on needs and project resources has been established	0	1	2	3	—
iii) Training curriculum and/or other tools to ensure capacity for end-users are available	0	1	2	3	—
iv) Mechanisms are in place for quality assurance of the training programme (e.g. checkpoints for competency and certification)	0	1	2	3	—
Total points earned (out of a possible 12)					<input type="text"/>

12-2. Has a structure been established for providing ongoing supervision for end-users during and after their adoption of the product? (9 points)

	NO	IN PROGRESS	PERFORMED	DOCUMENTED	POINTS EARNED
i) An organizational structure for providing supportive field supervision and monitoring of end-users' activities is in place	0	1	2	3	___
ii) Required resources have been allocated for routine field supervision or monitoring end-users' interactions with the system	0	1	2	3	___
iii) End-users have been trained on how to get their questions and problems addressed	0	1	2	3	___
Total points earned (out of a possible 9)					<input type="text"/>

12-3. Have efforts been made to ensure that adequate user and technical support systems are in place? (9 points)

	NO	IN PROGRESS	PERFORMED	DOCUMENTED	POINTS EARNED
i) A local first-line technical support team has been identified and trained appropriately to provide troubleshooting	0	1	2	3	___
ii) There is a procedure in place to connect the local technical support team to a higher level of support when needed	0	1	2	3	___
iii) There are strategies in place for providing user support through peer assistance (e.g. having champions within the health workforce cadre)	0	1	2	3	___
Total points earned (out of a possible 9)					<input type="text"/>

► DOMAIN 13: OUTREACH AND SENSITIZATION (15 POINTS)

Efforts to orient key stakeholder groups and raise awareness in targeted communities in order to promote wider acceptance of the mHealth product and its scaling up

13-1. Have procedures and strategies for orienting key stakeholders to the mHealth product been developed? (9 points)

	NO	IN PROGRESS	PERFORMED	DOCUMENTED	POINTS EARNED
i) Orientation for implementing partners (e.g. NGOs, CBOs) that will be involved directly in the scaling-up implementation has been established	0	1	2	3	___
ii) Orientation for government representatives has been established through meetings, workshops or other face-to-face mechanisms	0	1	2	3	___
iii) Efforts to engage with local community leaders and/or community council members have been made in order to obtain approval for introducing the mHealth product	0	1	2	3	___
Total points earned (out of a possible 9)					<input type="text"/>

13-2. Has community mobilization been undertaken with the communities that will be served by scaling up the mHealth product? (6 points)

	NO	IN PROGRESS	PERFORMED	DOCUMENTED	POINTS EARNED
i) Efforts to spread awareness of the mHealth product and its value have been made	0	1	2	3	—
ii) The community has been encouraged to provide their feedback on concerns and issues related to the mHealth product through specific feedback events	0	1	2	3	—
Total points earned (out of a possible 6)					<input type="checkbox"/>

▶ DOMAIN 14: CONTINGENCY PLANNING (18 POINTS)

Considerations and guidelines surrounding operational procedures to maintain the continuity of use of the product in light of technical and programmatic obstacles

14-1. Have procedures been developed for addressing technical constraints (such as those identified in Factor 2-2)? (9 points)

	NO	IN PROGRESS	PERFORMED	DOCUMENTED	POINTS EARNED
i) Procedures for addressing lack of/inconsistencies in connectivity have been established (e.g. provision of several SIM cards so health workers can use different networks when necessary)	0	1	2	3	—
ii) Procedures for addressing lack of/inconsistencies in electricity have been established (e.g. provision of solar chargers, setting up charging stations in communities)	0	1	2	3	—
iii) Information regarding these strategies is included within the standard operating procedures (SOPs)/job aids provided to end-users and secondary users	0	1	2	3	—
Total points earned (out of a possible 9)					<input type="checkbox"/>

14-2. Have procedures been developed for retaining mobile devices in a health worker setting? (9 points)

	NO	IN PROGRESS	PERFORMED	DOCUMENTED	POINTS EARNED
i) Procedures for preventing loss/theft of mobile devices have been developed	0	1	2	3	—
ii) Policies (and contracts, if appropriate) for replacing lost or damaged mobile devices have been developed and vetted with appropriate stakeholders	0	1	2	3	—
iii) Methods for preventing the misuse of mobile devices are in place (e.g. preventing specific weblinks or application usage)	0	1	2	3	—
Total points earned (out of a possible 9)					<input type="checkbox"/>



Axis 5. Operations scorecard

▶ DOMAIN 11: PERSONNEL (33 POINTS)

SAQ 11-1. Are appropriate mechanisms in place to allow the project to adapt to changing human resource needs?	_____ / 21 points
SAQ 11-2. Have the key leadership positions required to guide scaling up and support operations been filled?	_____ / 12 points
Domain 11 total	_____ / 33 points
Domain 11 percentage: Domain total divided by 33, then multiplied by 100	_____ %

▶ DOMAIN 12: TRAINING AND SUPPORT (45 POINTS)

SAQ 12-1a. Have training programmes for end-users and secondary users of the product been developed? <i>If you responded N/A for questions (iii) through (v), the denominator is 6 points.</i>	_____ / 15 or 6 points
SAQ 12-1b. Are the training programmes for end-users and secondary users appropriate?	_____ / 12 points
SAQ 12-2. Has a structure been established for providing ongoing supervision for end-users during and after their adoption of the product?	_____ / 9 points
SAQ 12-3. Have efforts been made to ensure that adequate user and technical support systems are in place?	_____ / 9 points
Domain 12 total	_____ / 45 or 36 points
Domain 12 percentage: Domain total divided by 45 or 36 points, then multiplied by 100	_____ %

▶ DOMAIN 13: OUTREACH AND SENSITIZATION (15 POINTS)

SAQ 13-1. Have procedures and strategies for orienting key stakeholders to the mHealth product been developed?	_____ / 9 points
SAQ 13-2. Has community mobilization been undertaken with the communities that will be served by scaling up the mHealth product?	_____ / 6 points
Domain 13 total	_____ / 15 points
Domain 13 percentage: Domain total divided by 15, then multiplied by 100	_____ %

▶ DOMAIN 14: CONTINGENCY PLANNING (18 POINTS)

SAQ 14-1. Have procedures been developed for addressing technical constraints?	_____ / 9 points
SAQ 14-2. Have procedures been developed for retaining mobile devices in a health worker setting?	_____ / 9 points
Domain 14 total	_____ / 18 points
Domain 14 percentage: Domain total divided by 18, then multiplied by 100	_____ %

Domain 11 percentage _____ %

Domain 12 percentage _____ %

Domain 13 percentage _____ %

Domain 14 percentage _____ %

Add percentages together and divide by 4 for your Axis 5 score.

**AXIS 5
SCORE:** _____ %

C. Planning and guidance



This section can assist in planning next steps by . . .

- ✓ Offering strategies to deal with issues relating to staff turnover and technical support through consistent documentation, abbreviated training packages and organization-wide training
- ✓ Highlighting important considerations for effective training that supports end-users to be confident and accurate when operating mHealth products
- ✓ Providing practical recommendations on community mobilization and orientation for implementing partners to facilitate community support and avoid misunderstandings across collaborators
- ✓ Presenting examples of strategies for adapting to the constraints of technical infrastructure and managing the misuse and retention of mobile devices
- ✓ Describing a key debate on whether to use people's existing phones or procure new devices

► DOMAIN 11: PERSONNEL



Tips and considerations

Maintain documentation to mitigate effects of staff turnover

Staff turnover is a common issue across health domains and does not occur only in mHealth deployments. To minimize the repercussions of staff turnover and reduce the time and financial costs associated with training new staff, programme managers can create an abbreviated training package to speed up the training process and allow users to learn primarily through in-service and peer training after an initial introduction. If possible, dedicate a staff member to maintain and update key programme documentation to ensure it remains relevant for new personnel and partners.



