



**USAID**  
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# SPICE

**Structuring  
Partnerships for  
an Innovative  
Communications  
Environment**



**Final Report**  
Oct 2012 to Mar 2015



## Executive Summary

The goals of the SPICE program were to promote and deliver a greater diversity of information and services to the Cambodian public; to improve communications in Khmer using mobile devices; and to increase the capacity of civil society organizations and government to use communication technologies for development purposes.

The results of the program have been outstanding, triplicating and quadruplicating in some cases the original expectations. SPICE has delivered 37 technology solutions that have helped USAID partners, other civil society organizations, and the Cambodian government magnify the impact of their programs on their target beneficiaries. The program has reached directly or helped these partners reach over 1,200,000 Cambodian citizens with information, services and training. The program has also reinforced the connection of civil society organizations among themselves, and succeeded in creating a strong youth movement centered on technological development, with over 16,000 participants in events organized by the program.

Specifically, the program has widely attained its goals by accomplishing the following objectives:

**To increase the capacity of Cambodian CSOs to disseminate information via telephony voice-based systems or SMS as mass media.** Based on the Interactive Voice Response (IVR) infrastructure created during the first year of the project, SPICE has supported CSOs, government and political parties in the creation of their own IVR services. The number of IVR services created (32) is three times larger than the expectations at the beginning of the project. The partners creating these services included a good number of USAID-funded programs in most sectors covered by development cooperation. The public-private partnership with the ISP EZECOM ensured the sustainability of the IVR platform and the continuity of all projects after SPICE was completed. As a result of its experience working in IVR, Open Institute has developed **Self-IVR**, a new technology through which similar services to IVR can be offered using smartphones, without requiring any phone calls or Internet after the applications have been downloaded to the phones.

**To increase the access of Cambodian citizens - via mobile phone technology in their own language - to information and to new means of communication.** A successful public-private partnership with Google led to Khmer script being supported natively in the Android operating system for phones using Android versions above 4.2. For previous versions, Open Institute developed applications that integrate Khmer support inside the application, and which were downloaded by users over 400,000 times during the program period. Open Institute also contributed to the acceleration of the market penetration of Khmer-language phones through an awareness campaign in phone shops, helping to raise the number of Cambodians who had Khmer-enabled phones by 2 million in one year - four times the expected result for the whole program.

**To help citizen journalists overcome their reluctance to report on current events for online crowdsourcing platforms by ensuring their anonymity.** The program has completed development, deployment and publishing of its citizen-journalism crowdsourcing application for reporting on human-rights violations. The system includes a website where all reports are posted and a tool for smartphones that can be used to see reports by other citizen journalists or to create and send anonymous reports including pictures, video or sound captured by the smartphone. One human rights youth network has already adopted the platform, creating its own website for it; the network is already reporting on its chosen topics. Other large CSOs are also considering establishing their own websites with this platform.

**To support the implementation of innovative products using the program's platforms and to encourage innovation through intensive networking and training of innovators, young students and professionals.** A series of sectorial brainstorming workshops on CSOs' use of technology has facilitated the implementation of IVR services, increasing the impact of USAID partner CSOs. The Open Institute used its network of technologists and CSOs to increase technological literacy of young users at all stages through the organization and interconnection of 20 BarCamp and mini-BarCamp events around the country, which have attracted over 14,000 participants, triplicating participation each year of the program, an amount several times

larger than originally expected. Knowledge and advice on the correct use of the Internet and social networks has also been shared with schools through a roadshow that reached 4,500 students at 42 schools in 18 provinces. Finally, SPICE has reinforced the network on CSOs working on human rights and trafficking in Cambodia through a highly interactive 4-day training camp focusing on e-advocacy and security.

While largely achieving its overall program objectives, SPICE has also established and demonstrated the value of a technical platform that offers CSOs, government and political parties a new channel to access most of their beneficiaries or followers using pre-recorded voice messages. It also demonstrated that it is possible to better prepare the public to use phones as a means of communication by supporting rapid adoption of local-language-enabled phones and boosting the number of technology-savvy youth, who act as a bridge between sources of information and that segment of the population that is not yet connected.

In two and a half years the program has opened new channels for Cambodians to access information and services, while enabling civil society and government to use these new communication channels to develop the country. This success demonstrates how USAID's strategy on the use of Science, Technology, Innovation and Partnerships for development can be effectively applied to support effective and sustainable development.

