

RESEARCH STUDY

Mobile Phones in Cambodia 2014



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Executive Summary

This study has been undertaken with the aim of developing an understanding of the knowledge, attitude and practices of phone users in relation to Khmer-language typing, writing and searching habits, as well as the motivating factors in the use of Khmer script. It also attempts to identify changes and trends in the use of Khmer-enabled phones and Khmer script to communicate via mobile phones.

This study's findings respond to the need to understand whether phones can be used as a tool for government and civil society organizations to communicate directly with citizens and beneficiaries all over Cambodia, offering them information and services in written Khmer.

The study was done in-house by the Open Institute, with over 2,066 respondents randomly selected among citizens all around the country. The results enable quantification of the percentage of Cambodians who own phones that are able to send and receive SMS in Khmer, as well as using Internet and social media in Khmer.

It was found that almost 94% of Cambodians claim to own their own phone, and more than 99% are reachable through some sort of phone. The proportion of citizens using more than one phone was only 12.5%, while one Cambodian in four uses more than one operator.

The results show that 51.3% of Cambodians own phones that are capable of communicating in Khmer script. The use of such phones is more common among men (55.7% versus 46.9% for women) and also more common in urban areas (57.3% urban versus 48.7% rural).

28.4% of the phones found were smartphones. Usage of Khmer was more common in smartphones than in dumb phones (63.5% vs. 47.7%). Among smartphone users, the ability to display Khmer was more common among users with a higher level of education.

A very large increase was detected in the number of Cambodians who write Khmer in their phones daily or weekly (335%), reaching a peak increase of over 2,000% for the users between the ages of 35 and 45.

The study concludes that the number of Khmer-enabled phones has reached the necessary critical mass for facilitating communication in Khmer. Awareness is also increasing rapidly, with more and more people regularly using Khmer script on their phones.

In order to increase the speed of adoption, the encouragement of the development of better text prediction and input methods for Khmer in phones is recommended, including Khmer speech recognition—the input method of the future.

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Abbreviations & Acronyms

| | |
|-------|----------------------------------------------------|
| ICT | Information and Communications Technology |
| KTV | Karaoke Television |
| MoE | Ministry of Environment |
| MoEYS | Ministry of Education, Youth and Sport |
| MPTC | Ministry of Posts and Telecommunications |
| PPS | Probability Proportional to Size |
| SMS | Short Message Service |
| SPSS | Statistical Package for the Social Science |
| USAID | United States Agency for International Development |

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Mobile Phones in Cambodia 2014¹

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1 Introduction

1.1 Background of the study

It has only been in the past six years, accelerated by the KhmerOS and Open School Programs², that standardization of Khmer script used in computers has been achieved. The use of the Unicode standard has permitted the development of modern websites and blogs in Khmer, the translation of computer applications into this language, the use of social networks in Khmer, and the permanent storage of textual information without fear of it being unreadable when the legacy (pre-Unicode) fonts are lost.

This advance has also opened the door to the use of Khmer in phones. First supported by Nokia in 2006 in some of their phones (with help from the KhmerOS program), the use of Khmer did not catch on at the time, as the mid-range models that supported Khmer were not the most popular, with purchase decisions based on either price (inexpensive) or social status (expensive).

Since then, a few manufacturers of other basic phones have developed support for Khmer, but the number of these phones in the market never reached the critical mass that would have permitted widespread use. Also, their input methods were too complicated for normal users. The use of Latin script to write Khmer-language SMS messages became an option, but the number of people who could understand it was limited and the vocabulary that could be used was also restricted, allowing only poor communication among youth.

Smartphones nevertheless started a small revolution, arriving as they did at a time in which the Internet was becoming popular, and in many cases they have become their users' only way of accessing the Internet. Most of these smartphones (Nokia being an exception) did not support Khmer natively, but users of some (iPhones mostly) quickly learned how to enable Khmer on them. For users of phones that supported Android it was not as easy. It was not possible to enable Khmer-support in the first generations of these phones (prior to version 4.1). Only in the past two years has the SPICE³ program worked with

1 This work has been made possible by the generous support of USAID through the SPICE program and of The Asia Foundation.

2 The Open Institute's KhmerOS program has worked since 2004 to help standardize the use of Khmer script in society and government by using Unicode. The Open Schools Program, also housed at the Open Institute, has supported the Ministry of Education in the standardization via Unicode and the teaching of Unicode to all students in grades 11 and 12. www.open.org.kh - www.khmeros.info

3 The USAID-funded program **Structuring Partnerships for an Innovative Communication Environment** (SPICE), implemented by the Open Institute, helps improve communication between civil society organizations and their beneficiaries through the use of mobile technology.

Google to enable full support for Khmer in Android 4.4, as well as provided a full translation of this system, which is being distributed to all phone manufacturers, opening the way for all future Android phones to support Khmer natively.

1.2 Research problems/significance

While the path has now been cleared for the use of Khmer in phones, with new models of smartphones and dumb phones⁴ permitting the use of Khmer, it is important to quantify the penetration of these Khmer-enabled phones, and to understand whether they have reached the point of critical mass at which users start writing to each other in Khmer. The percentage of users who had phones supporting Khmer was measured by the Open Institute in 2013 (29.5%), but rapid changes in technology and in demand mean that the numbers change rapidly; information that is one year old is already outdated and irrelevant, creating the need to again quantify the percentage of phones that support Khmer script. This information is necessary to evaluate whether SMS can be used as a means of communication for civil society organizations and government to reach phone users in order to provide information and services. Also, knowing the penetration rate of Khmer-enabled smartphones would facilitate a deeper understanding of how these phones can be used to access social networks in Khmer, the fastest growing means of communication in Cambodia among youth.

1.3 Research purposes and objectives

The purpose of this study is to better understand the characteristics and usage of mobile phones in Cambodia. Quantitative research techniques are used to gather data to fulfill the following objectives:

1. Identifying the characteristics of phones used, including brands, models and characteristics.
2. Investigating the knowledge, attitudes and practices of phone users in relation to Khmer-language typing, writing and searching habits, as well as motivation and demotivation factors in the use of Khmer script.
3. Acquiring information on the uses of social media in daily life.
4. Assessing the increase in the number of users who own Khmer-enabled phones.
5. Identifying changes and trends in the use of Khmer script to communicate through mobile phones.

⁴ For the purposes of this study, only two types of phones are considered. Phones capable of accessing the Internet (through a browser) and Facebook, and which have real keyboards, are considered smartphones. The rest are labeled dumb phones. Feature phones are not so popular in Cambodia, and hard to classify. Models are considered smart phones if they fulfill the characteristic of giving access to the Internet or to Facebook and have a real keyboard; otherwise they are considered dumb phones.

2 Means and Methods

2.1 Population of the Study

This work studies Cambodian citizens between the ages of 15 and 65 who live inside the country.

A projection of the 2008 population census to 2013, corrected to include an expected natural decrease, leads to an estimate of the present number of citizens in this age group of 9,606,450. This number is consistent with the approximation of the population offered by the Cambodian Intercensal Population Survey 2013.

For the purposes of this study, the rural Cambodian population is considered to comprise 70% of the total, with the urban population at 30%. According to the National Institute of Statistics, in 2008 the percentage of the population living in urban areas was 19.5%, and the rural population comprised 80.5%. However, due to the rapid urban population growth (mostly due to the urban-based garment industry and growth in the hospitality industry) we believe that these numbers must have changed. In particular, we have analyzed the composition of the garment industry workforce, which is mostly of rural origin, censused in their rural homes, but living and working in urban areas; they were included in the sample as part of the urban population (half of the 1,200,000 workers). These transplanted factory workers represented 6% of the population. The additional 4% moving to urban comprised mostly students, white-collar workers, hospitality workers and entertainment workers. These assumptions could only be partially justified by hard data, but we strongly believe that the census did not reflect reality and that 30% is a much more accurate figure.

