Productizing Two Large-scale Implementations of MOTECH for Global Reuse

Purpose of the Proposal:

Aim of this proposal is to obtain funding for productizing implementations of two hugely successful programs, built on top of the popular mHealth platform MOTECH. Mobile Academy (for educating field level workers - FLWs) and Kilkari (for targeted messaging to beneficiaries) are IVR based solutions. These two implementations are being used in conjunction with Mobile Kunji (mobile and print-based job aids for FLWs) to engage in effective social and behaviour change communication (SBCC) in poor and rural settings. National Scale-up Project (NSP) of Kilkari and Mobile Academy has enabled these services in reaching millions of users across different states of India. Productizing these solutions will enable organizations across the world, especially in low and middle income countries (LMIC), to engage in SBCC activities for a variety of initiatives at scale using reliable and proven technology platforms.

This proposal comprises details on the following:

- A background on the above-mentioned implementation programs and their impacts
- An overview of the technologies driving these programs
- Benefits of turning these implementations into reusable global health assets
- Activities required towards converting into reusable assets
- A roadmap for productizing and globalizing said assets
- A budget and workplan required for the productization
- Story of why we (BeeHyv Software with support from our partner in these programs, BBC Media Action) are well positioned to be successful in this endeavour

Problem Statement:

Some of the problems in areas like health, sanitation or even inequities in society in LMIC are related to behaviour patterns that have got entrenched over generations. Lack of education combined with lack of access to resources accentuates the issues.

Innovative ways are required to change these behaviours for the benefits to finally percolate down to the end beneficiaries.

Mass communication has been used for long to bring about behavioural changes. It holds relevance even today. However, the success of Mobile Academy, Mobile Kunji and Kilkari, conceptualized and implemented by BBC Media Action supported by other agencies, have shown that direct targeted messaging to the end beneficiaries is far more effective. These programs have adopted a two pronged approach of reaching out directly to the end-beneficiaries by using interactive voice response system (IVR) and via the FLWs who interact directly with them. They have enabled FLWs to communicate effectively using consistent information.

To implement such large campaigns at scale using existing technologies, especially open source technologies, requires significant effort and skill. Based on the success of above-mentioned programs and our experience with the technology implementations, we want to make the technologies easily usable and adoptable for organisations around the world who want to use IVR for SBCC, especially in LMIC.

The current implementations of Mobile Academy and Kilkari were built as specific services. The purpose of this proposal is to abstract out the implementation and create generic products.

Program Descriptions as User Stories:

BeeHyv Software and BBC Media Action have a strategic partnership and are working together on major interventions with MoHFW (Ministry of Health and Family Welfare) and MoDWS (Ministry of Drinking Water and Sanitation, Govt. of India). IMImobile is providing IVR services on these initiatives.

Kilkari is a mobile health education service that provides pregnant women, new mothers, and their families with timely, accessible, accurate and relevant information about Reproductive, Maternal, Neonatal and Child health. The service aims to improve families' knowledge and uptake of life-saving preventative health practices.

1. Uses IVR technology to deliver time-sensitive audio information directly to families' mobile phones

2. Covers the critical time period – where the most deaths occur from the 2nd trimester of pregnancy until the child is one year old (72 weeks)

3. Subscribers receive one pre-recorded call per week, linked to the woman's stage of pregnancy or the child's age

4. Obtains beneficiary information by integrating into Govt. of India's maternal and child tracking system (MCTS) and reproductive and child health (RCH) system.

Background:

Kilkari is India's first and largest maternal health messaging service. Kilkari was first launched by BBC Media Action in a state back in 2013, as part of a program supported by Gates Foundation.

Kilkari evolved from Mobile Midwife, the 1st maternal health messaging service for poor, rural women in a developing country. Launched in Ghana in 2010-2011, Mobile Midwife was developed by Grameen Foundation with support from Gates Foundation.

Mobile Academy is an IVR-based Reproductive Maternal Neonatal and Child health training course designed to refresh frontline health workers' knowledge of life-saving preventative health behaviors, and improve the quality of their engagement with new and expecting mothers and their families.

1. Uses IVR technology that is handset independent, audio based and accessed via a simple voice call

2. Covers 33 months; from pregnancy until the child is 2 years of age

3. Divided into chapters, lessons and quizzes, and CHWs' receive an accumulative pass/fail score at the end of the course

4. Obtains FLW information by integrating into Govt. of India's maternal and child tracking system (MCTS) and reproductive and child health (RCH) system.

Background:

Mobile Academy is the world's largest mobile based training program for FLWs. It was first launched by BBC Media Action as part of the same program that launched Kilkari under program management of BBC Media Action.