A video with the highlights of this report is available at:

<https://www.youtube.com/watch?v=2QyjV2HYtQI>

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## Acronyms

CLEC	Community Legal Education Center
COMFREL	Committee for Free and Fair Elections in Cambodia
CSO	Civil Society Organization
IFES	International Foundation for Electoral System
ILO	International Labor Organization
IRI	International Republican Institute
IVR	Interactive Voice Response System
KIND	Khmer Institute for National Development
KYA	Khmer Youth Association
KYN	Khmer Youth Network
MNO	Mobile Network Operator
NEC	National Election Committee
NDI	National Democratic Institute
OI	Open Institute
SPICE	Structuring Partnerships for an Innovative Communications Environment
TRC	Telecom Regulator of Cambodia
USAID	United States Agency for International Development

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## 1. Goal and Objectives

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The goals of the program **Structuring Partnerships for an Innovative Communications Environment (SPICE)** were to promote and deliver a greater diversity of information and services to the Cambodian public; to improve communication in Khmer using mobile devices; and to increase the capacity of civil society organizations and government to use communication technologies for development purposes. The program was fully funded by USAID and implemented by the local NGO Open Institute under a cooperative agreement.

To achieve these goals, the SPICE program identified four objectives:

***To increase the capacity of Cambodian CSOs to disseminate information by using telephony voice-based or SMS-based systems as mass media.*** The program was expected to create the necessary infrastructure and to provide the training and support that CSOs, government and entrepreneurs need in order to easily provide voice or SMS-based information services.

***To increase the access of Cambodian citizens - via mobile phone technology in their own language - to information and to new means of communication.*** SPICE had to ensure that Khmer script could be used in as many phones as possible; that smartphones could be operated using Khmer-language user interfaces; and that information in Khmer could be easily stored, retrieved and used.

***To help citizen journalists overcome their reluctance to report on current events for online crowdsourcing platforms by ensuring their anonymity.*** The program implemented a secure crowdsourcing platform in which information reported by citizen journalists is made easily available, while ensuring that those who report using the platform's phone-based reporting tool cannot be traced or identified.

***To support the implementation of innovative products using the program's platforms and to encourage innovation through intensive networking and training of innovators, young students, and professionals.*** The Open Institute brainstormed with CSOs in different sectors to identify innovative uses of the technologies it develops and promoted. It then provided to these CSOs all the training and support needed to use the technologies. It also promoted and supported the staging of technology-related events for youth throughout. These events provided technical know-how to participants of different levels and reinforced the network of young, technology-savvy Cambodians.

As a more general objective, SPICE attempted to reduce the technological barriers faced by USAID-funded CSOs in Cambodia, helping them to maximize their impact through the correct use of technology.

The SPICE program was originally designed to last for two years. Efficient use of resources by Open Institute allowed the project to continue for an additional period of six months, improving its results far above the original estimations.

## 2. Key Accomplishments

During its first year of existence, SPICE established the infrastructure, partnerships, applications and new technologies required to reach its objectives, using the rest of the project period to disseminate and use these components to accomplish its objectives.

In all, the SPICE program has reached in two and half years **1,202,648** Cambodian citizens by developing **37 technological solutions for 32 CSOs, government bodies and political parties**, as well as by developing **widely used phone applications** that supported its objectives, and by providing **technological training to youth**.

The specific achievements for each one of the program's four objectives are detailed below.

The objective of **increasing the capacity of Cambodian CSOs to disseminate information by using voice-based or SMS-based telephony systems as mass media** achieved results far beyond original expectations by helping to generate, and then responding to, a large number of requests by CSOs to develop and launch IVR services.

During the project period, **32 CSOs, political parties and government bodies started using the platform** and the technical support of the SPICE program to launch and operate voice-based information systems that afford citizens access to a greater diversity of information and services. All systems together have been used by **762,648 Cambodian citizens**.



These activities earned for the SPICE program the **Best Mobile Application for Development in Asia Award** in 2014, awarded by USAID/RDMA.

The program worked with the different development sectors to identify potential applications of IVR technology, as well as the organizations willing to use it. Several of the services started by partner CSOs were born of ideas developed at sectorial brainstorming workshops held during the first two years of the program on human rights, health, migration and

trafficking, agriculture, environment and emergency-response. The approach of bringing representatives of these sectors together to think about the potential applications of technology in their fields was highly successful, creating synergies that have in many cases led to new services being launched.

On the **democracy** front, work in year one concentrated on the 2013 national elections, setting up with the NEC and IFES an **Election Hotline** that supplied information on the elections to over 600,000 citizens (11% of actual voters). The program also provided technical support for election monitoring by NDI and its partners (setting up a call center) and applied its platform to support COMFREL and KYA in providing over 10,000 election reminders to activists through automatic outgoing calls with prerecorded messages. In year two the work focused on collaborating with IRI to train and support all political parties in the use of IVR, equipping them with a new

*It was a highly successful project; high impact and low cost. We were able to offer citizens, at a low cost to us and no cost to them, the exact information that they needed at the time they wanted it.*

*Carmina Ferrer – COP - IFES*

information distribution tool and increasing their options for reaching out to their constituencies. The political parties received more than 50,000 calls during the last year of the project.