This report also considers males and females to comprise 50% of the population each.

2.2 Sample size and composition

The size of the sample for this study was 2,066 participants, sufficient to be able to provide an answer to the main questions of the study with a confidence interval of 2.16 (with a 95% confidence level).

The population was divided into two groups for data-collection purposes: (a) a population who is expected to be at home at the time the data collection takes place (office hours); (b) a population that is hard to find at home during those hours, but can be found either at their work place or at the location where they have lunch.

Some 84.3% of the sample was collected at households across the country. Respondents were recruited based on official national census data. Gender, age and location of residence of the respondents were proportionally selected in accordance with census data and with the population of each one of the randomized provinces. In the case of Phnom Penh, due to the access to mobile phones in the city, the recruitment proportion was changed to fit the actual

proportion of rural/urban residents (estimated at 70% urban and 30% rural). The remaining 15.7% comprised white-collar workers (government officials, NGOs staff and private company staff) in Phnom Penh and blue-collar workers (garment industry, restaurant and entertainment workers).

2.3 Sampling

2.3.1 First type of respondent

Multi-stage sampling using Probability Proportional to Size (PPS) was used to select a nationally representative sample of 15-65 years old in households.

Cambodia's 24 provinces were categorized into five regions: plain; Tonle Sap; coastal; plateau and mountain; and capital city. Kampong Cham was selected in the plain region, Battambang was selected in the Tonle Sap region (including also data from floating villages, represented by Kampong Luong, Pursat), Preah Sihanouk was selected in the coastal region, while Stung Treng was selected in the plateau and mountain region. These provinces have the standard characteristics that matched the requirements of the study.

A total of 69 villages (28 urban) were selected across the five regions of Cambodia. Within each region the number of urban and rural villages was balanced to match the urban-rural proportion of the province. Villages were randomly selected. From each village, 25 respondents were selected.

Systematic sampling was used to recruit households. In each village, the data collection team leader visited the village chief to ask for the actual number of households in the village, and used the figure to calculate household intervals for the data collectors to use when looking for households. At the village level, purposive sampling was applied in the data collection process to choose the respondents. Interviewers visited the households, interviewed the persons they met, and screened the respondents that did not meet the gender/age requirements.

2.3.2 Second type of respondent

To collect data from respondents who were not at home, the interviewers were required to stand near the garment factories and wait for the workers. At restaurants, the study was explained to owners, whose permission was sought to interview employees and customers. Massage-parlor, beer-garden and karaoke-shop workers were interviewed after approval was obtained from the managers. Workers and customers of restaurants were randomly selected, as were workers from massage parlors, beer gardens and karaoke shops.

2.4 Questionnaire and observation data sheet

The survey form was constructed to include the following:

- ⤴ Demographic information
- ⤴ Phone characteristics (estimated by the user, but also observed).
- ⤴ Knowledge, attitude and practices of phone users

The questionnaire had already been used successfully in 2013 for the baseline study. It has been improved as a result of the first-year analysis and with new ideas accumulated during this year. It was piloted again before data collection, to ensure there were no problems and to test a new approach to data collection using phones or tablets.

2.5 Data collection

Data was collected using interviews and observation: face-to-face verbal interviews based on a standardized form. Interviewers read each question to the respondent and filled in the answer. Data was also collected through direct observation of the phones of the respondents, before and after sending an SMS in Khmer to them.

Data collection was performed using tablets and an electronic questionnaire (implemented using the Open Data Kit).

Each data-collection team conducting fieldwork consisted of one supervisor and five data collectors. In total, there were four supervisors and 20 data collectors, who were recruited and trained by researcher of Open Institute.

Data collection was then conducted over a period of two weeks in August 2014. Supervisors were responsible for field supervision and quality throughout the fieldwork.

2.6 Data management and analysis

The forms were checked by the supervisors before synchronizing to the Open Institute's server. All the consistency checks and constraints imposed by the form itself on the tablet, together with having the forms checked by supervisors before synchronization, guaranteed the accuracy and validity of the data. All completed forms were stored in the Open Institute's server. Only people responsible for data analysis had access to the data.

The OpenOffice 4 spreadsheet and IBM SPSS Statistic version 20 were used to analyze the data. Descriptive analysis was used to count frequencies of the key variables.

Comparison with the baseline survey data collected in 2013 provided important information on the trends and the changes that have taken place in the past year.

2.7 Research ethics

All interviewers and fieldwork team members were trained in ethical data-collection behavior, including confidentiality and anonymity. All selected respondents were informed about the study and asked to give their consent to participate in it. Respondents were able to skip questions or withdraw from the study at any time.

No identifying information on respondents was used in data analysis. All completed forms were stored in the Open Institute's server. Only those people responsible for data analysis had access to the data.

3 Results

3.1 Demographics of the sample

Of the 2,066 participants between the ages of 15 and 65 interviewed for the study, 47% resided in urban areas and 53% in locations considered rural. Female respondents comprised 56.3%, with 43.7% being male. Almost two fifths of the respondents (36%) were single, while more than half were married (59%). Participants were chosen from three age groups: 15-24 (34.1%), 25-39 (35.1%) and 40-65 (30.8%). The average age of respondents was 33 years.

The majority of participants had attended (if only partially) primary, lower and upper secondary school (31.9%, 32.7% and 21.6% respectively). Some 8% of respondents had completed university and a few had obtained a master's degree. Only 5.8% had had no formal schooling at all.

It is usually accepted in research on Cambodia that 50% of the population is female. Because women make up 56.3% of the participants in the sample, a correction has been made in all applicable calculations to ensure that the results faithfully reflect the population balance.

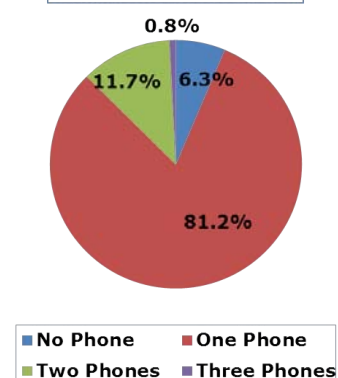
Regarding the urban and rural populations, the study takes into account the fact that the number of rural and urban participants surveyed does not correspond to the actual proportions of Cambodia. The 47% urban/53% rural sample has been weighted to fit the reality of a 70% rural/30% urban population.

3.2 Owning a phone

Out of the total 2,066 respondents interviewed for this survey, **93.7% declared that they had their own phone(s)** (a 3.6% increase from last year) and showed it (them) to the interviewer (95.2% ownership in urban areas versus 92.3% ownership in rural areas). A total of 91.8% of the women were found to own a phone, versus 96.1% of men.

Most of the 6.3% who did not have a phone did have a household phone they could be contacted through. Only two respondents were not able to offer a phone number they could be contacted through (<0.001%).

Figure 1
Number of Phones Used



3.3 Number of phones and operators used

Respondents were asked how many phones they used. The majority of respondents (81.2%) used only one cell phone, some used two (11.7%) and only a few (0.8%) used three phones (6.3% did not have their own phone). Cambodians use an average of 1.05 phones per person. Women used an average of 0.98 phones, whereas men used an average of 1.12 of phones.