Lessons from the field

Empower staff at all levels to bolster support structures

A common challenge associated with scaling up occurs when projects become overly reliant on external technical support to troubleshoot in the event of unanticipated problems. Such dependencies can be reduced by using comprehensive training structures across all staff levels. For example, JSI trained staff across different administrative levels during scaling up of cStock in Malawi in order to foster complementary skill sets across the team for troubleshooting problems as they arose. Participants included field-level supervisors and coordinators, district-level technical staff and project managers. By establishing such training structures early on, projects can yield long-term benefits during scaling up, especially when geographic expansion can exacerbate the logistical constraints associated with obtaining technical assistance.



Tips and considerations

Dedicate ample time to introducing the mHealth product to end-users

End-users may be unfamiliar with some mobile devices, such as touchscreen tablets and smartphones. If an mHealth product requires technology that is new for users, it is important to dedicate time to training so that users feel comfortable with the device’s functions and interface before introducing them to the content. An overview will enable end-users to acquaint themselves with the basic tasks, including navigating touchscreens, entering login details and selecting appropriate applications or features. A demo mode using a dummy server is another way to familiarize end-users with system functions and has the advantage that they do not need to worry about making mistakes. Lastly, factors such as age and previous exposure to technology may affect their ability to absorb the training material and it may be useful to separating training according to technology literacy.



Tips and considerations

Focus on learning outside the classroom

Follow-up on-the-job training is a useful way to reinforce training, troubleshoot potential issues during deployment, and obtain feedback to improve the application’s usability. Most questions and problems will emerge when users begin to access the service, rather than while they are still in the classroom. Training programmes therefore should build in regular follow-up and supportive supervision to complement the basic pre-service training. Many IWG grantee organizations recommend allocating at least four weeks to follow-up training sessions.

Table 5: Approaches for enhancing training for health workers

TRAINING DELIVERY	EXAMPLES FROM THE FIELD	CONSIDERATIONS
Peer champions	After conducting training-of-trainers in the United Republic of Tanzania, Pathfinder International, in partnership with D-Tree, identified health workers that had mastered the application, and used them to directly train and support their peers. “It’s more fun with the health workers training other health workers, because they are more in touch.” These peer trainers can also flag common challenges and mistakes from the perspective of a health worker.	There is a risk of isolating health workers who are less technologically savvy or untrained to shift responsibilities. This should also be supported by additional materials to ensure fidelity of the training (e.g. health workers do no unintentionally misadvise peers).
Integration with health content	Allowing health workers to view the mHealth tool in the context of their existing work is a valuable way of demonstrating the relevance of the mHealth product. IRD in Pakistan conducted training sessions on entering the data onto the mobile device in concert with the senior vaccinators who provided refresher courses including updates to the larger immunization programme. Additionally, IRD found that receiving certificates and reference letters upon the completion of training boosted the motivation of trainees.	Additional time was needed prior to the joint training in order for health workers to become familiar with the application’s interface and system. IRD also incorporated feedback from the vaccinators during the application development phase to ensure the product met their requirements. Consequently the vaccinators were already familiar with the application ahead of training sessions.



Tips and considerations

Consider local support to meet needs for technical expertise

Local universities that train students in computer science and informatics can be a useful resource for providing technical support to mHealth projects. Forming partnerships with local universities may help project teams to identify specialized expertise for first-line technical support while minimizing costs and promoting sustainability by reducing reliance on non-local institutions.

▶ DOMAIN 13: OUTREACH AND SENSITIZATION



Tips and considerations

Develop standard operating procedures (SOPs) to delineate stakeholder roles

It is important to involve the stakeholders responsible for implementing the innovation. Similarly, developing a package of materials that includes roles and responsibilities can bring clarity for local partner organizations that manage and monitor an mHealth deployment. This package can take the form of SOPs and training materials, both of which provide clear instructions on the implementation protocol, including details on managing devices, training for workers and supervisors, roles and responsibility checklists, reporting formats and guidelines on monitoring data to allow corrective action to be taken.



Tips and considerations

Allocate adequate resources for community mobilization

Although community mobilization can yield substantial long-term gains for the adoption of the mHealth product, it demands a significant investment in time and resources, and the pace of change can be slow. Projects first need to fully understand the local structure and identify the key opinion leaders, such as community and religious leaders. Successful community mobilization requires continuous engagement with local leaders to inform them and gather their support for smooth implementation of the intervention. Projects therefore should consider allocating resources for community mobilization activities, including hiring venues and creating communication strategies (e.g. to include performances, meetings, event launches). Additionally, projects should be aware that community mobilization is not a one-off activity; it requires continuous engagement, with adequate resources to ensure that grievances and questions are addressed as they arise.



▶ DOMAIN 14: CONTINGENCY PLANNING



Lessons from the field

Design around the technical environment

When deploying mobile-based communications systems in low-resource settings, projects will inevitably encounter technical barriers in the forms of lack of connectivity, physical infrastructure and unstable power sources. Medic Mobile, in partnership with United Methodist Communications and the MOH, designed and deployed an integrated disease surveillance, stock monitoring and early disease outbreak warning system in Katanga Province, Democratic Republic of the Congo, targeting 57 clinics. To effectively design a system that could withstand the technical environment, the team conducted a thorough field-based assessment on the mobile coverage, power sources, frequency of power outages and costs associated with charging a mobile phone. Two key issues were the need for access to a stable power source and the cost of keeping the devices charged. The Medic Mobile team therefore decided to use basic handsets and robust solar chargers equipped with a high-power solar lamp. They also recommended that health workers should engage in income-generation activities using the solar charger to provide phone charging services for the broader community. This example shows that it is rarely sufficient to look simply at the mobile coverage map in the given area when deciding on the devices to use.



Tips and considerations

Take precautions to limit misuse of devices

To limit the potential misuse of mobile devices, programme managers can install application blockers, which restrict the use of Smart devices for non-work purposes (e.g. downloading games, watching YouTube videos, etc.). These features can be downloaded easily onto the mobile devices from an app store. The use of an application blocker not only ensures the phones are being used for the intended purposes, but also prevents depletion of batteries and shortage of hardware memory.

Another mechanism for limiting misuse of mobile health tools is the inclusion of phone tracking applications, such as Meraki – System Manager. These types of applications enable the remote management of devices deployed in the field, allowing the programme management team and supervisors to monitor each device. This can be useful for distributing application updates (without having to collect all devices at a central location), or shutting down the device and wiping the data if the hardware has been lost or stolen.

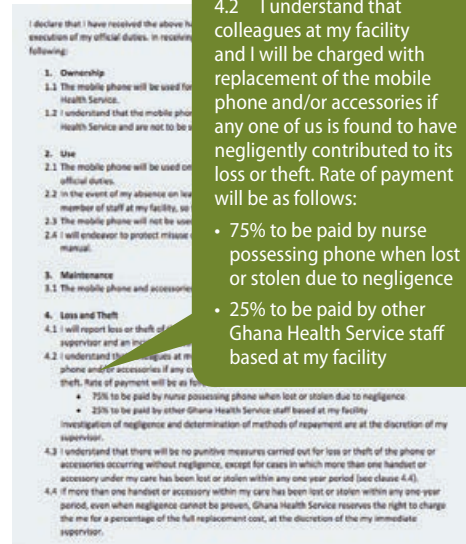


Lessons from the field

Explore protocols to minimize loss and theft of devices

D-Tree, in partnership with Pathfinder International, developed a strategy for group accountability and allowed personal use of mobiles as a means to promote phone retention among health workers in Shinyanga Region in the northwest of the United Republic of Tanzania. To promote collective accountability, D-Tree and Pathfinder gathered community health workers into groups of 10–15 people. Each month approximately US\$ 1.50 was withheld from their stipends and saved in the group pool. If a group member lost their phone, it could be replaced using money from the group pool. At the end of the year, any unspent money was distributed evenly among the group members. As a result, the health workers felt more accountable for their phones, since any misuse would have repercussions on their peers. In addition, the programme allows health workers to use their phones for personal use, which encourages retention. In over seven months of implementation, only one phone has been lost among 120 health workers.

While there are many strategies to promote accountability, the most important consideration is to ensure support from health workers and other stakeholders.



In Grameen Foundation's Mobile Technology for Community Health (MOTEC) programme in Ghana, all health staff members receiving a phone have to sign a handset receipt agreement.