In the **human-rights** arena, a number of organizations have developed IVR services with very different objectives. The NGO Community Legal Education Center (CLEC) uses IVR to allow callers to connect to legal counselors, learn about protection of human rights through prerecorded lessons and report on human-rights violations.



*The IVR program has really opened a new channel of communication for political parties to communicate with their constituents. It has the potential to revolutionize how campaigns are conducted in Cambodia.*

*Jessica Keegan – Country Director - IRI*

*The IVR system of the Community Legal Information Center provides education on several legal issues; it also allows citizens to record voice reports on violations of human rights.*

*Yeng Virak – Executive Director - CLEC*

The ILO's Better Factories program is using its IVR channel to inform factory workers of their legal rights, as well as to survey them on their knowledge of these topics.

Action Aid's system uses IVR to collect information on violence against women in the cities, as well as to help run its Safe Cities campaign. The Open Institute has collaborated with the Cambodian Indigenous Youth Association, Building Community Voices and The Asia Foundation to inform indigenous minorities in Cambodia of their rights in their own languages. The NGO KIND is using IVR as a channel for anonymously reporting information related to school issues (corruption, school hygiene and security).

IVR services informing workers who are considering **migration** of the opportunities and risks they face have been developed by Winrock and CARAM.

Following the elections hotline, **emergency response** is the second sector in which an IVR system has been adopted by the Cambodian government. The IVR-based Emergency Warning Service of the National Committee for Disaster Management (NCDM) registers villagers' phone numbers and locations in three provinces prone to natural disasters. When an emergency (flood, etc.) is expected in one of these areas, villagers likely to be affected receive warning phone calls. The system was created by the CSO People in Need, tested and then handed to the government.



**Health** is probably the sector where IVR shows the most potential, with care for mothers and infants being the purpose of most of the services created, followed by reproductive health, nutrition and HIV/AIDS. The most advanced of these health-sector services is the

*In order to have clear and effective messages, we had to go through a long and complex design process. Having Open Institute and the SPICE program to take care of the technical aspects allowed us to concentrate on the content.*

*Piotr Sasin – Country Director – People In Need*

one created by the NGO People in Need to provide mothers timely information that is vital to a baby's health during the first month of life. Evaluation surveys have demonstrated that through this service, based on periodic outgoing phone calls, mothers not only acquire and apply new information through the calls; they value the service to the point where they are prepared to pay for receiving the voice messages. While People in Need will expand this service, URC, through the USAID Quality Health Services program, will also take it to the nine provinces where it operates, hoping to reach 90% of the new mothers in these areas in the

*The USAID Quality Health Services and Social Health Protection programs have directly benefited from SPICE and the know-how that the Open Institute has gained through this program. Bringing them as partners has moved our programs into a whole new technological dimension.*

*Tapley Jordawood – COP of SHP program – URC*

coming three years (162,000 mothers per year). Registration of mothers of newborn children is being prepared in collaboration with the USAID Social Health Protection (SHP) program's work to register patients with health facilities, a specific technical task of SHP that is being performed by the Open Institute.

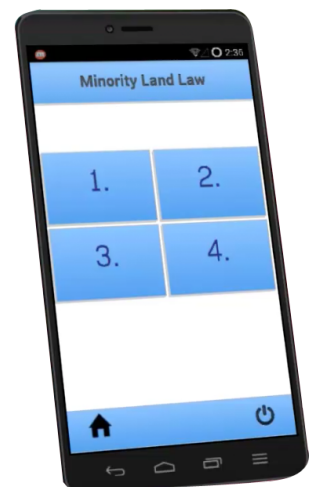
Other health IVR information services are being operated by RHAC (counseling for public-health support), World Vision (nutrition), FHI360 (information for HIV/AIDS target groups) and the Women's Media Center of Cambodia (reproductive health).

Finally, Voice of Democracy is using IVR as an alternative channel to provide a **news service** for the general public.

During the second year of the program – based on its experience of IVR – Open Institute developed a new technology that brings together the value of IVR with smartphones' ability to store and deliver content. This new technology, christened **Self-IVR**, stores prerecorded voice messages inside a smartphone application, delivering the messages in a structured way (similar to IVR) to the user on demand, or at specific dates and times, imitating incoming calls, but without the need of phone calls or Internet once the application is installed.