Mobile Academy evolved from a BBC Media Action program in Bangladesh called BBC Janala, which was the largest mobile-based education program in the world in 2011. Thanks to sustained uptake and usage of services and the value beneficiaries saw in the service, (MoHFW) Ministry of Health & Family Welfare decided to scale Kilkari and Mobile Academy nationally in August 2014.

Mobile Kunji, a mobile and print-based job aid for FLWs, is a dedicated tool aimed at delivering high quality, standardized, facilitated SBCC that has been rolled out at a significant scale, and consistently adopted by FLWs for a sustained period of time.

Much after the implementation of a program Ananya by BBC Media Action, it was realized that challenges to engage in effective social and behavior change communication (SBCC) with poor, rural women in a northern state of India persisted. Mass media penetration in that region is 22% for television and 15%-20% for radio. These statistics are said to be much lower in lower-income-group households. Such households are marked as "media dark households". Given these barriers, FLWs remain the most effective channel for changing the behavior of most pregnant women and mothers in this and other similar regions because they can access pregnant women and mothers at their homes.

Kilkari, Mobile Academy and Kunji , in tandem, have worked effectively to achieve tremendous behavioural change amongst beneficiaries on a mass scale.

Each of these reinforce the other, at the end increasing the chances of adoption of the right behaviour by the beneficiary. Studies have shown that the results are better when all three work together than when they are used individually.

Based on the success of these programs (which we will see in the next section), BeeHyv Software and BBC Media Action think that abstracting their implementations and productizing will help organizations across the world looking to drive such behavioural changes in diverse areas (not just limited to health) to build similar programs.

Their effectiveness has already been demonstrated when it comes to reproductive, maternal and child health.

We are also in the process of implementing Mobile Academy christened "WASH Academy" for Ministry of Drinking Water and Sanitation, Govt. of India, for driving such behavioural changes in people in issues related to drinking water and sanitation by educating sanitation workers.

Program Impacts:

Timelines & Impacts
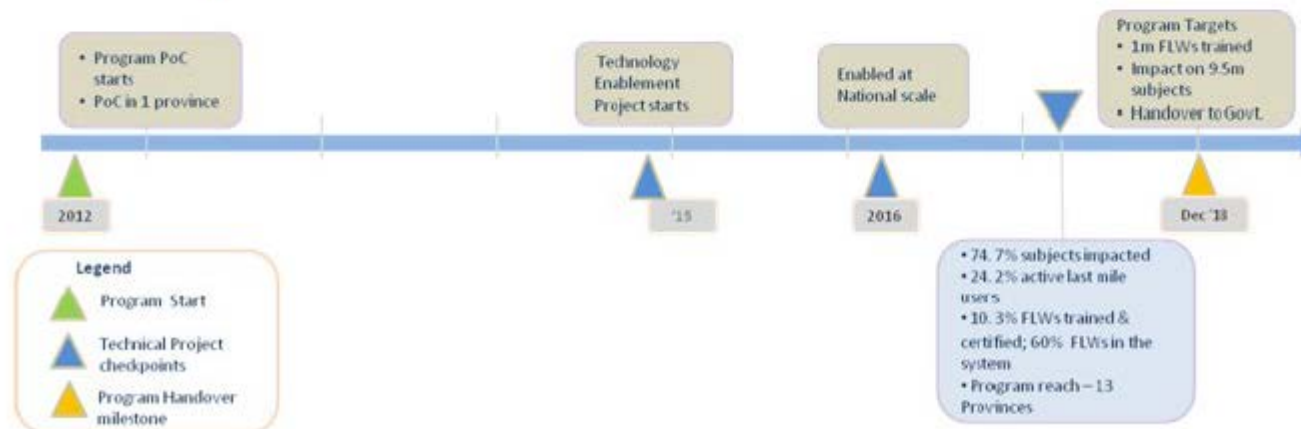
National Scale up project of Mobile Academy and Kilkari officially kicked off in October 2014. In November 2015, soft launch for Kilkari was carried out in 6 states and for Mobile Academy in 4 states.

Kilkari: what has been delivered in 24 months

Launched in 13 states

More than 900 state officials trained

~0.1m subscribers reached

5 languages

Mobile Academy: Impacts in 24 months

Launched in 13 states

More than 900 state officials trained

1,14,267 have started the course*

89,901 have graduated**

4 languages

Mobile Kunji: Impacts in 72 months

Launched in 28 districts of a state

115,000 FLWs engaged

48 million minutes of Mobile Kunji content played

52,000 unique users across 28 districts

1.1 million minutes of content played/month

Kilkari performance

In 24 months

- **0.1m** — Unique mobile nos. subscribed
- **0.09m lakh** — Answered at least one call
- **1.54m** — Calls answered
- **1.54m** — Mins of content played