Tips and considerations

Weigh the pros and cons of procuring devices or using personal phones

The ubiquity and extensive penetration of mobile phones serves as one of the primary driving forces behind mHealth initiatives. The increasing level of mobile phone ownership may encourage mHealth programmes to implement applications that run on end-users' own personal devices. Alternatively, implementers may choose to buy devices to be used specifically for the mHealth programme, with the aim of ensuring the compatibility and reliability of the hardware. The issues below highlight several of the advantages and limitations that should be considered when determining whether to purchase new devices or use those already in the hands of the end-users.



Project-sponsored procurement: This enables devices to be standardized with uniform hardware capacity and consistent software updates. It can also facilitate the use of applications and platforms that require enhanced functionalities, such as general packet radio service (GPRS). However, the purchase of new devices requires additional upfront costs and maintenance, as well as potential supplementary training for users. Lastly, procurement presents the additional risk that health workers may lose their device (possibly on purpose), especially in the absence of appropriate protocols for loss and damage.

Using personal phones: This minimizes the need for upfront hardware costs, and end-users are more familiar with their own device, which can expedite training. However, the developed application would need to reflect the least common denominator of device capability, which could pose limitations on the mHealth strategy employed.



Resources

Mobile Technology for Community Health in Ghana: What it Is and What Grameen Foundation has Learned So Far (Grameen Foundation, 2012)

As one of the earlier mHealth deployments, Grameen Foundation's MOTECH project in Ghana offers useful lessons on implementation challenges and considerations for overcoming hurdles.

Useful features: This document highlights many common issues related to selecting phones, training and motivating health workers, and administering policies to manage devices. The publication includes links to a cost model for navigating the costs of SMS versus voice.

<http://www.grameenfoundation.org/sites/grameenfoundation.org/files/MOTECH-Lessons-Learned-Sept-2012.pdf>



ORB (mPowering Frontline Health Workers)

This platform hosts an online library of digital openly-licensed training materials for frontline health workers. This tool is designed to enhance the access to training content related to family planning, antenatal care, newborn care, child health, nutrition and other critical health domains served by frontline health workers.

Useful features: ORB contains over 200 training resources and allows submissions of new content. Users can browse the portal based on health content area or customized searches.

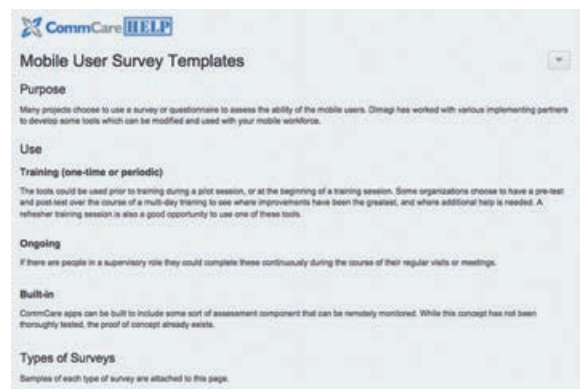
<http://www.health-orb.org>

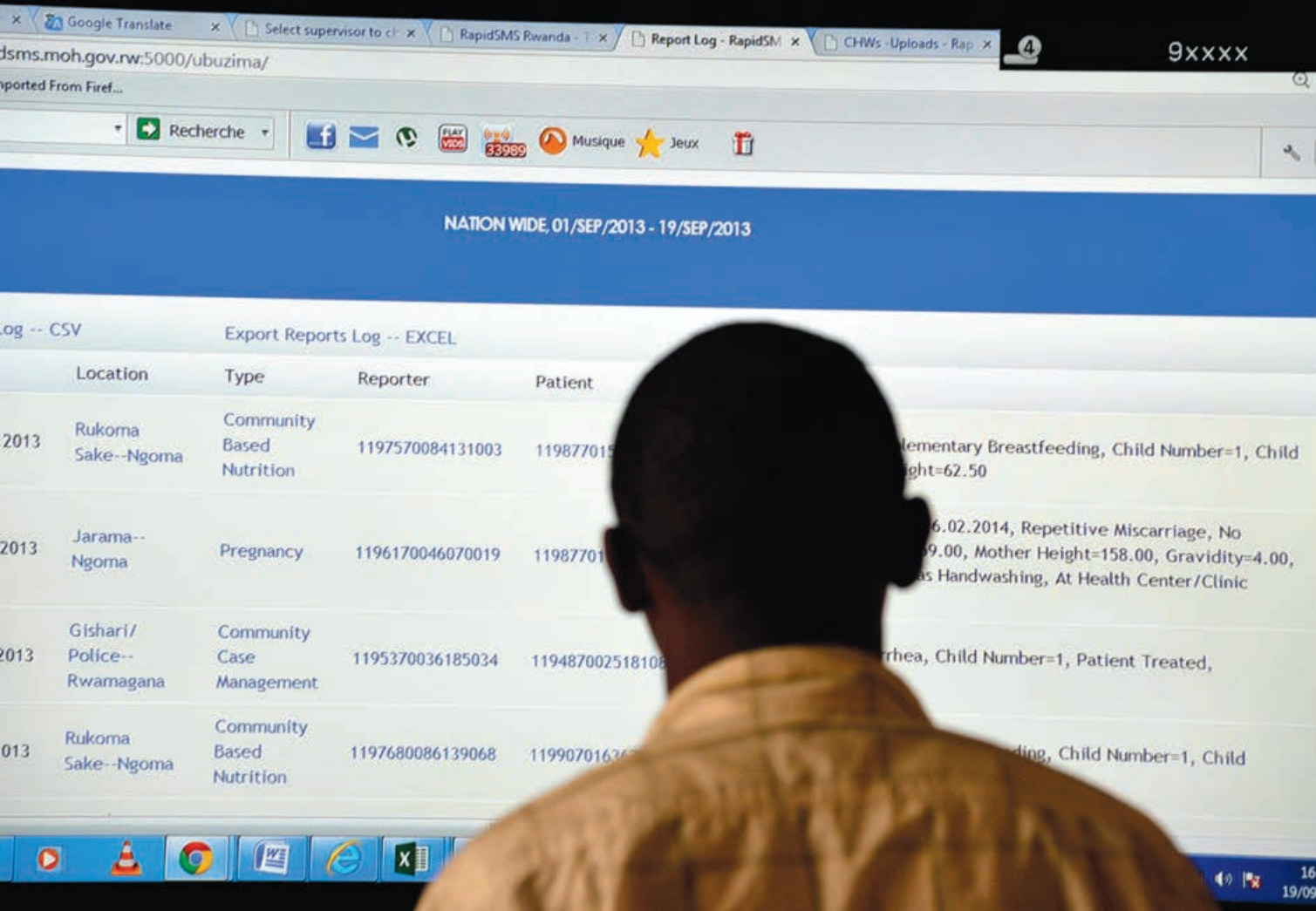
CommCare Help: Mobile User Survey Templates (Dimagi, 2012)

This website provides a series of tools for assessing the mobile phone experience of health workers that can be used when developing training curricula. It also provides links to monitoring tools for items like pre- and post-training assessments.

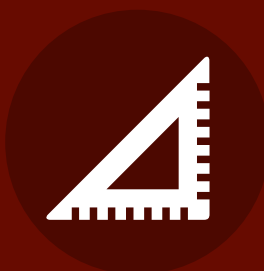
Useful features: Implementers are provided with a range of downloadable files, in particular the *Mobile experience survey skills categories and scoring guide*, that can serve as a starting point for customizing assessments on health worker ICT literacy.