This technology has enabled the development of several applications for partners:

- In collaboration with VSO, an application has been developed to give primary-school teachers (who will have to start teaching English next year) access to the correct pronunciation of the English words they will be teaching in Grade 4 (the level at which first-year English will be taught at public schools starting next year). The application has started being used in teacher training centers of the Ministry of Education, Youth and Sport.
- A previously mentioned IVR system, which provides information relating to the Land Law (registration, legal aspects, economic concessions, etc.) in minority languages, has also been developed as a Self-IVR application, granting access to all local-language information without requiring the user to make a phone call (the phone acts as a radio on demand). Self-IVR has been found to be better adapted than IVR for this particular purpose.



*We had the legal know how and the clear mission to provide legal information to indigenous communities, and yet those communities lacked a practical way to get access to it. We found that the Open Institute's Self-IVR technology was the perfect response to our problems.*

*Silas Everett – Country Director – Asia Foundation*

- An application that, imitating the IVR system, calls mothers following the birth of their babies has also been developed, with the same content. The phone activates itself every three days (simulating an incoming call) and delivers the message to the mother.
- In collaboration with URC, a Self-IVR application is being developed to help maintain the level of training received by health workers nationwide. Three times a week, the application prompts the user's phone to ring and delivers a question relating to the training received. Right after, independently of the answer given by the user, the application plays a voice message with the correct answer. The application features a game in which points accrued for providing correct answers allow the user to rise through various levels (from hospital cleaner up to minister of health); receive badges for their knowledge of specific topics (i.e., post-natal care); and to compare these levels with Facebook friends, facility colleagues, etc.

The use of SMS for delivery of information and services is still in its early days in Cambodia. Only 10% of phones were able to deliver SMS in Khmer in 2012, when the SPICE program started. This number has grown quickly to 51% in 2014. Given the rate of change, it is expected that by 2016/2017 the penetration of Khmer-enabled phones will reach 90%, making it advisable to start considering SMS-based information and services. During the life of SPICE none of the partners contacted by the program expressed an interest in developing services using this channel.

**These results confirm USAID's original thesis of the high value of voice communication - and more specifically of IVR technology - as an information and service distribution channel for CSOs and government in present-day Cambodia.**



## USAID – Open Institute – EZECOM

### A highly successful public-private partnership

**Interactive Voice Response** - prerecorded voice messages delivered to users over the phone - is a technology widely used in developed countries to automatically direct callers to the right person in an organization, or to reduce the number of people needed to respond to customer requests by providing information directly through prerecorded messages.

In the developing world, Interactive Voice Response (**IVR**) technology has proven very useful to CSOs and government as they reach out to beneficiaries with on-demand information services.

IVR is a resource-intensive service with high start-up costs: equipment, software customization, and training of technical staff. It also involves high maintenance costs; expensive fiber-optic connections must be maintained between the IVR infrastructure and the networks of all major mobile network operators.



Pulling together investment from the ISP **EZECOM** and financial support from **USAID** through the **SPICE** program, the Cambodian NGO **Open Institute** and **EZECOM** were able to build the necessary infrastructure for what has become Cambodia's first and only multi-operator IVR platform. The infrastructure includes connections to all major operators, allowing up to 330 simultaneous calls to or from the platform. EZECOM and Open Institute adapted open source platforms to the needs of the SPICE program and of EZECOM's administration, while training EZECOM's staff to run the necessary IVR and telephony platforms. For the IVR component, the system uses the **Verboice** open source platform developed by InSTEDD.

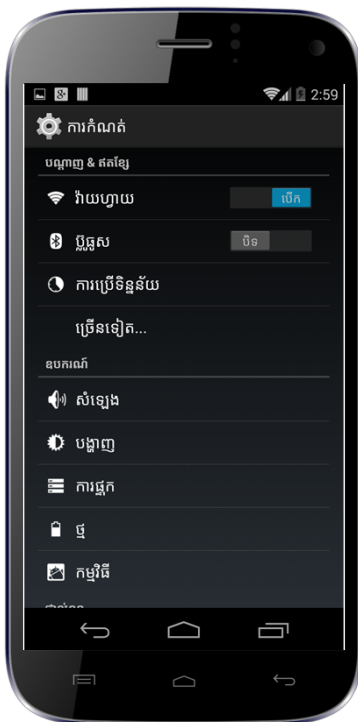
**Over 32 CSOs and government departments have started IVR projects and hosted them in this platform during its first two years of operation.** In 2013 the platform hosted the government's **Election Hotline**; the service received **over 600,000 phone calls** from voters looking for information on how and where to vote (11% of those who voted). Other services hosted on the platform include a government emergency-warning service that calls villagers when a natural disaster is expected in their area, and a service that makes calls to mothers who have recently given birth, providing important infant-health information.