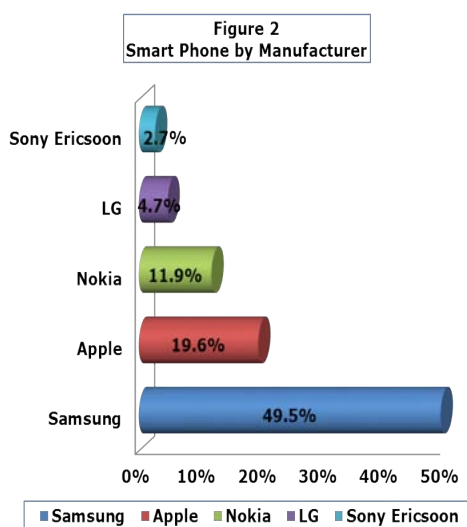
Regarding the number of operators used by a single user, it was found that 28.8% of Cambodians used more than one (35.5% for urban and 26% for rural, 36.3% male and 25.9% female). Only 2.9% used more than two operators. The average number of operators used by a Cambodian is 1.22. This comes to 1.16 operators used for each phone (= 1.22 / 1.05).

The total number of phones used by Cambodians between the ages of 15 and 65 is estimated at 10,084,915 (a 6% increase from last year).

The total number of operator connections in Cambodia used by Cambodians between the ages of 15 and 65 is estimated at 11,715,958 (a 10% increase from last year).

3.4 Smartphones

A total of 28.3% of the phones found were smartphones, up 29% from the previous year. **The percentage of Cambodians that had at least one smartphone was 26.1%**, a 31.5% increase from last year. Some 38.6% of urban residents had at least one smartphone, whereas for rural residents the figure was only 20.7% (20.9% female and 31.2% male). Ownership of smartphones was also found to gradually increase with the level of education of the owner, from 6.7% of those who have had no formal education to 60.5% for those who study or have completed university.



Regarding the brand of smart-phones used, Samsung accounted for 49.5% of the market (up from 37.5% last year), followed by Apple with 19.6% (down from 21.9%). Nokia accounted for 11.91% (down from 18.5%), LG was at 4.7% (from 3.8%). The remaining manufacturers (including Huawei, HTC, Sony Ericsson and others) added up to 8.5% (compared to 10.6% last year).

For Samsung smartphones, the Galaxy Note model accounted for 17.7%, followed by Galaxy S2 (15.8%), Galaxy S (9.5%), Galaxy S3 (7.6%), Galaxy Grand (5.4%), Galaxy Note2 (5.4%), and other varieties of Galaxy model (38.6%).

Of Apple smartphones, the iPhone 4 accounted for 28.8%, followed by the iPhone 4S (23.2%), iPhone 5 (20.8%) and iPhone 5S (17.6%). Other models comprised 9.6%.

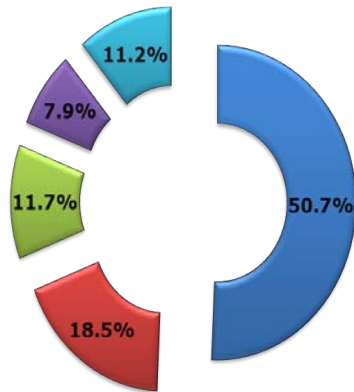
The Asha series covered more than half of Nokia smartphones (52.6%), trailed by the C series (7.9%) and X2 (7.9%). Least significant was the Lumia series (6.6%) and a group of other models (25%).

For LG smartphones, the Optimus series accounted for 36.7%, with a large variety of models (63.3%) comprising the remainder.

3.5 Khmer language in phones

3.5.1 Manufacturers of phones that support Khmer

Figure 3
Khmer-Enabled Phones
by Phone Manufacturer

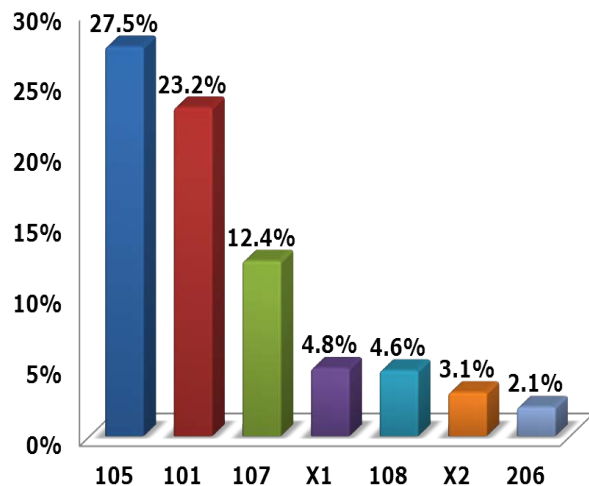


Nokia phones comprise 56.7% of all phones in Cambodia. The three other brands of significance are Samsung (16.2%), Metfone (6.2%) and Apple (4.8%).

Nokia phones represent 50.7% of all phones that support Khmer. The brand is followed by Samsung (18.5%), Metfone (11.7%) and Apple (7.9%). The remaining 11.2% was distributed among a large number of manufacturers.

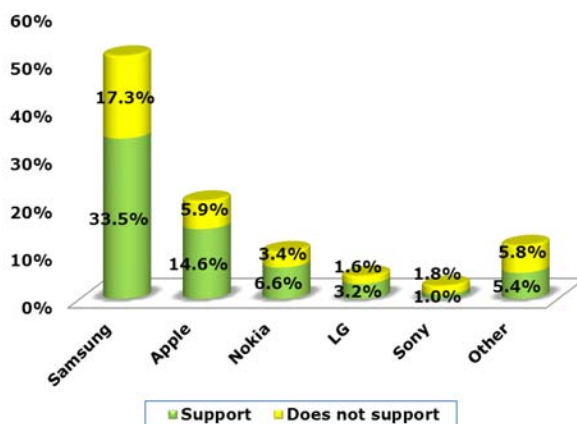
Figure 4
Nokia Model that Support Khmer

■ Nokia ■ Samsung ■ Metfone ■ Apple ■ Other



Within Nokia phones, only a few models account for most of the support for Khmer script. The Nokia 105 model accounted for 27.5% of Nokia phones supporting Khmer, followed by Nokia 101 (23.2%) and Nokia 107 (12.4%). Variations of X1/X2 totaled 7.9%. They were trailed by the Nokia 108, at 4.6%. The Nokia 206 was the last significant model, accounting for 2.1%.

Figure 5
Distribution of Smart Phone by Brand and Their Support for Khmer Script



Some 63.5% of smartphones were found to support Khmer script (versus 47.7% of non-smartphones). These numbers were up from 52% for Khmer-enabled smartphones and 55% for Khmer-enabled dumb phones last year.

Of the 71.1% of Apple smartphones that supported Khmer, the iPhone 4 accounted for 27.8%, iPhone 4S represented 25.6%, iPhone 5 accounted for 21.1% and the iPhone 5S for 17.8%.

Some 66.1% of Nokia smartphones supported Khmer, most of them being different version of the Asha phone (87.8%).

Almost seven out of 10 Samsung smartphones supported Khmer (66%). Galaxy Note accounted for 21.5%, followed by Galaxy S2 (15.3%), Galaxy S (8.6%), Galaxy S3 (8.13%), Galaxy Grand (7.2%) and Galaxy Note2 (5.3%).

3.5.2 The beliefs of respondents and the Truth after observation

For each phone they used, respondents were asked if the phone(s) supported Khmer text (Unicode). After they responded, the interviewer sent an SMS in Khmer to each one of the respondent's phones, observing to see whether the message was correctly displayed in the phone(s).