<https://help.commcarehq.org/display/commcarepublic/Mobile+User+Survey+Templates>





AXIS 6. MONITORING & EVALUATION



AXIS 1.
GROUNDWORK

AXIS 2.
PARTNERSHIPS

AXIS 3.
FINANCIAL HEALTH

AXIS 4.
TECHNOLOGY & ARCHITECTURE

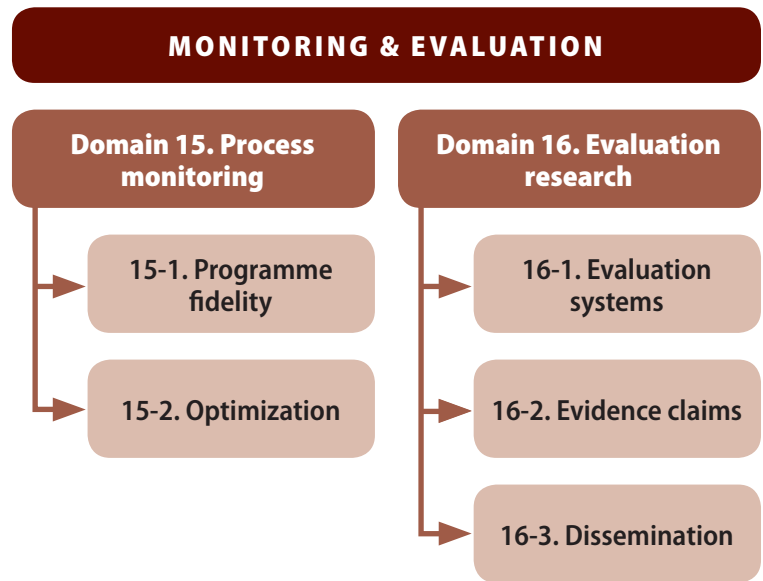
AXIS 5.
OPERATIONS

AXIS 6.
MONITORING & EVALUATION

A. Thematic overview

Monitoring & evaluation: Decisions and activities that enable effective process monitoring and in-depth outcome evaluation, based on project and stakeholder needs

A strong monitoring and evaluation (M&E) approach is essential to the successful scaling up of mHealth products. Scaling-up processes will be strengthened if they are informed by data drawn from process monitoring activities, and external support for the mHealth product will grow if evidence for its value emerges from evaluation research. M&E processes for mHealth projects present unique challenges given that ICT products for health system needs are relatively new and involve many different technologies, platforms, health domains and end-users. Project teams should dedicate adequate effort to securing appropriate resources and establishing procedures for thorough M&E activities at an early stage.



► DOMAIN 15: PROCESS MONITORING



The first component of mHealth M&E is the routine monitoring of implementation to track programme processes and address any challenges that emerge during the scaling-up process.

This involves monitoring **programme fidelity**, which requires that adequate resources – both financial and human

– are in place from the start. A portion of the project budget should be allocated to these continuous monitoring activities. While the exact amount will vary, donor organizations such as the United Kingdom’s Department for International Development (DFID) suggest allocating 10% of the project budget to M&E.²⁷ Next, projects should develop the overall plan for checking process indicators, such as a Performance Monitoring Plan (PMP), to guide ongoing data collection. This plan should define appropriate performance indicators, data sources, instruments, and the methods and schedule for data collection.

After determining the most appropriate way to collect monitoring data, the project team should determine the specific procedures and tools that will be used for analysing the data in order to identify implementation-related challenges. This process monitoring data will contribute to the **optimization** of the scaling-up process because it will provide information that can be used as a basis for making adjustments and course corrections.

A process of continuous quality improvement can be fostered by the inclusion of user-friendly dashboards and scorecards to benchmark progress and indicate where to implement relevant course-correction procedures. In addition, explicit structures must be defined for the collection of user feedback and for addressing implementation-related challenges.



PROCESS MONITORING

Routine and ongoing monitoring of the implementation of the product to track programme processes, review implementation milestones, and make course corrections throughout the scaling-up process.

EVALUATION RESEARCH

Assessment of the product’s effects and outcomes, with the emphasis on research protocols that include rigorous methods.

PROGRAMME FIDELITY

The degree to which the product is implemented as it was intended.

▶ DOMAIN 16: EVALUATION RESEARCH



The second element of M&E for scaling up mHealth products is **evaluation research**, which involves using rigorous and systematic methods to assess the product's effects. Evaluation research differs from routine monitoring in that it tracks the outcomes of expanded implementation efforts rather than programme processes. The development of appropriate evaluation systems for meeting these goals involves several different activities. First, evaluation research calls for the allocation of significant funding, which will vary based on the study design selected and whether an external evaluator is used. Second, there is the need to ensure that the findings will be relevant for core partners and other stakeholders. Provided that stakeholders, especially government and other investment partners, require rigorous evaluations to facilitate decision-making for supporting mHealth products, project teams must closely assess stakeholders' evidence priorities and reporting requirements early on.

Third, an evaluation framework (such as a theory of change or a logical framework) must be developed that details the links among the mHealth product inputs, activities, outputs and outcomes or impacts. This evaluation requires quality data streams from both system-generated and human-collected data. The data collection methods need to be aligned with stakeholder priorities and with the evaluation framework. Finally, evaluation preparatory activities involve applying for and securing ethical approval for research activities.

In considering evidence in relation to relevant stakeholders, projects will want to articulate the types of **evidence claims** that are needed at various levels of the health system. The mHealth product may affect three areas: (1) the **health system**; (2) **provider/health service delivery** performance; and (3) **individual health status**. Furthermore, cost-effectiveness analyses demonstrate value for money and cost-savings of the product over standard care.

Next, for each of the specified outcomes, project teams will need to define key components of the evaluation process, including indicators (e.g. number of monthly antenatal care [ANC] visits), data sources (e.g. DHIS2 reporting records), data collection methods (e.g. household interviews) and comparator groups (e.g. number of monthly ANC visits prior to implementation of the mHealth product).

Finally, project teams should consider opportunities for the **dissemination** of their evaluation findings, both in terms of local dissemination (e.g. press briefings) and wider dissemination (e.g. poster sessions at conferences). Once the evaluation results become available, project teams must ensure these are presented in formats that are appropriate and accessible to stakeholders.



DIFFERENT LEVELS OF OUTCOMES FOR MHEALTH PRODUCTS

Health systems

The impact of the product on health systems functioning, including improvements with regard to governance (e.g. improved management), care provision and cost-related concerns (e.g. cost-effectiveness).

Provider/health service delivery

The effect of the product on improving workflow for health workers and health-care providers (e.g. increased efficiency due to data management), and improving access, timeliness and quality of care for patients (e.g. increase in referral rates, client access to needed commodities).

Individual health status

The benefits of the product for clients/users or beneficiaries, including improvements in service use (e.g. increased use of ANC services) and attitudes (e.g. patient satisfaction).

B. Self-assessment questions

► DOMAIN 15: PROCESS MONITORING (25 POINTS)

The routine monitoring of implementation fidelity and use of the product, and the use of these data for the purposes of continuous improvement

15-1a. Have appropriate resources been allocated to support ongoing monitoring of implementation throughout all stages of scaling up? (4 points)

	NO	YES	POINTS EARNED
i) Sufficient funds are earmarked and applied to general monitoring activities (e.g. 10% of the project budget)	0	2	___
ii) Appropriate internal staff have been identified to manage and support monitoring activities	0	2	___
Total points earned (out of a possible 4)			<input type="text"/>

15-1b. Have processes and tools been developed for monitoring implementation and programme fidelity? (9 points)

	NO	IN PROGRESS	PERFORMED	DOCUMENTED	POINTS EARNED
i) A Performance Monitoring Plan (PMP) or the equivalent, which defines data collection procedures and intervals, has been developed	0	1	2	3	___
ii) Performance indicators and information sources have been defined	0	1	2	3	___
iii) Appropriate instruments for measuring the indicators have been identified	0	1	2	3	___
Total points earned (out of a possible 9)					<input type="text"/>

15-2. Have processes and tools been developed to allow for data analysis and optimization of implementation? (12 points)

	NO	IN PROGRESS	PERFORMED	DOCUMENTED	POINTS EARNED
i) Processes for regular analysis and interpretation of monitoring data have been defined (including frequency of meetings, who will participate, etc.)	0	1	2	3	___
ii) Dashboards and scorecards are in place to track implementation progress of the system	0	1	2	3	___
iii) Processes for collecting user feedback and addressing implementation-related challenges have been developed	0	1	2	3	___
iv) Protocol for making course corrections for implementation activities based on monitoring data is in place	0	1	2	3	___
Total points earned (out of a possible 12)					<input type="text"/>