During its first two years, the SPICE program has sponsored use of the IVR platform by CSOs. Now, the same platform, as a commercial product of EZECOM, allows CSOs to continue running their IVR services at a very reasonable cost. Open Institute continues to encourage CSOs to develop IVR services and become EZECOM customers.

Through this public-private partnership, USAID and the SPICE program have been able to meet their objectives of making IVR technology widely and sustainably accessible to Cambodian CSOs. EZECOM has developed the infrastructure and the know-how to become the only multi-operator IVR supplier in the country, and has acquired a customer base that can support its operations while it develops the market for multi-operator IVR-based value-added services in Cambodia.

SPICE also exceeded the expected results concerning its objective of **increasing Cambodians' access - via mobile-phone technology in their own language - to information and new means of communication.** It has done this by helping bring into the Cambodian market smartphones in the Khmer language, and by helping to increase the number of Khmer-enabled phone users by two million in one year.

A public-private partnership with Google, through which SPICE used Open Institute's expertise in software translation to translate the Android operating system for phones, peaked in year two of the SPICE program with the release of Android 4.4, in which the use of Khmer script is native (no separate installation required) and a Khmer-language user interface translated by SPICE became available for the system and its most important applications. SPICE intervention has enabled the placement of Khmer — a language Google was not planning to translate — into the Google translation chain. Google has assumed continuation of the work once SPICE's tasks are complete, considering Khmer as one of the languages it maintains.



For versions of Android preceding 4.4, Open Institute developed applications that permitted the use of Khmer script in phones that were not designed for it. The most important of these applications, a Khmer-script keyboard capable of functioning in any Android phone, has been downloaded more than 400,000 times during the life of the program.

Several other applications that are important to Cambodian phone users, but which are not supported by Google, have also been localized in Khmer to create a better experience for Cambodian users. Some of these applications were specifically developed to permit secure communication, either through VoIP or browsing.

SPICE has also developed a keyboard and fonts for the Cham script, the one other script native to Cambodia that is in use. The Cham language is used by the approximately 500,000 members of the Cham community in Cambodia. This development has opened the way to store all the information available in this language, to type books in Cham and to generally reinforce Cham culture. Coordinating with the organization Breogan Consulting, it has brought this development to traditional Cham communities all over the country.

As Cambodia does not yet have a critical mass of phones capable of sending and receiving SMS in Khmer, another focus of the SPICE program during its second year relates to one of its key objectives: increasing the number of Cambodians who own Khmer-enabled phones by 500,000.

While perfectly conscious of the many factors affecting Cambodia's advance toward full communication in SMS in its own script, SPICE detected in a survey in 2013 that a major factor





limiting growth in the number of Khmer-enabled phones was that users did not yet see the value of it (i.e., “my friends and family do not have phones that can send SMS in Khmer; it is not useful for me to be able to send them”).

In response to this finding, during its second year SPICE boosted its efforts to create awareness of the value of using Khmer in SMS. More importantly, it focused these efforts on the precise moment and location at which users decide whether to buy a new phone: in the phone shop. This work was done through a countrywide campaign aimed at phone



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shops, working with them and providing visual elements to be placed in the shops, including posters, “We sell Khmer phones here” stickers, and small “Has Khmer language” stickers for phones that can actually use Khmer). These elements forced buyers to consider whether or not they wanted to buy Khmer-language phones, a process that usually led to the purchase of such a phone. Over 300 shops were involved in the campaign.

Nationwide surveys on phones used in Cambodia at the end of the first and second years of the program show growth in the proportion of Khmer-enabled phones in the country from 29.5% in 2013 to 51.3% in 2014. This means that over two million additional Cambodians have become able to receive messages in Khmer during the second year of the program. Naturally, SPICE cannot claim to be the only factor behind this growth, but there is no doubt that the increased awareness created by the program played an important role in accelerating this change.



*Open Institute has achieved the objective of **helping citizen journalists overcome their reluctance to report on current events for online crowdsourcing platforms by ensuring their anonymity**. This was done by implementing and launching a secure crowdsourcing platform in which information reported by citizen journalists is made easily available, while ensuring that those using the platform's phone-based reporting tool cannot be traced or identified.*

SPICE has developed **I Saw It**, a reporting platform for crowdsourcing of anonymous information produced by citizen journalists.