Average monthly indicators

Approximately 72% of Kilkari subscribers are listening to all 4-5 calls that they are supposed to receive in a month*

On average, Kilkari subscribers listen to 1 minute of content per call

On 43% of calls answered, subscribers are listening to 75% to 100% of the content

*Among those who have answered at least one call

National Scale-up Project Impacts

- Outreach to 7.1m beneficiaries by means of IVR messaging
- Trained 0.103m FLWs (frontline health workers)
- Project implementations expanded to beneficiaries across 13 provinces having started from 4 in the first phase
- The Union Health Minister, Govt. of India launched both services as part of the Digital India Mission in Delhi in January 2016

Mobile Kunji: Qualitative impacts of implementation

The 2014 Usage and Engagement Study conducted by BBC Media Action with a larger population demonstrated that

- Conversations between FLWs & beneficiaries last twice as long and are more interactive
- Usage of Mobile Kunji enhanced self-efficacy and changes in attitudes and social norms across multiple behaviours
- Usage of Mobile Kunji has increased awareness in better family planning methods adopted by families

Table below depicts all program/project partners and their respective roles:

Technical Partners	Program Implementation Partners	Program Governance Stakeholders
BeeHyv Software Solutions	BBCMA (BBC Media Action)	BBCMA (BBC Media Action)
IMI Mobile		BMGF (Bill & Melinda Gates Foundation)
NIC (National Information Center)		USAID
RailTel		MoHFW (Ministry of Health & Family Welfare – India)

Digital Health Technologies:

Roadmap for Existing Implementation to Lead Upto End-Product

BeeHyv, in conjunction with BBC Media Action, has conceptualised a journey to convert existing program implementations to the end product for global reuse. The said journey focuses on the following:

- End-product being aligned to digital health technology for large-scale adoption in wider contexts for global reuse

- Ease of use by global communities by enabling sufficient documentation
- Modular structure of end-product enabling independent user-stories by ensuring decoupled architecture

Following table shows activities planned for the productization of existing implementation:

| High-level Goal	High-level Activities
Generalization of Mobile Academy & Kilkari for wider usage	- Developing UI, DB for generic modules of Mobile Academy and Kilkari for generalising their user-stories - Generalising following modules: Location & Language Import User (Beneficiaries & FLWs) Data Media Transaction Management CMS for Media User Identification Management - Integrating with an IVR provider by building an IVR configurator - Testing product for generalized user stories - Documentation, Packaging & Release

Our understanding of value proposition is as follows:

High-level Goal	Value Proposition
Generalization of Mobile Academy & Kilkari for wider usage	1. Reuse of the user-stories for FLW training and IVR-based messaging to beneficiaries for the purposes of social and behavioural changes in wider contexts (maternal & child health, sanitation, diversity and inclusion etc.) across the world 2. Full-fledged documentation for enabling the ease of use of the intended platform by other teams and technical communities 3. Independence of being able to work with an IVR provider of choice (Product will integrate with a generic IVR provider)

Technical Summary of Existing Implementation

Existing Implementation is built on top of open-source mHealth MOTECH platform. It leverages a large-scale database of beneficiaries and FLWs to deliver IVR-based messaging as well as training content respectively. The implementation uses IVR technology by IMI Mobile. End-product is an open-source product.
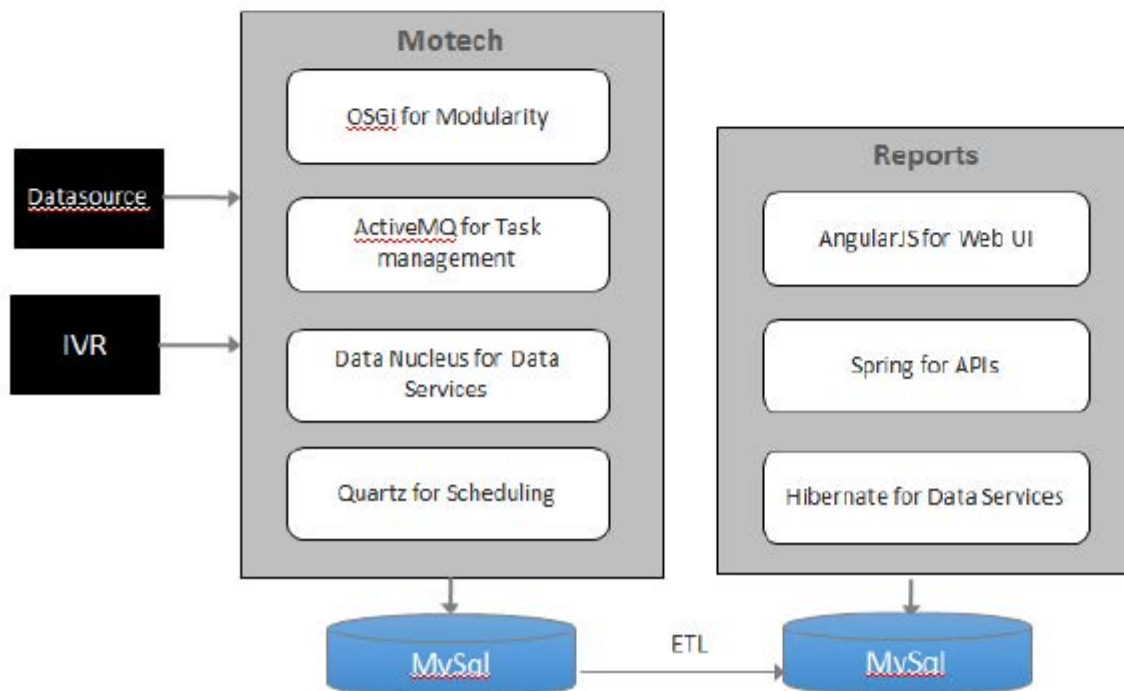
Functional Flow Diagram for Existing Program Implementations