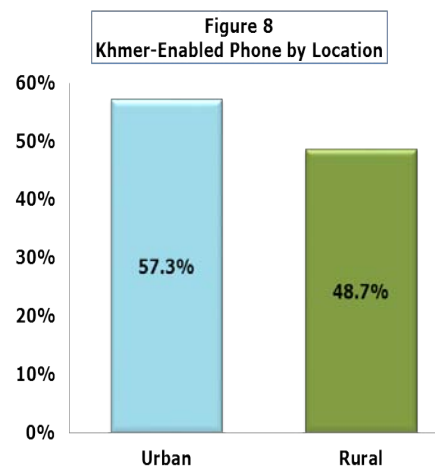
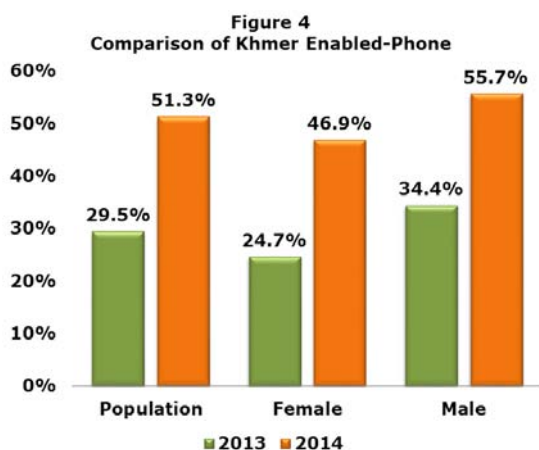
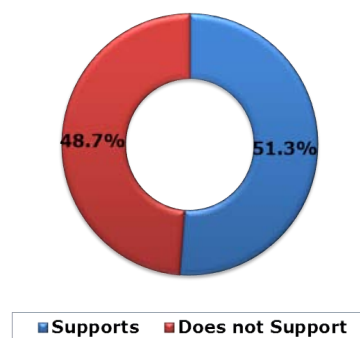
As a result of these questions it was found that 38.4% of the users thought that their main phone supported Khmer, 34.4% thought that it did not, and 20.6% admitted not knowing if it did or not.

The observation of phones (after sending and SMS in Khmer to them) showed that the users' perceptions were not always correct.

The study found that, after equilibrating for location and gender, **51.3% of Cambodians between the ages of 15 and 65 (a 65% increase from last year) had at least one phone through which it was possible to send and receive messages in Khmer script** (46.9% of women had such a phone, versus 55.7% of men). The growth in the use of Khmer phones for women in the last year was 89.8%, while for men it was only 61.8%.

Support for Khmer was found to be more extensive in urban areas than in rural areas (57.3% / 48.7%). The increase in support in urban areas last year was 56.7% (compared to 83.7% for rural areas).

Figure 6
Cambodians who have a phone that support Khmer

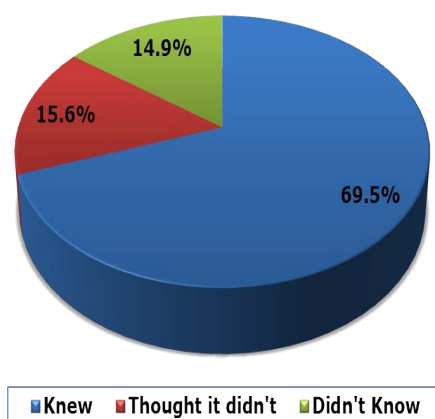


The ability to display Khmer was also found to gradually increase with the level of education of the owner, from 33% of those who have had no formal education to 69.2% for those who attend or have completed university. Support among those who study at or have completed university was slightly higher among men (71.8%, versus 67.3% in women)

Discrepancies between the perception of the users and the actual ability of the phones to display Khmer went in both directions: some users thought their phone could support Khmer when the phone could not, and some believed theirs did not when it was actually able to display Khmer. In particular:

- 8.7% (a 55.7% decrease from last year) of those who thought that their main phone could receive Khmer Unicode messages were wrong; their phone could not receive such messages. This confusion was often due to their phones being able to receive picture messages (bitmap SMS) that contained Khmer text (an option that is quickly disappearing in new phones).

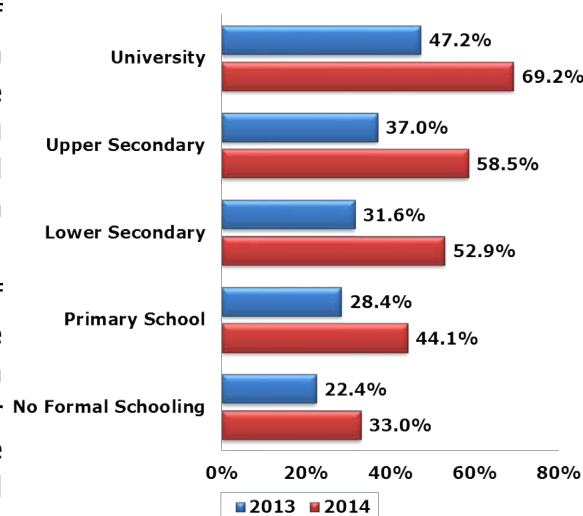
Figure 10
Phone Supports Khmer
Did users know?



It was found that of all users whose main phone supported Khmer, only 69.5% knew it for sure (this awareness was up 20% from last year); 15.6% thought it did not, and 14.9% didn't know. In terms of location, the numbers of participants who knew their phones supported Khmer in urban and rural areas were pretty similar (69%). Last year this level of awareness was stronger in urban areas (61% versus 54.8% rural), so it is clear that rural areas have reached the same level of awareness by becoming aware faster (27% growth, versus 13% in urban areas).

Regarding gender, men knew that their main phone supported Khmer slightly more often than women (72.4% versus 67%); these figures represent a 21% increase for men and an 18% increase for women from last year.

Figure 9
Khmer-Enabled Phone
by Level of Education



- 20.9% (a 43.8% increase from last year) of those who thought their phone did not support Khmer were also wrong, as their phone did show ability to support it. The phones of 36.7% of those who did not know if their main phone supported Khmer actually supported it.

For smartphones, the number of those who knew that their phone supported Khmer was as high as 79.5%, while for dumb-phone users it was only 64.8% (both up 18% from last year).

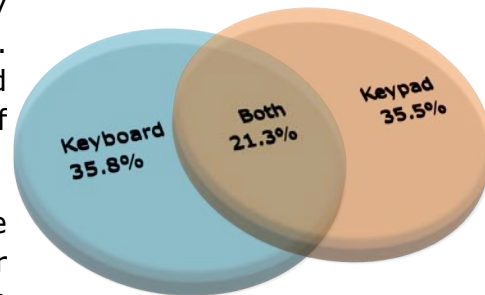
There was a large difference in awareness depending on the brand of the smartphone. The lowest was for Nokia smartphones, with only 57.6% of users being aware of their phone's ability to support Khmer. For Samsung, the proportion went up to 81.8%, and for Apple to 87.3%. These percentages are similar to those in the previous year.

3.5.3 Ability to write Khmer script using phones

In this section the term *user* refers to phone owners between the ages of 15 and 65 who have at least one phone that can send and receive SMS in Khmer.

Some 35.5% (a 12% increase from last year) of these users claimed to know how to use the keypad of a dumb phone to type Khmer script. 35.8% (a 23% increase) declared that they knew how to use a smartphone keyboard. Some 21.3% (21% increase) reported knowing how to type on both types of keyboards.