The **I Saw It** suite of tools includes a website where all the reports prepared and sent by citizen journalists are organized by topics and displayed. Topics can be added to the platform by anybody who registers. Citizen reporters might send reports on any topic defined in the platform. **I Saw It** also includes a phone application (for Android) that can be used to either view the reports that have been uploaded to the website or to prepare and submit new reports on any of the existing topics.

Reports made using the **I Saw It** application can include pictures, video, sound and text captured by the phone using the application, or they might include other media already present in the phone. No information about the reporter is sent.

Information is encrypted in the phone as soon as it is captured, and cannot be decrypted in the phone itself. Only the website has the key that allows decryption after the reports have arrived. All information embedded in the media is removed, to avoid providing any information about the reporter.



Open Institute has established its own website using this software (saksey.net). It also makes the software available to organizations that wish to set up their own reporting sites. Documents and training materials have already been developed and are available for users. The platform has been widely advertised to human rights CSOs in Cambodia, and released as Open Source software.

The **Cambodia Youth Network** has been the first to establish its own version of the platform (under the domain solidarityvoice.net), enabling members to report on human-rights violations. Other organizations are considering integrating their own versions of the platform into the programs.



The successful **supporting of implementation of innovative products using the program's platforms and through intensive networking and training of innovators, young students and professionals** can be seen in the large number of CSOs using the platforms to develop innovative services, as well as in the impressive growth in the number of technology-related events for youth organized or supported by SPICE.

In addition to the brainstorming **workshops** mentioned in objective one, through which SPICE has been able to identify potential solutions to development problems using IVR and other technologies, SPICE's training and support department has used all the events that it organizes and any other available NGO and technology forums to disseminate the value of using the platforms. In addition, it has offered **one-to-one training and support** to any organizations wishing to use the platform or learn more about it. The fruits of this careful and constant work are the 37 technological solutions developed through the IVR platform or using Self-IVR technology.



Along the duration of the program, SPICE has largely expanded the reach of **BarCamp** meetings. These youth-oriented informal technology-related events attract youth of all types and ages, from high school students to young IT professionals, offering each the opportunity to increase their technical knowledge and improve their usage of information society tools, while putting them in touch with other members of the technology community with similar interests. The more than 20 BarCamps and mini-BarCamps supported during the program life have attracted over 14,000 participants, triplicating participation each year. The BarCamp events have been taking place in Phnom Penh and provincial capitals that have large universities. Technologists from Phnom Penh travel to these events to teach and to connect with a national network of young technologists.

SPICE has used an innovative approach to create a network of ICT practitioners at Cambodian CSOs, particularly among those working on human rights, democracy, migration, trafficking and health. The key to this strategy was **Open Cambodia 2014**, a four-day collaborative learning camp on e-advocacy and basic security for CSOs. The event, co-sponsored by the program USAID Development Innovations, attracted 109 participants (36% women) from 69 CSOs.



With the support of specialized facilitators of such events from the US-based NGO Aspiration, working with 20 local facilitators, **Open Cambodia 2014** used training methodologies that rely heavily on the sharing of knowledge among participants, small group discussions, skill sharing, peer-to-peer work, and group development of strategies, remaking constantly the agenda based on the learning needs and wishes of the participants. Topics covered ranged from advocacy strategies to data storage, data visualization, crowdsourcing, citizen journalism, as well as data and communication security. Participants declared themselves to be very satisfied with the methodology and the results, as it pushed them to both share with and learn from each other.



To facilitate high school students' access to the tools of the information society, SPICE – in collaboration with the Ministry of Education, Youth and Sport – has created an event to introduce high school students (through a carefully developed video) to the Internet and social networks, with a focus on correct use of the Internet, how it is used through phones, and the importance of using Khmer script. This event was taken to 42 schools in 18 provinces through a **road-show campaign**, which presented the video to over 4,500 students.

After viewing the video, the students were organized into groups and placed in different situations related to the use of social networks. They were then asked to discuss whether the use of social networks in these situations was risky, socially correct and ethical.

To enable Khmer on mobile devices of young students, an installation campaign for Khmer fonts in phones accompanied the road show, installing the fonts and other support for Khmer in the phones of students in all the schools visited.



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### 3. Challenges

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The program is based on partnerships with operators, ISPs, Google, government, and other players. Partnerships with the ISP EZECOM and with Google have yielded excellent results, as it has been possible to find models that benefited both civil society and these organizations. Working with the mobile-network operators is more complex, as it is hard to align the interests of the programs to their commercial interests. Network operators still see value added services as a strategic advantage over competitors, for which projects must work with only one operator, something that is usually contrary to the program's interest. Close cooperation requires finding new sustainable financial models that produce a profit for the operators, which in most cases will involve payments from the beneficiaries.