Following flow diagram provides a view of functional components and interactions between them. Each functional module/component is annotated.
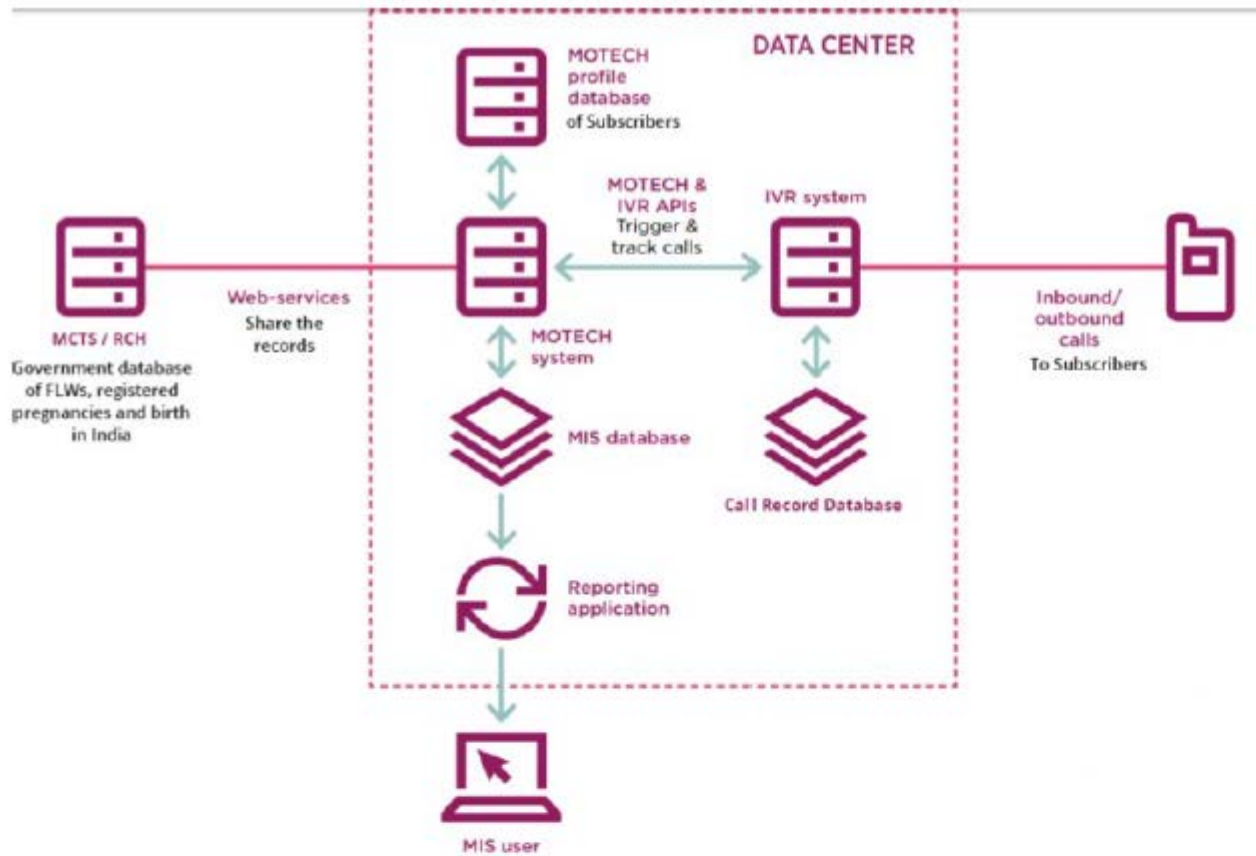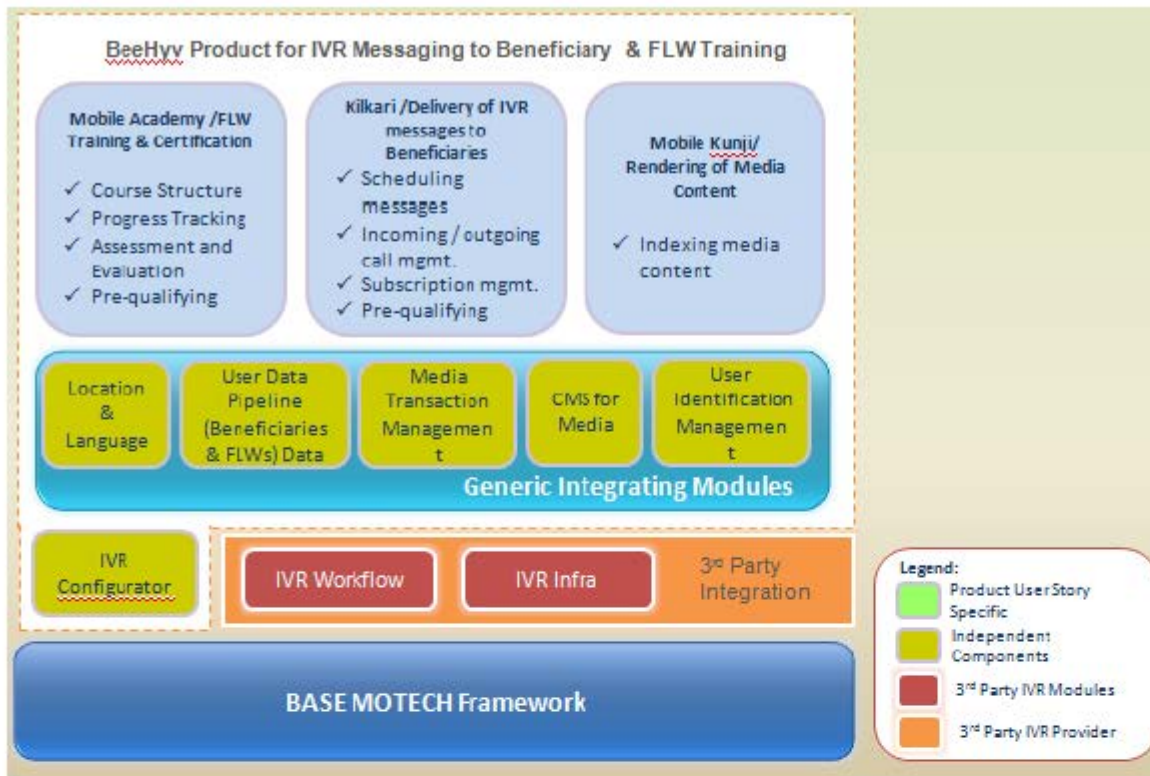
Technology Landscape for Existing Implementations:

The architecture diagram below represents the technology components and landscape used for the implementation of the current project (National Scale-up Project). All technology components are open-source framework.
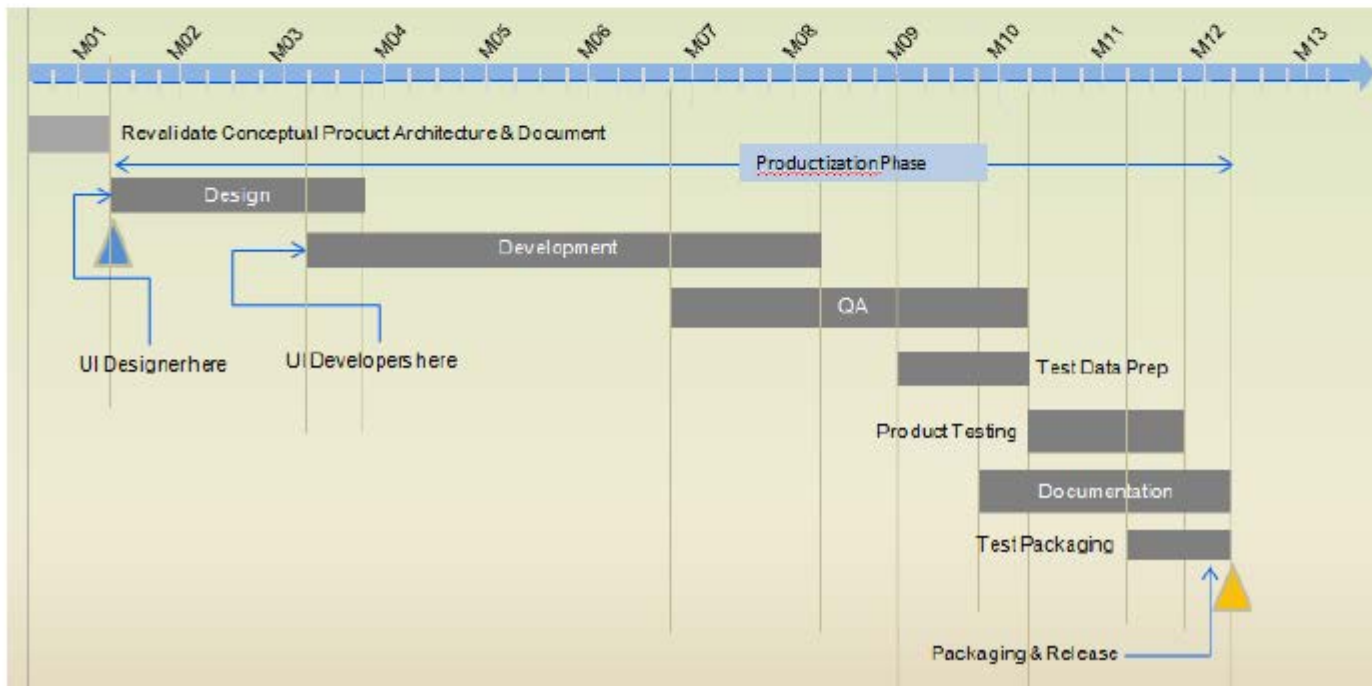
Conceptual Architecture for the Proposed Product