▶ DOMAIN 16: EVALUATION RESEARCH (66 POINTS)

Process in place to assess the product's effects in relation to the health system, health services and/or individuals' health status, using rigorous and systematic research methods

16-1a. Have appropriate resources been allocated to support evaluation research? (6 points)

	NO	YES	POINTS EARNED	N/A
i) Sufficient funds are available for designing and conducting rigorous studies of the outcomes of scaling up the product	0	2	—	If SAQ 16-1a is not applicable, write "0" in box below.
ii) Appropriate internal staff have been identified for managing and supporting evaluation activities	0	2	—	
iii) External organization(s) have been recruited to assist with evaluation research, as needed	0	2	—	
Total points earned (out of a possible 6)			<input type="text"/>	<input type="text"/>

16-1b. Has the foundation been laid for conducting relevant evaluation research using appropriate methods? (9 points)

	NO	IN PROGRESS	PERFORMED	DOCUMENTED	POINTS EARNED
i) The specific evidence priorities and reporting needs of each key stakeholder can be articulated	0	1	2	3	—
ii) A framework (e.g. theory of change, logical framework) describing the links among the product's inputs, activities, outputs and outcomes, and impacts has been developed	0	1	2	3	—
iii) Ethical approval has been granted to carry out the planned evaluation study	0	1	2	3	—
Total points earned (out of a possible 9)					<input type="text"/>

16-1c. Are data streams available for supporting evaluation research activities? (6 points)

	NO	IN PROGRESS	PERFORMED	DOCUMENTED	POINTS EARNED
i) Procedures for accessing system-generated data from the mHealth platform for evaluation and reporting purposes have been established	0	1	2	3	—
ii) Methods for assembling human-collected data and accessing it for evaluation and reporting purposes have been established	0	1	2	3	—
Total points earned (out of a possible 6)					<input type="text"/>

16-2a. Have the types of evidence that will be demonstrated at various levels of the health sector, and by key stakeholders, been articulated? (12 points)

	NO	IN PROGRESS	PERFORMED	DOCUMENTED	POINTS EARNED
i) Health systems-level outcomes have been articulated	0	1	2	3	—
ii) Provider/health service delivery-level outcomes have been articulated	0	1	2	3	—
iii) Client-level outcomes have been articulated	0	1	2	3	—
iv) Population health outcomes/impacts have been articulated	0	1	2	3	—
Total points earned (out of a possible 12)					<input type="text"/>

16-2b. For each of the outcomes specified in 16-2a, have the key components of the evaluation process been defined? (12 points)

	NO	IN PROGRESS	PERFORMED	DOCUMENTED	POINTS EARNED
i) Indicators for measuring the specified outcomes have been defined	0	1	2	3	___
ii) Data sources pertaining to each indicator have been defined	0	1	2	3	___
iii) Data collection methods (quantitative and qualitative, as needed) are appropriate and sufficient to capture evidence priorities	0	1	2	3	___
iv) Frequency of data collection and comparators have been defined <i>Comparators may involve a comparison/control group or, if the study design is pre- and post-, then comparators may involve the baseline characteristics.</i>	0	1	2	3	___
Total points earned (out of a possible 12)					<input type="checkbox"/>

16-2c. Has data collection been carried out to support the following evidence claims? (15 points)

	NO	IN PROGRESS	PERFORMED	DOCUMENTED	POINTS EARNED
i) The functionality of the technology has been demonstrated (Does the technology work as intended?)	0	1	2	3	___
ii) The usability of the product has been demonstrated (Can the product be used effectively by intended users?)	0	1	2	3	___
iii) The efficacy of the product has been demonstrated (Does the product have the effect that was intended in an ideal/controlled setting?)	0	1	2	3	___
iv) The effectiveness of the product has been demonstrated (Does the product have the effect that was intended in a non-research setting?)	0	1	2	3	___
v) The cost-effectiveness and/or cost-utility of the product has been demonstrated (Does the product offer a greater value for impact compared to existing alternatives?)	0	1	2	3	___
Total points earned (out of a possible 15)					<input type="checkbox"/>

16-3. Have the means of dissemination of evaluation results been defined? (6 points)

	NO	IN PROGRESS	PERFORMED	DOCUMENTED	POINTS EARNED
i) Opportunities for local dissemination (e.g. community briefings) have been identified	0	1	2	3	___
ii) Opportunities for wider dissemination have been identified (e.g. publications, poster sessions, websites)	0	1	2	3	___
Total points earned (out of a possible 6)					<input type="checkbox"/>



Axis 6. Monitoring & evaluation scorecard

▶ DOMAIN 15: PROCESS MONITORING (25 POINTS)

SAQ 15-1a. Have appropriate resources been allocated to support ongoing monitoring of implementation throughout all stages of scaling up?	_____ / 4 points
SAQ 15-1b. Have processes and tools been developed for monitoring implementation and programme fidelity?	_____ / 9 points
SAQ 15-2. Have processes and tools been developed to allow for data analysis and optimization of implementation?	_____ / 12 points
Domain 15 total	_____ / 25 points
Domain 15 percentage: Domain total divided by 25, then multiplied by 100	_____ %

▶ DOMAIN 16: EVALUATION RESEARCH (66 POINTS)

SAQ 16-1a. Have appropriate resources been allocated to support evaluation research? <i>If you responded N/A to this question, the denominator is 0 points.</i>	_____ / 6 or 0 points
SAQ 16-1b. Has the foundation been laid for conducting relevant evaluation research using appropriate methods?	_____ / 9 points
SAQ 16-1c. Are data streams available for supporting evaluation research activities?	_____ / 6 points
SAQ 16-2a. Have the types of evidence that will be demonstrated at various levels of the health sector, and by key stakeholders, been articulated?	_____ / 12 points
SAQ 16-2b. For each of the outcomes specified in 16-2a, have the key components of the evaluation process been defined?	_____ / 12 points
SAQ 16-2c. Has data collection been carried out to support the following evidence claims?	_____ / 15 points
SAQ 16-3. Have the means of dissemination of evaluation results been defined?	_____ / 6 points
Domain 16 total	_____ / 66 or 60 points
Domain 16 percentage: Domain total divided by 66 or 60, then multiplied by 100	_____ %

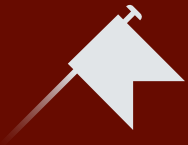
Domain 15 percentage _____ %

Domain 16 percentage _____ %

Add percentages together and divide by 2 for your Axis 6 score.

**AXIS 6
SCORE:** _____ %

C. Planning and guidance



This section can assist in planning next steps by . . .

- ✓ Demonstrating the value of process monitoring mechanisms to identify gaps impeding the fidelity of implementation
- ✓ Highlighting tools such as a Performance Monitoring Plan (PMP) and the use of system-generated data that can be harnessed for optimization and course correction
- ✓ Detailing experience-based examples of aligning evidence needs
- ✓ Demonstrating opportunities to use mobile phones for data collection in evaluation research
- ✓ Presenting resources for organizing an evaluation plan, including:
 - M&E frameworks to demonstrate links across inputs, outputs, etc.
 - handbooks for designing and conducting evaluations
 - repositories for retrieving research publications
 - guidance on reporting and disseminating findings

► DOMAIN 15: PROCESS MONITORING



Tips and considerations

Considerations for using system-generated data for process monitoring

System-generated data may be a useful tool for automatically obtaining operational data, as a means of monitoring the project. It is important to understand the type of data that can be collected and accessed easily for monitoring purposes (e.g. timestamps, global positioning system [GPS] coordinates, health worker identity numbers, etc.). Additionally, early considerations about how the data are formatted and structured during implementation will reduce future problems in retrieving relevant data. Even when working with MNOs, the variables and format for data sharing should be agreed upon. Projects should also develop an early understanding of how data captured through the mobile phone are stored on the back-end server. If the data structure is not clearly documented or set up, the analyst may need to expend considerable effort on understanding the data structure, how it works and the skip patterns in the data. They may also need to clean the data before it can be analysed. This can all take a considerable amount of time, or, worse, the data may not be usable at all if project teams do not plan in advance.