Only one of the three major operators has given the project a series of phone numbers to be administrated by SPICE and assigned to customers. Another operator provides numbers one by one for specific customers, while simply requesting a meeting is difficult with the third. Not even the ILO has been able to get a reaction from this third operator. Careful negotiations are still required before the point is reached at which a real multi-operator platform can be managed.

From a technical point of view, the telephony connections to our platform use thoroughly tested technology. To offer the services, the program uses open-source platforms adapted to provide virtual VoIP telephony and IVR services that are suited to the types of services requested by the CSOs. After two and a half years, while these platforms are more stable, some problems remain and more work needs to be done by the organization developing the platform, but their funding for this project has run out, meaning that funding needs to be found for any improvement, fix or modification.

For most phone customers, cost is the main factor in choosing an operator or maintaining a phone number. SIM cards are sold in the secondary market for less than the amount of call money they contain, giving users little or no incentive to stay with one card and number. Loyalty to the operator is considered very high, as the chosen operator will be that used by close friends and family. Some 28% of Cambodians use at least two operators, selecting on each call the operator that makes it cheapest for them. As most users are not attached to their phone numbers, changing them often, lists of users' phone numbers are not valid for very long, as many of the numbers fall out of use within a few months. This is one of the main problems faced by services based on outgoing calls.

The major obstacle to the use of SMS in Cambodia is the fact that half of all phones in the country lack the capacity to display Khmer script. Critical mass will probably be reached in two years, by which time up to 90% of phones are expected to be able to display Khmer script. The use of social networks and other communication applications is also expected to encourage growth in the use of smartphones and Internet in Khmer, forcing users to learn to type this script into their phones, making SMS viable.

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## 4. Discussion

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The SPICE program established the first multi-operator platform for **voice services** in Cambodia (interactive voice response services or IVR). This was achieved despite a lack of understanding by mobile-network operators of the purpose or value of these services, or of how they might profit from them. The development of the platform has required some of the major operators to change some policies and develop their billing systems in order to charge for the services. Connection of these operators to the SPICE platform has been assisted by the fact that mandatory government services are hosted on the platform, mandating connection to it.

Creation and maintenance of the platform have been made possible through a close public-private partnership. While SPICE has covered the costs of establishing the platform, the high monthly cost of maintaining the connections to the network operators is covered by the ISP EZECOM, for whom this is not an additional cost (due to the fee structure for laying optic fiber in Phnom Penh). EZECOM also covers staff and other technical costs, hoping to develop its own projects based on the infrastructure.

The success of voice services confirms IVR as a good communications solution for CSOs whose beneficiaries face the particular conditions found in Cambodia: a small percentage of phones are able to display Khmer script; voice communication is in many cases cheaper than SMS; and the level of practical literacy is low. Added to these is the fact that most Cambodians are unaccustomed to reading. Surveys have shown that when voice content is well developed, the impact is high, with users retaining the information and carefully listening to the messages.

The impact of IVR services depends on two key factors: users' perceptions of the usefulness to them of information, and the quality of the content. Quality content must communicate authority, whether by identifying the speaker with somebody trusted, providing voices of the correct gender and age, or using a particular language. If possible, good content should also attempt to arouse empathy in the user, opening his or her mind to the information supplied. Tone, speed, language and the use of metaphor are keys to the correct understanding and retention of content. Timing is also important. A message that arrives when the information is needed will be absorbed much more fully, and applied immediately, increasing retention of the information. **Using the technology in the absence of high-quality content will not have the desired impact.**

IVR services cannot be developed outside of the framework of existing development projects, otherwise they will lack the resources to reach out to beneficiaries and conduct any necessary follow-up. They must be integrated into existing activities. In some cases these services can be turned into sustainable activities if users perceive them as worth paying for, or when a business is interested in reaching out to users and providing information to them for commercial purposes (bundled with development-related information).

Replicating the SPICE program's success in setting up an IVR platform is unlikely to be easy in other countries, as the process depends on the availability of the right partners, the willingness of mobile-network operators to participate, cooperation from government, and an absence of excess regulation that could inhibit development. Successful application would depend on the level of practical literacy in the country and the availability of other means of on-demand communication.

**Self-IVR** technology, developed by Open Institute to cover the shortcomings of IVR (including costs and lack of infrastructure) has demonstrated huge potential to solve organizations' communication and training problems, whether it be in communicating with final beneficiaries or supporting training within the organizations. The rapid growth in the use of smartphones and the Internet opens the door to these new technologies at all levels of society. Self-IVR allows use of smartphones either as a personal tool or as a sort of radio-on-demand that can be used by groups for training or sharing information, ensuring that the original information reaches the final users in the form that was intended.