BeeHyv Product for IVR Messaging to Beneficiary & FLW Training

Mobile Academy /FLW Training & Certification

- ✓ Course Structure
- ✓ Progress Tracking
- ✓ Assessment and Evaluation
- ✓ Pre-qualifying

Kilkari /Delivery of IVR messages to Beneficiaries

- ✓ Scheduling messages
- ✓ Incoming / outgoing call mgmt.
- ✓ Subscription mgmt.
- ✓ Pre-qualifying

Mobile Kunji/ Rendering of Media Content

- ✓ Indexing media content

| Location & Language | User Data Pipeline (Beneficiaries & FLWs) Data | Media Transaction Management | CMS for Media | User Identification Management |

Generic Integrating Modules

IVR Configurator

IVR Workflow | IVR Infra | 3ʳᵈ Party Integration

BASE MOTECH Framework

Legend:
- Product User Story Specific
- Independent Components
- 3ʳᵈ Party IVR Modules
- 3ʳᵈ Party IVR Provider

Planning for Productization:

The gantt chart below shows timelines

Timeline: M01 M02 M03 M04 M05 M06 M07 M08 M09 M10 M11 M12 M13

- Revalidate Conceptual Procuct Architecture & Document
- Productization Phase
- Design
- Development
- QA
- UI Designer here
- UI Developers here
- Test Data Prep
- Product Testing
- Documentation
- Test Packaging
- Packaging & Release

Self-Assessment (Based on Global Good Maturity Model):

Based on the productization approach driven from National Scale-up project implementation, self-assessment on the parameters of Global Good Maturity Model has been carried out by BeeHyv proposal team. The completed self-assessment model is here .

Budget Narrative:

The budget rolls up the cost based on estimates of all activities required for the said productization. The work to productize is estimated to be approximately 1150 person-days and the duration is expected to be 12 months. Following phases are estimated to be key to the life-cycle:

- Revalidation of conceptual architecture
- Design - includes changing the DB models, separation and modularization of code, new admin UI for setting up new use cases
- Development - source code development for front-end UI as well as the back-end
- QA - testing components of new architecture and product use cases
- Test Data Prep - Product is aimed at user-stories in different contexts. Use-cases will be picked up for product testing and corresponding mock data will need to be prepared.
- Documentation - includes technical as well as functional documentation. Technical documentation will enable reuse by open-source community as well as implementors globally.
- Packaging & Release - the product will need to be packaged for release as an open source and a corresponding effort to test packaging & release is also included.

The budget includes following high-level items:

- Cost for project team's effort directly working on the product
- BeeHyv's headquarter and organisational costs
- 4 regional (in-country) trips to discuss productization status and related developments with BBC Media Action
- Standard infrastructure cost as a fraction of resource-loaded cost
- 13 months' hosting charges for managing different technical environments

Budget estimate is $240,455.

Why will we be successful?

Successful partnership

- BBC Media Action (Program Implementation Partner) and BeeHyv Software (Technology partner) have worked together to deliver successfully on these complex implentations.

Knowledge of SBCC domain

- BeeHyv will leverage BBC Media Action's strong expertise in SBCC domain.