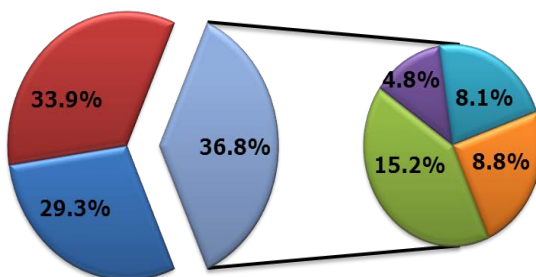
Figure 11
The Ability to Write Khmer Script in Phone



A total of 67.7% of users with at least one **smartphone** that could operate in Khmer declared knowing how to type Khmer Unicode (a 21% increase from last year). Among this group, those who had finished high school stood out, as 76.2% of them knew how to type Khmer. If only those who had finished school and lived in urban areas were considered, the percentage went up to 78.4%.

3.5.4 Writing Khmer script

Figure 12
Writing Khmer Using Khmer Script



■ Did not know they did ■ Never wrote
■ Rarely ■ 1 per month
■ 1per week ■ Daily

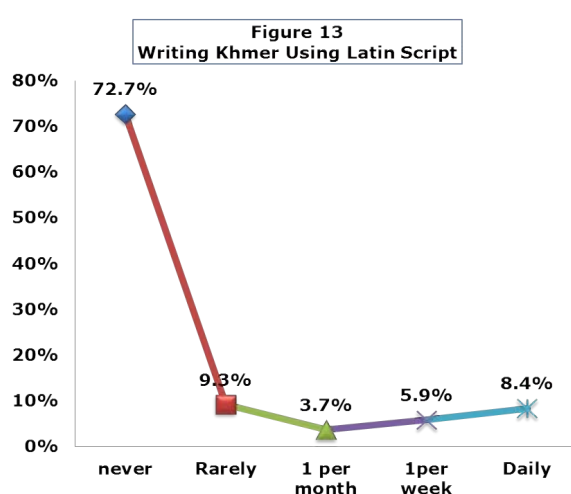
We have seen above that 69.5% of those who had phones that supported Khmer actually knew that their phones had such capability.

Looking at the problem from the opposite angle, we see that 29.3% of those who had phones that supported Khmer did not know that they did, and 33.9% responded that they had never actually written a message using Khmer Unicode on their phones. Only 36.8% had written in Khmer at some point or another.

Some 20.4% of users (a 79% increase from last year) — equivalent to 18.4% of the whole population — declared that they typed Khmer script into their phones. More than two thirds of these users (15.2%) typed in Khmer daily or weekly (an extraordinary increase of 335% from 4.5% the year before).

Looking at the age groups in which typing Khmer script is more frequent, it was found that 24.8% of those under 25 used it daily or weekly (versus only 5.8% last year, a 427% increase). For those between 25 and 35 it was 17.4% (3.1% last year, for a 561% increase). For those between 35 and 45, the percentage was 10.2% (compared to only 0.5% last year—a **2,040% increase**). And for those older than 45, it was 4.1% (versus 0.5% last year, an 820% increase).

3.5.5 Writing Khmer using Latin script

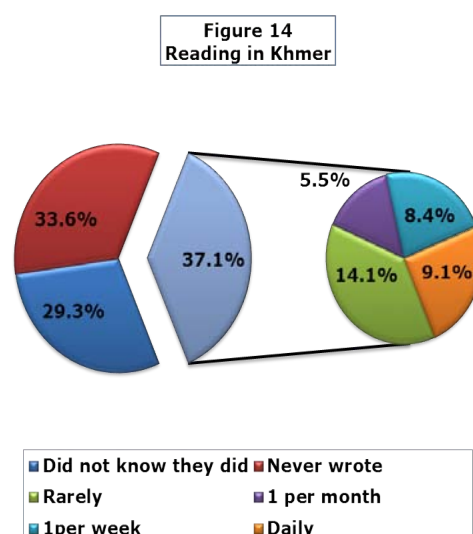


It was found that 72.7% of the phone users never wrote in Khmer using Latin characters, versus 27.3% who had done at some point (24.6% of the total population). Some 14.3% of the users claimed to write in Khmer with Latin characters either daily or weekly (12% last year).

Looking at the age groups in which typing Khmer in Latin characters is more frequent, it was found that 29.4% of those under 25 used it daily or weekly (25.6% last year). For those between 25 and 35, the percentage was 12% (4.6% last year), and for those older than that it dropped to 1.8% (0.9% last year). Only the increase for the 25-35 was important (260%), even if there was also an increase for under 25s (11%).

3.5.6 Reading in Khmer

Again, only 69.5% of those who had phones that supported Khmer actually knew that they did. Looking again at the problem from the opposite angle, we see that 29.3% of those who had phones that supported Khmer did not know they did, and 33.6% responded that they never actually read Khmer Unicode on their phones. Only 37.1% said they had read Khmer at some point or another.



This means that 20.6% of users (an increase of 55% from last year) — equivalent to 18.5% of the whole population — declared they had read Khmer on their phones. There

was no significant difference between women and men reading Khmer script regularly this year (18.3% for men versus 16.8%) but in terms of growth from last year there was a big difference (245% for men versus 393% for women).

Looking at the age groups in which reading Khmer script is more frequent, it was found that 23.3% of those under 25 used it daily or weekly (versus only 8.2% last year, a 283% increase). For those aged between 25 and 35, it was 21% (3.4% last year; a 618% increase). For those between 35 and 45 the percentage was 10.1% (only 0.7% last year, for a 1,537% increase). And for those older than 45 it became 4.1% (versus 1.2% last year, a 358% increase).

3.5.7 Reasons not to type Khmer script on phones

The main reasons offered by respondents for never writing in Khmer script, (even if their phones supported Khmer and they knew how to type using Khmer Unicode) were, by order of importance:

- 1.** Writing Khmer script was difficult and time-consuming.
- 2.** Non of their relatives or friends used Khmer on their phones.
- 3.** They were busy with their work.
- 4.** They were not able to read and write Khmer (illiterate).

In the previous year, the most common reason for non-use “it was unnecessary for them to write in Khmer” was less frequently cited this year (not in the top four). The second- and third-most important last year were the most and the second-most important this year.

It was also found that respondents preferred to make a phone call rather than type a message in Khmer. This is consistent with the fact that in Cambodia in many cases it is cheaper to call than to send an SMS.

Respondents said the factors that would most encourage them to use Khmer script were:

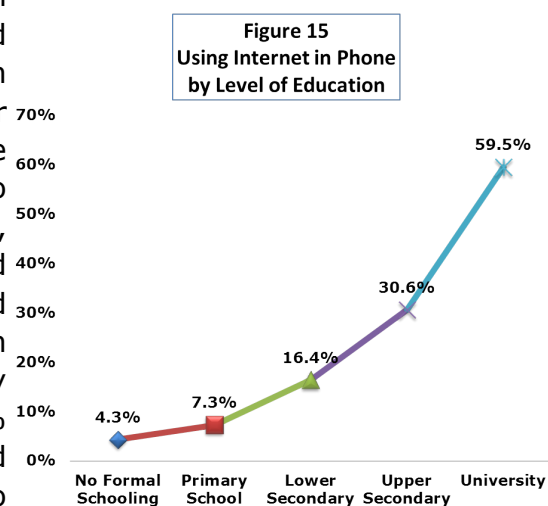
- 1.** Having Khmer typing training;
- 2.** Having friends and relatives who did so;
- 3.** Having simpler input methods, allowing them to type in Khmer more quickly; and
- 4.** Having Khmer characters on the keypad of their phone.

The most important factor encouraging them to use Khmer script this year was less important last year. The second-, third- and fourth-most important factors this year were the most, second-most and third-most important last year.

3.5.8 Use of the Internet on phones

Some 26.7% of Cambodians claimed they used or had used the Internet (44.7% urban versus 19% rural). The percentage of men who said they used or had used the Internet was greater than among women (34.1%/19.4%). Use of the Internet was also found to drastically decrease with age, from 43.5% of those aged between 15 and 25 to 8% of those aged between 40 and 65.