It is now clear that the progression toward having 100% of phones in Cambodia able to display Khmer script is irreversible. Studies conducted by Open Institute last year show not only an increase in the number of Khmer-enabled phones, but also an important increase in users' awareness of this functionality, as well as a startling increase during the past year in the number of users who write and read in Khmer on their phones daily or weekly (increases of up to 2,000% in some cases!). During the program's second year, penetration of smartphones grew to 26% of the population, with the number of Cambodians claiming to be Internet users reaching a similar percentage — almost all of them Facebook users (23%). Cambodia has fully entered the age of information technology, strongly so in urban centers, but also advancing quickly in rural areas, where in the coming years we will see smartphones and Internet in locations that do not have electricity networks, meaning phones will have to be charged with car batteries. This expansion opens the door to new ways of communicating for all purposes. In particular, it is important to consider that the channels available for communicating with citizens during the 2018 National Elections will be very different to those available in 2013.

While for the general population reaching a critical mass of smartphone penetration will still take a couple of years, some collectives with a higher economic standing (for example health professionals) already have reached this stage, opening the way to use mobile technology as a tool for communication and knowledge acquisition for the whole collective.

One very important side effect of this technological advance is that more and more Cambodians are writing and sharing their thoughts. Even if these exchanges of information are currently limited to non-controversial topics, the new channel of communication has opened, and will be available later for discussions of other social topics.

One of the risks of applying technology to development issues is that the excitement about using the technology might lead to technology-driven initiatives in which the use of the technology becomes more important than finding the correct way to solve a problem. SPICE has worked very hard to avoid this trap. Through its sectorial brainstorming workshops it has planted the seeds and demonstrated the outreach possibilities of technology. It has then let the CSOs work out whether a certain technology is the right solution for their problem. These CSOs only come back to the project when their ideas are mature enough to ensure the value of implementing them using the program's technologies.

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## **5. Conclusion**

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The expected results of SPICE were carefully planned by USAID after exhaustive research of the state of development and technology in Cambodia in early 2012. The spectacular success of the program is a clear indicator of the accuracy of this analysis, and of the projections for what programs such as SPICE can attain if managed by the right organization — which Open Institute has turned out to be.

The SPICE program has demonstrated the value of USAID's strategy of using Science, Technology, Innovation and Partnerships in development, as well as the interest of centralizing technological and innovation know-how into one organization that supports other USAID program in a country, instead of requiring every organization to develop expensive technology know-how and infrastructure, distracting them from their real purpose. The high number of applications developed, by far exceeding the number originally proposed, shows the interest that the program has been able to attract in USAID partners and other civil society organizations, as well as in the Cambodian government. The ability of the program to effectively help these organizations magnify their impact demonstrates that their trust was well placed, and contributed to the success of the program.

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## 6. Looking Ahead

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The termination of the program has seen a transfer of activities to others, ensuring that none of these activities ended with the program. This is especially important in the case of the two highly successful **public-private partnerships** developed. **EZECOM** continues running the IVR platform, expecting to turn it into a profitable commercial service. Open Institute also continues working with them, and with partners such as URC and People in Need, to try to develop sustainable IVR applications that will help maintain the platform.

All active IVR projects continue, as their operations are not part of the program itself, but based on commercial contracts with the program's partner EZECOM, who continues to provide the IVR service. EZECOM also accepts new programs and supports customers in the starting phase.

As far as the other key partnership is concerned, **Google** maintains the translation of Android and its applications, including the inclusion of Khmer in the set of languages that it maintains.

Sponsorship and support for **BarCamps** was handed to the USAID Development Innovations program, which will continue supporting the events for the period of its duration, reducing its participation each year for them to become fully commercial-sponsor based.

Open Institute will continue developing the **Self-IVR** technology that originated as a side effect of the SPICE program, as it believes it has huge potential. While the first applications developed were more of a proof-of-concept, the Institute has started working on several larger and more sophisticated Self-IVR projects requested by specific CSOs (most of them funded by USAID) and will work with the Ministry of Education, Youth and Sport on the deployment of the application developed with VSO to support English teachers in Grade 4. It will also work on a Web platform that will allow CSOs worldwide to create their own Self-IVR applications.

The completion of the SPICE program is not a termination. Its services, technologies and know-how will continue through Open Institute and its partners, having added valuable tools to the development sector in Cambodia, and having developed technologies that have the potential to be used worldwide. Through the program, Open Institute has acquired social and technological know-how, consolidated its position as the leading organization working on technology for development in Cambodia, and improved its financial and administrative management with the support of USAID.