Technology expertise

- BeeHyv Software has a lot of expertise on the underlying MOTECH platform.
- BeeHyv Software will leverage the same technical team and the project manager who were involved in NSP program.

Scale

- The programs being productised are the largest mobile health implementations in the world.

Implementation experience

- Productization will leverage the learnings from program implementations.

References Used:

Source of data on Mobile Academy, Kilkari and Kunji: BBC Media Action

Appendix: Concept Note

National Scale-up Project Implementation

Project Details

NSP is a Public-Private Partnership for the National Scale-Up of Mobile Health Services in India. It provides the following services to the users:

- Kilkari: Kilkari literally means a baby's gurgle in Hindi. It is an outbound service that delivers weekly, time-appropriate audio messages about pregnancy, childbirth, and childcare directly to families' mobile phones, from the second trimester of pregnancy until the child is one year old.
- Mobile Academy: It is an Interactive Voice Response training course designed to refresh Asha workers' knowledge of health behaviours, and to improve their ability to clearly communicate them. An Asha (Accredited social health activist) is a community health workers instituted by the government of India's Ministry of Health and Family Welfare (MoHFW) as part of the National Rural Health Mission (NRHM).

These services were launched in Bihar state in 2012 and   then scaled to national level in 2016   with a target of training One million Asha workers and helping 9.5 million new and expecting mothers make healthier choices in a span of three years.

So far, Kilkari has reached 6.3 million users with current active base of 1.4 million users, and Mobile Academy has reached 106,883 FLWs, across 12 states. A 13th state is due to go live by end of January 2018. NSP is currently the largest mHealth program in the world. The program has been studied and recognized through the course of its implementation. Here are some examples:

- NSP has been used as a case study for an e-book on building scalable socials systems by Digital Impact Alliance (DIAL). The e-book will be published in a couple of months.
- GSMA has also published a case-study report on NSP In November 2016. The report can be accessed here .

MOTECH

The MOTECH (Mobile Technology for Community Health) is an open source enterprise platform built to provide mHealth services in areas with low internet penetration.

MOTECH has been implemented and integrated for various mHealth services across multiple countries. The details of all the implementations can be found here .

NSP Implementation

The technical implementation of NSP consists of two systems:

- MOTECH based backend system: This system imports and subscribes beneficiaries for Kilkari and Ashas for Mobile Academy by polling the web services provided by MoHFW, schedules the daily outbound calls for Kilkari beneficiaries and keeps track of the progress of the subscription and course.
- IVR system: This system manages the call flow logic for both the services.

The purpose of applying for the funding is to implement critical features that will improve the outreach of the service. It will make the service

better and extendable in the global context.

Consortium team

The services were originally developed by BBC Media Action with support from the **Bill & Melinda Gates Foundation** in Bihar, and the scale-up has been further supported by **USAID** and the **Barr Foundation**.

Existing investment

The program has been supported to date through **institutional and foundation funding**, which has supported the scale-up of services to 12 states:

- BMGF technical support
- USAID support
- Barr Foundation support

The **Ministry of Health & Family Welfare, Government of India** is also making a significant financial contribution to the scale up, covering:

- All call costs for both services
- The cost of the data center that hosts both services
- Costs of training at state, district and block level to support the roll-out of the services as well as promotional materials

The remaining stakeholders

- BBC Media Action (BBCMA): BBCMA is the program implementation partners. They are primarily responsible to interact with all the stakeholders. They also work at the ground level with Ashas and block level health workers to spread awareness off the program and gather feedback.
- BeeHyv Software Solutions (BeeHyv): BeeHyv is the MOTECH implementation partners. They are responsible for all the technical work on the backend and reporting systems.
- IMI Mobile: IVR implementation partners. IMI Mobile's in-house IVR system is integrated with MOTECH to enable the services.

The on-going management of these services is expected to transition to the MoHFW from BBCMA and BMGF at the end of 2018, ensuring long-term, large-scale, sustainable impact.

Sai Rahul (Project Manager) from BeeHyv will be the primary contact for this proposal. The additional funding is primarily required for building new enhancements on the MOTECH implementation for NSP.

Project Description

The MOTECH implementation for NSP is free and open source. It has been designed such that, the services can be re-used. The Asha and beneficiary information is specific to India, the rest of the implementation is interoperable. BeeHyv has been providing support for NSP Motech implementation for two years now. BeeHyv was also a development partner for Motech platform open source development.

This section will first explore the functional aspects of current implementation of the MOTECH platform and then will cover the list of enhancements requested by MoHFW.

Functional Specification of existing system

The following are the list of functional modules that are currently implemented in the backend built on MOTECH:

Import of Kilkari beneficiary and Asha data

There are two sources of data for the system:

1. Mother and Child Tracking System (MCTS): MCTS is a centralized database that stores information of pregnant women and infants across India.
2. Reproductive And Child Health (RCH): RCH is a new centralized database that tracks women through-out their child conceiving age and children till age of six years.