Some 19.1% of Cambodians claimed to use the Internet on their own phone (only a 6% increase from last year). This percentage was as high as 32.5% for urban users and as low as 13.4% for rural users. The percentage of men who said they used or had used the Internet on their own phones was greater than for women (23.9%/14.3%). The use of the Internet on their own phone was also found to drastically decrease with age, from 29.6% of those aged between 15 and 25 to 6.3% of those aged between 40 and 65. By contrast, the use of the Internet on one's own phone was found to drastically increase with education level, from 4.3% of those who attended or had completed primary school to 59.5% of those who studied or have completed university.



- 35.7% of those who used the Internet on their smartphone claimed to read Khmer on their phone daily or weekly.
- 30% of those who use their smartphone to access the Internet claimed to write Khmer on their phones daily or weekly.

Some 23.2% of Cambodians said they used or had used Facebook (a 29% increase from last year). This percentage was as high as 39.4% for urban residents and as low as 16.3% for rural residents. Men claimed to use Facebook more than women (29% versus 17.5%).

A total of 19.1% of Cambodians said they have their own Facebook accounts. Men made this claim more often than women (23.3% versus 14.8%). Some 33.8% of urban residents said they had accounts, compared to 12.8% of rural residents. 10% of Facebook users claimed to have more than one account.

Of the respondents, 18.8% claimed to use Facebook and also had a phone that supported Khmer, but only 12.8% used Facebook in their Khmer-enabled phones. This 12.8% group comprised four categories: those who claimed to write on Facebook in both Khmer and Latin characters (48.9%); the 13.6% who write only in Khmer characters; 22.3% who write only in Latin characters; and 15.2% who never write in Khmer.

Additionally, looking at the data from different points of view, it was found that:

- 57.2% of smartphones are used for accessing Facebook.
- 79.1% of Facebook users who use their smartphone to access their account actually have phones that support Khmer, but only 38.5% of them claim to read Khmer on their phone daily or weekly, and only 33% claim to write in Khmer using their phone daily or weekly.
- 95.5% of users of Khmer-enabled smartphones use their phones to access Facebook.

3.6 Conclusions based on results

The results of this study are expressed with a 95% security (Confidence Level).

The Confidence Interval (m) is calculated using the formula:

$$m = \text{sqrt} ((t^2 \times p (1-p))/n)$$

n = sample size

t = confidence level (standard value of 1.96 for 95% confidence level)

p = proportion of the sample who use Khmer phones

m = **Confidence Interval**

Given that the weighted percentage of users that have phones supporting Khmer is 51.3% of phone users, with a sample of 2,066 we can calculate the interval for both confidence levels.

For 95% confidence, the confidence interval is 2.16. We can therefore express the result as:

With 95% certainty (p≤0.05), 51.3±2.16% of Cambodians between the ages of 15 and 65 have phones that support Khmer Unicode messaging.

This implies that we are 95% certain that between 4,720,610 and 5,135,608 Cambodians between the ages of 15 and 65 have at least one phone that supports Khmer.

4 Discussion

4.1 Owning or having access to a phone

The findings that 93.7% of respondents between the ages of 15 and 65 have their own phone, and that almost 100% have access to a phone, represents 4% growth from the previous study conducted by the Open Institute in 2013⁵.

The growth in the number of owners from 90.4% to 93.7% in one year shows an already saturated market in which there is little space for growth in user numbers. The big change detected in this study is in the quality of the phones, and it is consistent with the deep economic change that is taking place in Cambodia, as well as with the change produced by the more than 180,000 new phones being bought by Cambodians every month (a figure used by phone operators). We estimate that 10,084,914 phones are in use in Cambodia, covering most of the market that can afford them.

Mobile phones have become a necessity for many people to keep in touch with family, friends and business partners. The reasons for not having one seem to be economic in most cases. Often we found that for young people, being without a phone was a temporary condition, arising from the fact that the person's phone was broken, lost or stolen, and they did not have the money to replace it at that time. For older people, we often found that a lack of a phone was due to their believing that they did not require one for communication. However, the mobility required of the younger generation to work in garment or other factories, or to work in other countries, has led them to push phones onto their parents as a means of communication.

4.2 Phones

On the higher end, 28.4% of the phones owned by respondents were smartphones, an increase of almost 30% from last year. This growth is not surprising, due to the popularity of such phones, the country's economic development, and the growing need to access the Internet. The usage of smartphones is — as expected — much denser among educated urban youth than among other sections of the population.

The number of users who use more than one operator has grown almost 10% to 28.8% of the population, showing an increase in interconnection, while users are not yet prepared to pay for cross-network interconnection calls, due to the huge difference in prices with on-net calls, which make it valuable for them to maintain two or more SIM cards of different operators.

⁵ *Existence and use of phones that permit written communication in Khmer Script - Phong, Uy, Sola. Open Institute. 2013.*

4.3 Owner Awareness and Reality on Whether Phones Supports Khmer

One of the most surprising results of the study has been the 65% increase in the number of users who have phones that support Khmer (almost 2,100,000 new users!). This probably means that almost all new phones being sold in the country support Khmer script natively or that this support is systematically installed in them (as in the case of iPhones).

An interesting change from the previous year is the 20% increase in the percentage of owners of Khmer-enabled phones who are actually aware of the fact that their phone has this capability. This awareness is similar in urban and rural users, while last year rural awareness was much lower. Also worth noting is the 43.8% increase in the number of those who have Khmer enabled phones who were sure that their phone does not support it. This is probably due to the large increase in the availability of very-low-cost Khmer-enabled phones in rural areas bought only for voice communication (or to be used as flashlights).

Furthermore, of the 69.5% who knew that they could use Khmer on their phones, 18.5% actually wrote and read Khmer script on their phone. This represents a 60% increase from last year. The study also found increased interest in the use of Khmer script, implying that Cambodians are starting to appreciate the value of using Khmer script on their phones.

While in previous years the percentage of Android phones supporting Khmer was low, this seems to be changing rapidly, with almost two thirds of Android phones now supporting it. However, it has not yet reached the percentage of iPhone users that have installed the support for Khmer in their phones.

There are important differences in awareness levels between owners of different brands of phones. This is probably due to the fact that support for Nokia phones is native (low awareness), while for Apple and Samsung phones the owner must make the effort to have the support installed, thus becoming aware of its existence.

4.4 Writing in Khmer using Khmer script versus Latin script

Another valuable result is the growth in the number of people who actually use Khmer language on their phones. While the total number of people who claimed to use Khmer in their phones increased moderately (20%), the number of those claiming to use it often (daily or weekly—the real users) exploded to over 330%. In some age groups that previously reported very little use of Khmer (over age 35), the increase was as large as 2,000%. This indicates very strong growth in active use of the language in phones.

5 Conclusion and Recommendation

Cambodia seems to have reached the point where the move toward 100% of phones being Khmer-enabled is now irreversible. It is only a question of time before we see the remaining non-Khmer phones replaced by Khmer-enabled models. At a rate of 2,100,000 phones per year, it will take another two and a half years, approximately, to reach near-full coverage. Considering the average lifespan of a phone in Cambodia is four years, this is also consistent with having all phones purchased before 2013 replaced by mid-2017.

Awareness is also rapidly increasing, with more and more regular users of Khmer script in phones. It should be expected that in two years' time, all users will expect their phones to be Khmer-enabled, and will be slowly getting into the habit of using them.