Tips and considerations

Tools for developing a Performance Monitoring Plan (PMP)

The CommCare Help Site provides tools that can be used to routinely monitor and track health worker performance. Although the forms were designed specifically for CommCare deployments, they can be used more broadly to help projects inform their PMPs. For example, the Worker Activity Report form highlights questions that can be used to monitor behaviours such as phone use, the types of tasks completed on the phone, and the timing of these activities. The Form Completion Time monitors how long it takes a health worker to fill in the forms. Data managers and staff responsible for M&E can use these data to estimate average time spent on completing forms, and to check whether individual health workers show marked differences from the norm. This analysis can be used as an opportunity to identify competencies that require further targeted training and/or supervision. The suite of monitoring reports can be downloaded from the CommCare Help Site.



<https://help.commcarehq.org/display/commcarepublic/Worker+Monitoring+Reports#WorkerMonitoringReports-WorkerActivity>



Lessons from the field

Optimize service delivery through continuous improvement

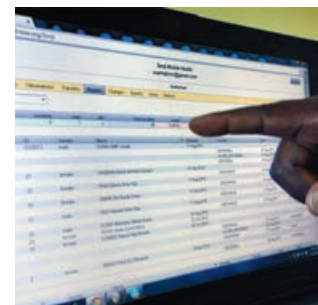
Projects can benefit greatly from making course corrections based on process monitoring data, which may enhance the coverage and fidelity of implementation. For example, VillageReach Chipatala cha pa Foni (Health Centre by Phone), a hotline service in Malawi, used its health hotline system to monitor the frequency and timing of SMS and voice messages sent, details on the time of day messages were sent, volume and outcomes of incoming calls, and the successful receipt of messages. This information was used to improve service delivery through changing the time of day when messages were sent, and reallocating hotline staff to avoid calls going unanswered.



Lessons from the field

Enforce measures to promote data quality and integrity

Preventing the fabrication of data is a persistent challenge for both paper-based and digital records, and the inclination of health workers to falsify data may be greater in motivational schemes that reward performance based on success in reaching targets. D-Tree International in the United Republic of Tanzania designed a pay-for-performance system that allowed health workers to view their performance and monitor their achievement towards set targets; if the targets are met, the health workers receive a small addition to their monthly stipend. The system yielded a marked increase in monthly registrations and follow-up visits. During routine data monitoring, the team observed unusual patterns of data collection, with follow-up visits being recorded consecutively within two minutes of each other or GPS codes indicating that submissions were all from the same location. These cases were investigated further, which led to the confirmation of fraudulent reporting.



Although this issue was resolved immediately, the close assistance of the implementing partner, D-Tree, has heightened the focus on routine monitoring through mechanisms such as a suspicious activity reporting to flag potentially fabricated information based on a set of tested parameters.



Tips and considerations

Considerations for ethical review

Although the considerations for ethical review of research related to mHealth products are similar to those for other interventions, projects should anticipate additional delays in obtaining ethical review due to the additional complexity associated with data security and privacy implications that are layered onto existing health interventions. Additional time may also be needed for approvals from in-country institutions as well as an external institution/university, if there are partnerships with external evaluators. Implementers should submit study protocols as early as possible, and allow time for potential delays. For evaluations delivered over the telephone, researchers will need to invest time in scripting informed consents that are detailed enough to meet ethical requirements yet concise enough to be communicated easily.



Lessons from the field

Organize M&E needs

Frameworks to organize M&E can be a good way of ensuring the relevance of data that are being collected, and useful for flagging areas of evidence needs that require additional information sources. The Reach Effectiveness Adoption Implementation Maintenance (RE-AIM) framework is an example of a comprehensive M&E approach for consolidating the different threads of data being collected. The RE-AIM framework was developed by Virginia Tech and has been applied by Kenya Medical Research Institute (KEMRI) in the design of a comprehensive M&E system in their Texting to Improve Testing (TextIT) intervention, which aims to increase clinic attendance and early infant HIV testing.

<http://www.re-aim.hnfe.vt.edu/>

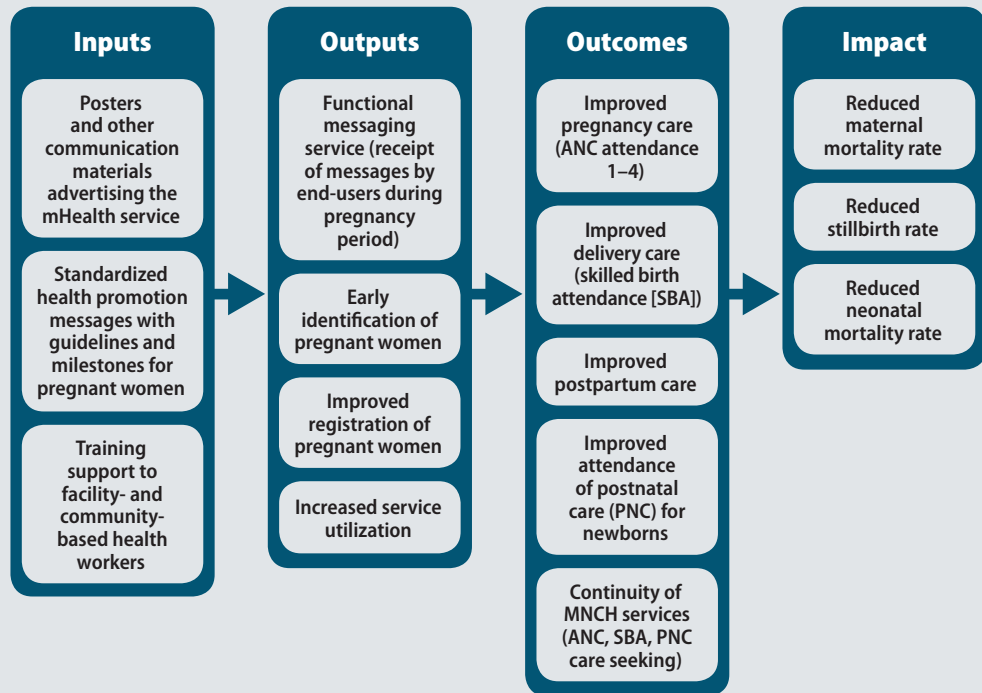
RE-AIM CONSTRUCT	INTERPRETATION AND USE BY KEMRI
Reach: the level of penetration of an intervention in terms of the proportion of eligible participants who receive the intervention	Proportion of users who receive the TextIT intervention, from among the total number of eligible HIV-positive pregnant women identified at health-care facilities
Efficacy/effectiveness: the impact on targeted outcomes	Based on a cluster-randomized controlled study measuring the primary outcomes of the early infant diagnosis of HIV
Adoption: the proportion of organizational units or settings that adopt a given intervention	Proportion of health-care facilities implementing the TextIT intervention, from among the total number of eligible or targeted health-care facilities
Implementation: the delivery of an intervention with fidelity to the original design	Proportion of women who receive messages as scheduled, from among the total number of women registered for the service (based on automated reports from TextIT system)
Maintenance: the sustainability or government adoption of an intervention	Measured through a proximal indicator as the proportion of all health-care facilities that include the TextIT strategy in their annual operating plan – a resource planning document that each health-care facility is required to prepare every year



Tips and considerations

Use logical frameworks to demonstrate linkages to outcomes and impact

Logical frameworks are an effective way to organize and connect project activities to outcomes and eventual impact. They can also be used to identify the corresponding indicators necessary for measuring particular outputs and outcomes. The example below highlights common components of an M&E logical framework applied to the South African Department of Health's MomConnect programme.



Source: Adapted from the model developed by JHU-Gml and WHO's Department of Reproductive Health and Research for GSMA's mHealth for Maternal, Newborn and Child health (MNCH) Impact Model <http://www.gsma.com/mobilefordevelopment/mhealth-for-mnch-impact-model>



Lessons from the field

Align evaluation efforts with evidence needs of key stakeholders

Before beginning evaluation activities, it is useful to reflect on and understand the evidence claims and indicators required to gain the support of stakeholders. Reviewing national health strategies and mapping the priority areas is a useful way to identify the evidence claims needed for stakeholders, particularly government partners. This understanding will allow projects to identify the required indicators, such as cost-effectiveness, sought by decision-making partners. For example, KEMRI identified the proportion of infants exposed to HIV as a key indicator for alignment with the national strategy on Elimination of Mother-to-Child Transmission. Thus, KEMRI ensured this was incorporated into their rigorous cluster randomized controlled study to demonstrate that their system affected this key outcome.