All the states in India are migrating for MCTS to RCH. Both the databases are maintained by National Informatics Centre (NIC), Government of India.

The data is uploaded into the system through two end-points:

- CSV upload: When the services are launched in a state, the list of all the pregnant ladies or mothers of infant and the Ashas in the state are provided by NIC in the form of a database back-up file, which is converted in a CSV file and then uploaded into the system.
- Web service integration: NIC exposes SOAP based web services, which are integrated with NSP backend to import the daily updates to the MCTS and RCH databases. The web-services allow NSP to fetch updates for the last week only, after the request is authorized based on the credentials passed along with the request.

Multi-language support

There are 22 officially recognized languages in India and more than 1000 dialects used across the country. The NSP program provides support for multiple languages to ensure that the messages shared to the end-users through the services are in their regional-language.

The languages are mapped to either Districts so that when an Asha or Kilkari beneficiary is imported into the system, the corresponding language is linked to her. There is also a facility in the system to map language to Telecom circle and provide support for users to register for the services to IVR. IVR based registration is currently disabled.

Kilkari Outbound call scheduling

Kilkari program provides 72 weeks messages from the second trimester of the pregnancy till the completion of one year of child growth. One message is scheduled every week.

Based on the Last Menstrual Period (LMP date) for the pregnant woman or the Date of Birth (DOB) of the child, a CSV file containing the list of beneficiaries along with the message name to be played is generated and passed on to the IVR before 6 AM. The IVR system calls each beneficiary and plays the corresponding audio content to the beneficiary once they answer the call. The system also has facility for retrying to reach a beneficiary in case they do not answer the call.

At the end of the day, IVR system sends a CSV format file containing the details of all the calls for the day, including the duration of call and the message listened to. This file is processed by the backend to store the call details for reporting purposes and also to schedule the calls for the next day.

Kilkari Inbox

A facility is also provided for beneficiaries to call a toll-free number for their registered Mobile Numbers to listen to the scheduled messages in case they are not able to answer the call.

Mobile Academy

Mobile Academy course is split in 11 chapters, each containing 4 lessons and 4 quizzes. All the lessons and quizzes are played in the language corresponding to the district of the Asha. At the completion of the course, in-case an Asha scores a minimum of 50% marks, they are eligible for a certification from their state government.

Reporting web application

A custom web-application is under development, which will provide reports as per the requirements of MoHFW. The application will provide two types of reports:

- Line-listing reports: Excel based actionable reports that are provided to ground-level health workers. These reports enable them to take corrective action based on the up-take of each individual Asha and Kilkari beneficiary.
- Aggregate reports: Provided for the decision makers across all stakeholders to enable better decision making.

Enhancements for which funding would be utilized (Documented before Productization Proposal)

The following list of enhancements are needed in the MOTECH based backend system to provide better service to the end-users.

Dynamic language-flow

As mentioned above, the language diversity in India is very high. Each region across the country has multiple languages that majority of the people communicate in. Thus, the stakeholders have realized the importance of providing support for more than one language in a district, from which end-users can select the language they are most comfortable with. The technical implementation has been designed, but the requirement has been de-prioritized due to budgetary constraints.

This feature will help in making the system even more interoperable for implementation across multiple regions and countries.

Service specific language

The system has been designed to support one language in a district for both Kilkari and Mobile Academy services. This is restricting MoHFW from launching the services in new states as content needs to be generated in the new language for both the services so that they can be launched.

Once the system becomes capable of supporting Mobile and Kilkari services in separate languages, MoHFW can choose launch one service in existing launch and the other in a new language, which will provide them more flexibility.

Automation of operational activities

There are a lot of daily activities that need to be automated that would enable continuous improvement of the service. A couple of examples are listed below:

- **Deactivation of not-answering or low-listening beneficiaries:** It has been identified from studies conducted by BBCMA that user who do not answer calls continuously or disconnect the call regularly are not real beneficiaries. Thus, they are unsubscribed from the system on regular basis so that the hardware is used to reach actual beneficiaries better. This process is currently not automated yet.
- **Reconciliation of date between MOTECH and IVR databases:** An automated process has been conceived to reconcile the data between the two systems on a daily basis. This would ensure that any deviations are identified and rectified immediately.

These tasks haven't been taken up yet as existing technical team and budgets have been allocated to reporting web application development, which all the stakeholders need for continuous improvement on the delivery of the service.

The funding will help us in enabling the features in the platform that would make it useful in the global setting.

Supporting Documents: 📄 global_good_maturity_model_self-assessment_for_beehyv_proposal.xlsx