Smartphones are also advancing. The present 30% growth rate probably leaves room for further acceleration of growth, with dropping prices seen as a key factor for adoption by lower-income consumers. Smartphones are already a key communication tool in certain professional collectives with above-average incomes.

The main factor that is expected to lead to further use of Khmer in phones is simplicity of use. This simplicity will be related to improving text-prediction for the specific vocabulary used in SMS or other forms of quick written communication.

In order to increase the speed of adoption of the use of written Khmer script in phones, it is recommended that development of better text prediction and input methods for Khmer script in phones be encouraged. This includes speech recognition for Khmer, as the input method of the future.

Appendix A: The Questionnaire Instrument

KAP Survey on Phones in Cambodia and their ability to communicate in Khmer Script



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| | | |
|-------------------|-------|--------|
| Interview No. | | |
| Interviewer Name | | |
| Interviewer No. | | |
| Date of Interview | / | / 2014 |
| Interview Length | From: | To: |

Introduction

Hello, my name isI work for Open Institute as data collector. The Open Institute is conducting the study on "Phones in Cambodia and their ability to communicate in Khmer Script" funded by USAID and Asia Foundation. The study aims at quantifying the number of Cambodians who have phones that allow them to communicate in Khmer script, as well as understanding their circumstances and the groups that they belong to. The selected-sites of this study are Phnom Penh, Kampong Cham, Battambang, Kratie and Sihanouk Ville. The target group of the study is the Cambodian cell phone users aged from 15 to 65 years old. All information you provide will be highly kept as confidential. This interview will be taken approximately 15 minutes. So, would you please give me 15 minutes to interview with you?

Section I: Demographic Information

| | | | | | |
|------|-----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------------------|----------------------|
| D 1 | Village: | Village Code (2 digits) | D1 | <input type="text"/> | <input type="text"/> |
| D 2 | Commune/Sangkat..... | Commune Code (2 digits) | D2 | <input type="text"/> | <input type="text"/> |
| D 3 | District:..... | District code (2 digits) | D3 | <input type="text"/> | <input type="text"/> |
| D 4 | Province..... | Province Code (2 digits) | D4 | <input type="text"/> | <input type="text"/> |
| D 5 | Code combined: | D5 | | <input type="text"/> | <input type="text"/> |
| D 6 | Urban / Rural | 1 = Urban 2 = Rural | D6 | <input type="text"/> | |
| Q 1 | Repondent name: <input type="text"/> | | | | |
| Q 2 | Age: | | Q2 | <input type="text"/> | <input type="text"/> |
| Q 3 | Sex: | 0 = Male 1 = Female | Q3 | <input type="text"/> | |
| Q 4 | Marital status: | 1 = Single – Never married 2 = Married /living with someone as married 3 = Widowed 4 = Divorced/separated 5 = Other..... | Q4 | <input type="text"/> | |
| Q 5 | Level of Education: | 1 = No formal schooling 2 = Primary School (K1-6) 3 = Lower Secondary (G7-G9) 4 = Upper Secondary (G10-G12) 5 = University (Undergraduate) 6 = Post Graduate 7 = Technical / Vocational 8 = Other (specify) 9 = Don't know (spontaneously) | Q5 | <input type="text"/> | <input type="text"/> |
| Q 6 | Do you have a mobile phone? | 0 = No 1 = Yes | Q6 | <input type="text"/> | |
| | <i>If the answer is No, go to questions 6b and 7 and terminate the interview</i> | | | | |
| Q 6a | Do you usually bring your phone wherever you go? | 0 = No 1 = Yes | Q6a | <input type="text"/> | |
| | <i>Go to question 8</i> | | | | |
| Q 6b | Does anybody in your household have a phone? | 0 = No 1 = Yes | Q6b | <input type="text"/> | |
| Q 7 | If somebody asks you to which phone they can call you, whose phone number do you tell them to call? | | | | |
| | 0 = I do not give them a phone number | 1 = Spouse | Most usually | Q7 a | <input type="text"/> |
| | 2 = Neighbour Relative | 3 = Neighbour not-relative | Second most usual | Q7 b | <input type="text"/> |
| | 4 = Friend | 5 = Phone Booth | Thrid most usual | Q7 c | <input type="text"/> |
| | 6 = Other (specify) | | | | |

Section II: Characteristics of Phone

- Q 8 How many phones do you use? (number of phones) Q8
- Q 9 Which network/mobile phone company(s) do you use most? Q9 a

| | |
|-----------|--|
| Most used | |
|-----------|--|

 1 = Cellcard, 2 = Metfone, 3 = SMART 4 = Beeline Q9 b

| | |
|------------------|--|
| Second most used | |
|------------------|--|

 5 = Qb, 6 = Excell, 7 = Other (specify)..... 0 = Not applicable Q9 c

| | |
|-----------------|--|
| Third most used | |
|-----------------|--|
- Q 10 What is the phone number that you use most ? Q10 a most used

| |
|--|
| |
|--|

 Q10 b second most used

| |
|--|
| |
|--|

 Q10 c third most used

| |
|--|
| |
|--|
- Q 11 How much money do you usually spend per month on cell phone credit? US Dollars Q11
- Q 12 For how long have you been using cell phones? Year(s) Q12
- Q 13 What are the characteristics of the cellphone(s) do you use?

| | Brand | Model | Smart / Non Smart | Input method |
|---------|-------|-------|-------------------|--------------|
| Phone 1 | Q13a1 | Q13a2 | Q13a3 | Q13a4 |
| Phone 2 | Q13b1 | Q13b2 | Q13b3 | Q13b4 |
| Phone 3 | Q13c1 | Q13c2 | Q13c3 | Q13c4 |

- Brand**
 Original
 1 = Apple 8 = Metfone
 2 = LG 9 = Motorola
 3 = HTC 10 = Samsung
 4 = Nokia 11 = Sony Errickson
 5 = Beeline 12 = BlackBerry
 6 = Smart 13 = I-Call
 7 = Cellcard 14 = Hiya
 15 = Copy of original phone: copy of.....
 16 = Other (specify).....
- Type**
 1 = Smart
 2 = Non-Smart
- Input Method**
 1 = keyboard
 2 = Numberpad

- Q13a1
- Q13a2
- Q13a3
- Q13a4
- Q13b1
- Q13b2
- Q13b3
- Q13b4
- Q13c1
- Q13c2
- Q13c3
- Q13c4

Section III: Knowledge, Attitudes and Practice

- Q 14 Do you know how to write Khmer script in a phone that has a numeric pad? 0 = No 1 = Yes Q14
- Q 15 Do you know how to write Khmer script in a phone with a real keyboard? 0 = No 1 = Yes Q15
- Q 16 Can your cell phone(s) display or write in Khmer script? Q16 a Phone 1
 Q16 b Phone 2
 0 = no, 1 = yes, 2 = Dont know 3 = Not Applicable Q16 c Phone 3

If non of phones can display or write in Khmer script, please go to Q25

- Q 17 Please indicate how often you write Khmer script in your phone(s) Q17
 1 = Never (N), 2 = Rarely (R), 3 = Every Month (EM), 4 = Every Week (EW) 5 = Every Day (ED)

If the answer is different from 1 (Never) please go to Q20

- Q 18 If you do not write Khmer script in your mobile phone, would you please tell the reason why?
 1 = Illiteracy Q18a1
 2 = No critical mass Q18a2
 3 = Difficult to type Q18a3
 4 = Time consuming Q18a4
 5 = Typing Khmer script is not necessary Q18a5
 6 = Busyness Q18a6
 7 = Don't like typing Khmer script Q18a7
 8 = Other..... Q18a8

Q 19 If you do not write Khmer script, what factors will encourage you to write it in your phones?