Lessons from the field

Explore opportunities to harness mobile phones for evaluations

An added advantage of conducting mHealth evaluations is the ability to incorporate mobile phones into the study design, and thus use them simultaneously for service delivery and M&E. While implementing the Mobile for Reproductive Health (m4RH) service in the United Republic of Tanzania, FHI 360 explored the unique opportunity to solicit information from users via the mobile phone. Using SMS allowed them to collect demographic data and information on health seeking behaviour, such as visiting family planning centres, via the same platform as that used to deliver the service. With participant response rates approaching 50%, this idea represents a robust approach to M&E of mHealth programmes. Such opportunities should be harnessed keeping in mind the potential limitations, such as selection bias (i.e. differences among those who choose to engage in the mobile survey and the general client population), and survey fatigue (i.e. the need to limit the number of survey questions that can be asked before respondents drop off).



Resources

The following resources provide details on methods and other critical components of evaluations.

MAMA's Research Agenda (Mobile Alliance for Maternal Action, 2015)

This compilation of research experiences showcases approaches to measuring health inputs, outputs, outcomes and impact measures across various programmes that use mHealth for maternal health.

Useful features: The document provides easy-to-use graphics that demonstrate examples of the theories of change models for maternal, newborn and child health (MNCH) priority outcome areas. It also includes primers on classifying the strength of evidence based on various study designs evaluating interventions that use mobile messaging for MNCH. http://mobilemamaalliance.org/sites/default/files/MAMA%20Research%20Agenda_FINAL_March%202015_1.pdf



Impact Evaluation in Practice (Gertier et al., World Bank, 2011)

This publication provides a practical guide to conducting rigorous impact evaluations for implementation settings. The book dedicates chapters to critical components for designing impact evaluations ranging from fundamental questions of deciding between prospective and retrospective evaluations, to determining the research questions and implementing the evaluation.

Useful features: This comprehensive resource includes areas relevant to mHealth evaluations, such as cost-effectiveness analysis, differentiating between efficacy and effectiveness studies, developing theories of change, and more granular areas such as the sampling strategy and questionnaire format. Project evaluators may find it valuable to review the table of contents for more targeted guidance.



mHealthEvidence.org (Knowledge4Health)

This online platform compiles a repository of peer-reviewed and grey literature related to mHealth.

Useful features: Projects can easily retrieve information sources based on a wide range of search criteria, including health domains, mHealth strategies and target users, among other classifications.

<https://www.mhealthevidence.org/about>



Guidelines for Reporting mHealth Evidence: the mHealth Evidence Reporting and Assessment (mERA) (Agarwal et al., in press)

This publication builds on the work of the mHealth Technical Evidence Review Group to establish standard criteria for reporting and disseminating findings from mHealth evaluations.

Useful features: Researchers can review the grading criteria appendix ahead of publishing to ensure that their papers reflect mHealth reporting guidelines.

Summary scorecard

After completing each axis scorecard, transfer the results for the axis percentages and domain percentages to this sheet. This will allow you to compare your progress across the six axes, and to identify the domains that require greater attention and efforts.

AXIS 1. GROUNDWORK	<input type="text"/>	%
Domain 1: Parameters of scale	_____	%
Domain 2: Contextual environment	_____	%
Domain 3: Scientific basis	_____	%

AXIS 2. PARTNERSHIPS	<input type="text"/>	%
Domain 4: Strategic engagement	_____	%
Domain 5: Partnership sustainability	_____	%

AXIS 3. FINANCIAL HEALTH	<input type="text"/>	%
Domain 6: Financial management	_____	%
Domain 7: Financial model	_____	%

AXIS 4. TECHNOLOGY & ARCHITECTURE	<input type="text"/>	%
Domain 8: Data	_____	%
Domain 9: Interoperability	_____	%
Domain 10: Adaptability	_____	%

AXIS 5. OPERATIONS	<input type="text"/>	%
Domain 11: Personnel	_____	%
Domain 12: Training and support	_____	%
Domain 13: Outreach and sensitization	_____	%
Domain 14: Contingency planning	_____	%

AXIS 6. MONITORING & EVALUATION	<input type="text"/>	%
Domain 15: Process monitoring	_____	%
Domain 16: Evaluation research	_____	%

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Annex 1. Methods used to develop the MAPS Toolkit

Workshops with Innovation Working Group (IWG) grantee mHealth projects

The need for the Toolkit was identified in 2011 with grantee projects jointly voicing a need for a scale-up tool. Specific concepts that have been incorporated into the MAPS Toolkit reflect on the “pain points” those projects expressed through collective learning exercises. Information gathered during more than two years of workshops, at which concept domains were tested using different worksheets with grantees, has significantly influenced the scope and development of the MAPS Toolkit.

Literature review

The process began with an analysis of peer-reviewed publications and grey literature (unpublished reports and guides) that discussed the scale-up solutions in general, as well as those that focused specifically on scaling up information and communication technology (ICT) or mHealth in low- and middle-income countries. This also involved an internal review of IWG grantee project reports and assessments, as well as monitoring worksheets that were used to target WHO technical assistance to IWG grantees.

Site visits with mHealth projects

A trained qualitative researcher conducted in-depth interviews (IDIs) and observations with project managers of IWG grantee organizations as well as key partners (May 2014).

Consultations with experts

Additional interviews were conducted remotely with technical experts in the field who offered specialized knowledge of different aspects of the emerging conceptual framework (June–October 2014).

Additional workshops

Feedback on the framework and initial self-assessment questions (SAQs) was solicited at two different workshops involving IWG grantees in 2014. Feedback from these activities was considered and incorporated into subsequent iterations of the SAQs.

Review panel

A review panel consisting of mHealth project managers from IWG grantee organizations met regularly over the course of three months (January–March 2015) to assess the soundness of the SAQs in comparison with their projects’ own experiences.

Technical workshop

A meeting was convened with a group of mHealth stakeholders and thought leaders, including representatives from the United Nations Foundation, the World Health Organization and Johns Hopkins University Global mHealth Initiative (April 2015), to scrutinize and finalize the SAQs.

Pre-testing

A group of IWG grantees applied the toolkit to their own projects during a validation workshop in Malawi (May 2015).

In addition to these specific methods, many of the themes and instructive features of the Toolkit emerged from project teams’ reflections on scale-up processes via conversations with the IWG team as well as presentations and discussions from IWG joint learning workshops that took place during the current and previous grant cycles. These workshops included:

- **IWG “expertise swap” workshop held in conjunction with the Global mHealth Forum:** December 2015; Washington, DC, United States
- **Government engagement and institutionalization:** June 2014; Dhaka, Bangladesh
- **In-country IWG technical workshop:** June 2013; Johannesburg, South Africa
- **In-country IWG technical workshop:** July 2013; Lilongwe, Malawi
- **IWG workshop:** December 2012; Warrenton, VA, United States
- **Challenges and lessons learnt workshop:** June 2012; Monkey Valley, South Africa

While the compilation of these experiences spans four years, the features included in this document focus more heavily on the themes that emerged during 2014–2015 in order to ensure their relevance in the rapidly evolving mHealth field.

Annex 2. Projects that informed “Lessons from the field”

The “Lessons from the field” sections present experiences from the Innovation Working Group (IWG) projects and affiliates, including the following teams:

Dimagi | India

CommCare is a mobile job aid that was developed to help India’s accredited social health activists (ASHAs) improve their performance to better serve the vulnerable, rural populations. The software includes registration forms, educational prompts, and several other tools that facilitate better data collection, decision support, communications with clients and health centres, access to educational training materials, and real-time case management tracking. Dimagi, a software company based in the United States, developed CommCare in collaboration with on-the-ground organizations in many parts of the world, which has helped make CommCare highly adaptable. The open-source online tool, CommCare HQ, allows users to design their own applications to address the specific needs of health workers in other settings.

<http://www.dimagi.com/>

D-Tree International | Zanzibar, United Republic of Tanzania

D-Tree International has developed the interactive nutrition software **eNUT** to improve the implementation of government-approved treatment guidelines for acutely malnourished children. eNUT is for government health workers (primarily nurses); it takes them step-by-step through these guidelines using data from past and current visits to assess the child’s progress and determine the next treatment steps. Zanzibar’s Ministry of Health and Social Welfare (MOHSW) has embraced eNUT as part of the national nutrition programme, and together with several other partners, D-Tree International is working to scale up the product throughout Zanzibar.

<http://www.d-tree.org/>

FHI 360 | Kenya and the United Republic of Tanzania

FHI 360 has developed the **Mobile for Reproductive Health (m4RH)** service, which is an automated, interactive and on-demand short messaging service (SMS) or text messaging system that provides essential information about the full range of short- and long-acting contraceptive methods. FHI 360 has been exploring three avenues that could contribute to financial sustainability of m4RH in Kenya and the United Republic of Tanzania: (1) Partnering with private companies; (2) charging user fees; and (3) marketing the service at different price levels.

<http://www.fhi360.org/>

Grameen Foundation | Ghana and Nigeria

The Grameen Foundation features the **Mobile Technology for Community Health (MOTECHE)** initiative in Ghana, which uses mobile phones to bridge the gap between access to health information and service provision. The MOTECHE software comprises two applications: Mobile Midwife, which provides weekly informational messages directly to pregnant women; and the Nurses Application, which helps nurses in rural areas record and track the care provided to women and newborns. MOTECHE has been implemented primarily in Ghana in partnership with the Ghana Health Service, and has also been launched in Nigeria.

<http://www.grameenfoundation.org/>

Institute of Reproductive Health (IRH) | India

IRH at Georgetown University has developed **CycleTel**, a direct-to-consumer family planning service designed in India. CycleTel is based on the evidence-based Standard Days Method, which enables a woman to track her menstrual cycle in order to identify her fertile window and use a barrier method or abstinence during that time to avoid pregnancy. CycleTel automates this process by using SMS to alert women of their fertile days each month.

<http://irh.org/cycletel/>

Interactive Research and Development (IRD) | Pakistan

IRD has developed the **Interactive Alerts** programme to improve immunization coverage through the Expanded Programme on Immunization (EPI) in Pakistan. Interactive Alerts aims to improve uptake and timeliness of child vaccination by sending SMS reminders for appointments to caregivers who enrol in a lottery system during an EPI centre visit. The lottery system serves as an incentive for health workers as well as caregivers, since each time a prize is won, the health worker who administered the vaccine receives a portion of the prize. In addition, Interactive Alerts allows health workers to track enrolled children through a phone-based radio frequency identification system (RFID). IRD is currently collaborating with the Department of Health and EPI staff in Sindh Province, and is planning future integration of activities across several projects to improve sustainability.

<http://www.irdresearch.org/>

International Institute for Communication and Development (IICD) | Mali and Senegal

IICD has developed the **Mamans Mobiles contre le Malaria au Mali (MAMMA)** application to address the burden of malaria among pregnant women and children under 5 years old, which results from limited knowledge about malaria prevention, in addition to late detection. Community health workers (CHWs) use the application to fill out a questionnaire on malaria indicators during their house calls. The collected data are then sent to local health centres, allowing for the routine monitoring of each patient's condition and for health specialists to communicate with the CHWs to help overcome barriers to treatment-seeking. IICD has partnered with local community health organizations in Mali and Senegal to train CHWs and health specialists in several zones in Mali and Senegal.

<http://www.iicd.org/>

Johns Snow, Inc. (JSI) | Malawi

JSI leverages **cStock**, an SMS- and web-based, open-source logistics management information system for reporting, calculating resupply, managing and monitoring all community-level health products. cStock has been scaled up nationwide in Malawi, and JSI is currently working with the Ministry of Health (MOH) to build their capacity to run the service independently.

<http://sc4ccm.jsi.com/countries/malawi/>

Kenya Medical Research Institute (KEMRI) | Kenya

KEMRI's **Texting to Improve Testing (TextIT)** project is a theory-based, individually tailored text-messaging intervention aimed at improving retention of mothers and babies in programmes for prevention of mother-to-child transmission (PMTCT) of HIV. KEMRI is currently in the process of determining the costs, cost savings and cost-effectiveness of regional scale-up in order to inform future countrywide expansion.

<http://www.kemri.org/>

Medic Mobile | Nepal

Medic Mobile's technology platform **SafeSim** improves access to prenatal, delivery and postnatal care by supporting Female Community Health Volunteers (FCHVs) in Nepal. The platform enables remote registration of patients, provides automated reminders to FCHVs, and allows them to report delivery and danger signs to skilled birth attendants. Medic Mobile has deployed the product in Baglung District, and aims to scale it up to the national level.

<http://medicmobile.org/>

Ministry of Health (MOH) | Rwanda

The MOH in Rwanda has partnered with United Nations Children's Fund (UNICEF) to launch an mHealth system based on **RapidSMS** to help track mothers and newborns. RapidSMS, a simple text-messaging tool, has been customized to allow CHWs to actively search for women with new pregnancies and to track them through gestation, neonatal care, postnatal care and community case management, including nutritional status. RapidSMS Rwanda has been implemented in all districts in Rwanda, and is currently being optimized with the support of UNICEF.

<http://www.moh.gov.rw/index.php?id=2>

MOH Zanzibar | United Republic of Tanzania

Wired Mothers, or **mama mitandao**, provides SMS reminders encouraging women to attend routine antenatal care appointments, use skilled birth attendants and access postnatal care. Customized software automatically sends text messages to enrolled women throughout their pregnancies according to gestational age and until six weeks after delivery.

http://www.africanstrategies4health.org/uploads/1/3/5/3/13538666/wired_mothers.pdf

Pathfinder International | Nigeria

Pathfinder supports Nigeria's Saving One Million Lives initiative by scaling up the use of **CommCare**, a mobile phone decision-support application, to improve the quality of maternal and child health services offered at primary health centres. Pathfinder is currently seeking to strengthen the health management information system (HMIS) to enable reporting on national-level indicators.

<http://www.pathfinder.org>

Society for Elimination of Rural Poverty (SERP) | India

As part of their efforts to break the cycle of malnutrition in mothers and children in India, which is largely responsible for the country's high rates of maternal and child mortality, SERP has created thousands of Nutrition Day Care Centres (NDCCs) in rural Andhra Pradesh. SERP's mobile application **mNDCC** enables increased communication between village-level community workers and programme officers at the headquarters. The mNDCC device tracks client information such as immunizations, growth monitoring and attendance at the NDCC, among other items, and then shares this information with headquarters staff to facilitate decision-making. In addition, mNDCC allows health activists to track the training sessions they have led, and provides alerts for every mNDCC module. Through this application, SERP has helped the government recognize the importance of real-time data to inform the best decisions possible.

<http://www.serp.ap.gov.in/SHGOLD/>

UNICEF and MOH | Uganda

UNICEF Uganda and the MOH have developed the **mTrac** system, which aims to strengthen the national HMIS and empower the Ugandan Government to monitor health system performance by providing access to real-time data and improving health sector accountability. This project includes mReport cards to assess the impact of increased transparency, as well as U-Report, an anonymous toll-free SMS hotline where citizens can voice complaints about health services. UNICEF is currently working with the MOH to strengthen the quality of the data collected from mTrac across Uganda.

<http://www.mtrac.ug/video-tags/unicef>

VillageReach | Malawi

VillageReach manages **Chipatala cha pa Foni**, a toll-free hotline and mobile messaging service, to improve case management of maternal and child health and increase uptake of community-accessed and facility-based services in four rural districts. The MOH in Malawi has endorsed the service, and has expressed the hope of seeing it scaled up nationally by 2017.

<http://www.villagereach.org/impact/ccpf/>

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