| | | |
|----------------------------------------------------|-------|--------------------------|
| 1 = Need critical mass | Q19a1 | <input type="checkbox"/> |
| 2 = Need typing training | Q19a2 | <input type="checkbox"/> |
| 3 = Simplify and improve the method of typing | Q19a3 | <input type="checkbox"/> |
| 4 = Khmer characters should be displayed in button | Q19a4 | <input type="checkbox"/> |
| 5 = Need to learn Khmer language | Q19a5 | <input type="checkbox"/> |
| 6 = Other..... | Q19a6 | <input type="checkbox"/> |

If you have answered question Q 18 and Q19, skip to Q21

Q 20 If you are writing Khmer script in your phones, would you please tell the reason why?

| | | |
|---------------------------------------------|-------|--------------------------|
| 1 = To uphold Khmer language | Q20a1 | <input type="checkbox"/> |
| 2 = Wants readers to easily understand | Q20a2 | <input type="checkbox"/> |
| 3 = Don't know English | Q20a3 | <input type="checkbox"/> |
| 4 = Can write what I really want to express | Q20a4 | <input type="checkbox"/> |
| 5 = Improve Khmer writing | Q20a5 | <input type="checkbox"/> |
| 6 = Saving contact name or song title | Q20a6 | <input type="checkbox"/> |
| 7 = Other..... | Q20a7 | <input type="checkbox"/> |

Q 21 Please indicate how often you read SMS or email or news in Khmer script in your phone(s)

Q21

1 = Never (N), 2 = Rarely (R), 3 = Every Month (EM), 4 = Every Week (EW), 5 = Every Day (ED)

If the answer is different from 1 (never), please go to Q25

Q 22 If you never read SMS or email or news in Khmer script in your phones, please tell the reason why?

| | | |
|------------------------------------------------|-------|--------------------------|
| 1 = Illiteracy | Q22a1 | <input type="checkbox"/> |
| 2 = No critical mass | Q22a2 | <input type="checkbox"/> |
| 3 = No SMS, news or email in Khmer to read | Q22a3 | <input type="checkbox"/> |
| 4 = Don't know how to check SMS, news or email | Q22a4 | <input type="checkbox"/> |
| 5 = Other..... | Q22a5 | <input type="checkbox"/> |

Q 23 If you never read SMS or email or news in Khmer script in your phones, what factors will encourage you to do it?

| | | |
|-----------------------------------------------------------|-------|--------------------------|
| 1 = Need critical mass | Q23a1 | <input type="checkbox"/> |
| 2 = Khmer characters should be displayed in button | Q23a2 | <input type="checkbox"/> |
| 3 = Need to learn Khmer language | Q23a3 | <input type="checkbox"/> |
| 4 = There must SMS, news or email in Khmer to read | Q23a4 | <input type="checkbox"/> |
| 5 = Need someone to teach how to check SMS, news or email | Q23a5 | <input type="checkbox"/> |
| 6 = Other..... | Q23a6 | <input type="checkbox"/> |

If Q22 and Q23 are answered, skip to Q25

Q 24 If you are reading SMS or email or news in Khmer script through your phones, would you please tell the reason why?

| | | |
|-------------------------------------------------|-------|--------------------------|
| 1 = To know the meanings | Q24a1 | <input type="checkbox"/> |
| 2 = Comprehensively easy to read | Q24a2 | <input type="checkbox"/> |
| 3 = Don't know English | Q24a3 | <input type="checkbox"/> |
| 4 = Spend less time to read | Q24a4 | <input type="checkbox"/> |
| 5 = Friends and relatives also use Khmer script | Q24a5 | <input type="checkbox"/> |
| 6 = Other..... | Q24a6 | <input type="checkbox"/> |

Q 25 Please indicate how often you write Khmer language in your phone(s) using Latin characters

Q25

1 = Never (N), 2 = Rarely (R), 3 = Every Month (EM), 4 = Every Week (EW) 5 = Every Day (ED)

Q 26 Do you know what Facebook is? *If No, please go to Q31* 0 = No 1 = Yes Q26

- Q 27 Have you ever used Facebook *If No, please go to Q31* 0 = No 1 = Yes Q27
- Q 27a Do you have Facebook account? If yes, how many accounts? *Number (No = 0)* Q27a
- Q 27b Do you use Facebook in a phone, in a computer, or in both? *1 = Phone 2 = Computer 3 = Both* Q27b
If 2, please go to Q29
- Q 28 Do you use Facebook on your phone? *If No, please go to Q29* 0 = No 1 = Yes Q28
- Q 29 Do you ever write Khmer in Facebook with Khmer script? 0 = No 1 = Yes Q29
- Q 30 Do you ever write Khmer in Facebook with Latin characters? 0 = No 1 = Yes Q30
- Q 31 Do you know what Internet is? *If No, please go to Q33* 0 = No 1 = Yes Q31
- Q 31a Do you use Internet? *If No, please go to Q33* 0 = No 1 = Yes Q31a
- Q 32 Do you use Internet on your phone? 0 = No 1 = Yes Q32
- Q 33 What applications do you use in your phone/s?

| Using | | | Q33 |
|-------|------------------------------------|---------|-----------------------------|
| 1 | Sending and Receiving SMS in Khmer | | 1 <input type="checkbox"/> |
| 2 | Sending and Receiving E-mail | | 2 <input type="checkbox"/> |
| 3 | Camera | 0 = No | 3 <input type="checkbox"/> |
| 4 | Internet | 1 = Yes | 4 <input type="checkbox"/> |
| 5 | Reading the news | | 5 <input type="checkbox"/> |
| 6 | Facebook | | 6 <input type="checkbox"/> |
| 7 | Skype | | 7 <input type="checkbox"/> |
| 8 | WhatsApp | | 8 <input type="checkbox"/> |
| 9 | Viber | | 9 <input type="checkbox"/> |
| 10 | Line | | 10 <input type="checkbox"/> |
| 11 | Listen to Music | | 11 <input type="checkbox"/> |
| 12 | Watching movies | | 12 <input type="checkbox"/> |
| 13 | Game | | 13 <input type="checkbox"/> |
| 14 | Radio | | 14 <input type="checkbox"/> |
| 15 | Other (Specify)..... | | 15 <input type="checkbox"/> |

- Q 34 Among the phone applications in the picture, which one is more interesting to you in a phone?
- Use the categories in the above question* Q34 a First Choice
- show respondent the card of images of the applications of mobil phone* Q34 b Second Choice
- Q34 c Third Choice

- Q 35 What are your main sources of news about Cambodia?
1 = TV 2 = Radio 3 = Newspapers 4 = Internet 5 = Facebook 6 = From SMS 7 = From telephony voice service 8 = Mobile phone applications 9 = Word of mouth 10 = other.....
- Most important
- Second
- Third

- Q 36 Have you ever received any automatic call from your mobile operators? 0 = No 1 = Yes Q36

- Q 37 If you have, how often you have picked up that automatic call? Q37
1 = Very Frequently 2 = Frequently 3 = Occasionally 4 = Rarely 5 = Never

- O 1 After sending a Khmer script SMS to each one of the phones, are you able to see the Khmer SMS correctly? O1 a Phone 1
 O1 b Phone 2
 O1 c Phone 3
0 = No, 1 = Yes, 2 = Some, but incorrect, 3 = Not Applicable

- O 2 Did you take a picture of the phones? 0 = No 1 = Yes O3

- O 3 If the user has affirmed using FB in his/her own phone, Do you see respondent's Facebook account on his/her phone? 0 = No 1 = Yes O2

This study was made possible through the collaboration and co-funding of:

