Food and Agriculture Organization of the United Nations

USE OF MOBILE PHONES BY THE RURAL POOR

Gender perspectives from selected Asian countries

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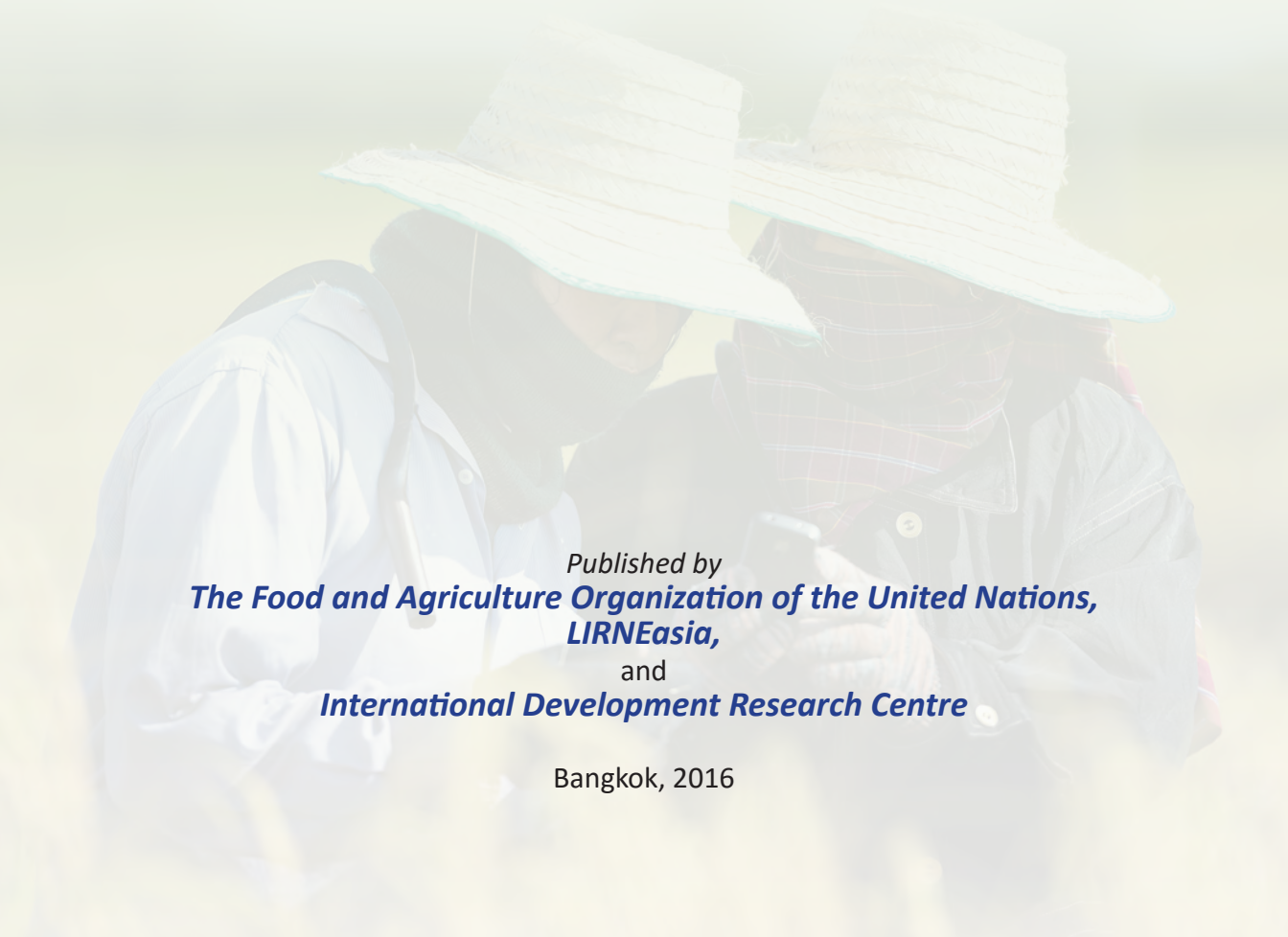
Edited by

Gerard Sylvester



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Preface

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In this day and age, mobile phone usage is by and large a normal facet of modern life. The International Telecommunication Union (ITU) estimated that in 2015 there were more than 7 billion mobile cellular subscriptions worldwide.[1] It is this near ubiquity that has made the mobile phone a target of much implementation and research in relation to improving rural development. Mobile phones have been shown (though not uniformly) to positively contribute in various ways to rural development, from reducing information asymmetry, to improving functional networks, to increasing access to services and finance. Yet a digital gender divide exists. When contrasted with the fact that women compromise 43% of the worlds' agricultural labor force,[2] this digital gender divide can inhibit rural development. There is substantial exploration of the digital gender divide in the literature. However, the answers to questions regarding differential access and use of information and communication technologies are mostly inconclusive.

The two studies in this report explore these issues further using empirical quantitative surveys as well as qualitative fieldwork from a cross-section of developing economies in South and South-East Asia. The first study is an empirical investigation of the digital gender divide amongst the poor (broadly called the Bottom of the economic Pyramid) from urban and rural perspectives. The study uses a six-country dataset from 2011 that tried to understand mobile phone access and use at the Bottom of the Pyramid (BOP). The Teleuse at the Bottom of the Pyramid 4 (Teleuse@BOP4) study was conducted in Bangladesh, India, Indonesia, Pakistan, Sri Lanka, and Thailand and is representative of BOP teleusers. The study finds that despite mobile phone ownership being greater amongst urban dwellers when compared to rural dwellers, location is not a statistically significant predictor of ownership. This was the case for five of the six study countries, with the exception being Indonesia (Java only) where mobile phone ownership amongst urbanites was found to be 66.9% more likely than amongst rural dwellers.

1. https://www.itu.int/en/ITU-D/Statistics/Documents/facts/ICTFactsFigures2015.pdf
2. http://www.fao.org/docrep/013/i2050e/i2050e01.pdf

The study also found that mobile phone ownership amongst women was less likely than amongst men and these results were statistically significant, even after controlling for a variety of variables such as income, education, etc. The only country where the gender divide was reversed was Thailand, where women were 42.9% more likely than men to own mobile phones. This contradicts recent studies that found that when one accounts for education, income, and employment, it is women who are more active users.[3]

The second study looks at the results of qualitative fieldwork that sought to explicate and provide greater context to the findings from the previous survey. Focus group discussions from Indonesia and Sri Lanka revealed that women and men tended to use the phone for different purposes and the utility that men and women derived from access and use of a mobile phone varied. What was also clear was that men in general had greater decision-making power in phone purchase than women.

From these two studies, it is clear that the digital gender divide exists and cannot be explained by differences in income, education and/or employment factors. Given that the survey findings differ from those of other researchers, this suggests that country and local socio-cultural contexts inhibit a more generalizable action plan for reducing the digital gender divide.

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Knowledge and Information Management Officer

3. Hilbert, M. (2011). Digital gender divide or technologically empowered women in developing countries? A typical case of lies, damned lies and statistics. Women's Studies International Forum, 34(6), 479-489. Retrieved from http://dx.doi.org/10.1016/j.wsif.2011.07.0012.

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Executive Summary

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Mobile phones are a normal facet of modern life. However, mobile phone ownership is uneven, not just amongst the sexes but also across rural and urban areas. A 2011 quantitative study of mobile phone use and access at the Bottom of the Pyramid (BOP) in Bangladesh, India, Indonesia (Java only), Pakistan, Sri Lanka, and Thailand found that ownership was more likely amongst men than women. While urban ownership was more likely than rural ownership, the study did not find this to be statistically significant.

Against this context, a qualitative study was conducted in Indonesia and Sri Lanka to understand the varied perceptions on the use and ownership of mobile phones. Given the large rural population in developing Asia, a nuanced understanding of mobile phone use and access that could articulate gender as well as locational (urban versus rural) differences, could sharpen the design of policy targeting the digital gender divide. This is particularly important given the importance of women in rural livelihoods.

The study was conducted amongst four (4) groups of people (urban men, urban women, rural men, and rural women) in each of two countries. The study found that:

- Gender does have some effect on how the phone is used. Women use it more for coordination. Men on the other hand seem to use it more for livelihood activities and for making and maintaining social connections.
- Men in general have greater decision-making power in a phone purchase even for their spouses.
- The most significant difference in the utility derived from mobile phones between urban and rural dwellers is the fact that, for the latter, the ability of the phone to help connect to needed infrastructure and services was more important. This was less of a concern for urbanites since essential infrastructure and services were generally close by, unlike for those rural dwellers.
- Language was a greater issue for study participants from Sri Lanka than those from Indonesia. This is mainly because the main language in Indonesia, Bahasa - Indonesia, is written using the Latin script.
- Whilst some considered that ownership of a mobile phone conferred them with higher social status (mainly in rural areas), for most, owning a mobile phone was a normal facet of modern life and not having one resulted in costs (social and otherwise).

- While mobile phones were considered mainly as a communication tool, the utility derived by users of mobile phones was varied. Women with children used it to play music to keep their young children entertained, men and women both used it as an alarm clock, rural dwellers found great use for phones with in-built flashlights, etc.

Acknowledging the differences in perceptions between genders, and between urban and rural dwellers, what must be realized is that these differences are often not unique to aspects related to the mobile phone. The concerns, needs, and benefits ascribed to the mobile phone are more a reflection of people's existing societal, familial, and gender norms prevalent in their environments, rather than having been elicited by the mobile phone. From the perception of the study participants, the phone is an enabler of extant human need and desire.

The second part of this publication looks at the results of a qualitative fieldwork that sought to explicate and provide greater context to the findings of the previous survey.

The literature on the digital gender divide is extensive. Equally extensive are the varying explanations and the degree to which it occurs. Empirical work that explores the digital gender divide in urban versus rural contexts is currently lacking. This aspect was explored in great detail using a six-country dataset from 2011 that tried to understand mobile phone access and use at the Bottom of the Pyramid (BOP). The Teleuse at the Bottom of the Pyramid 4 (Teleuse@BOP4) study was conducted in Bangladesh, India, Indonesia, Pakistan, Sri Lanka, and Thailand and is representative of BOP teleusers.[4] This dataset from the 2011 Teleuse@BOP4 study is representative of BOP teleusers (gender as well as location, i.e. rural and urban) at the national level in each of the countries, except in Indonesia where it is representative only of the main island of Java.

The analysis finds that despite mobile phone ownership being greater amongst the urbanites than those from rural areas, the suggestion that there is a greater likelihood of mobile ownership amongst urbanites compared to rural dwellers; however, it is not statistically significant. This is the case for five of the six study countries, with the exception being Indonesia (Java only) where mobile phone ownership amongst urbanites is 66.9% more likely than amongst those from rural areas.

In terms of gender, the analysis contradicts other recent work (e.g. Hilbert, 2011), and points to a digital gender divide. Mobile phone ownership amongst women is less likely than amongst men and these results are statistically significant. The only country where the gender divide was reversed was in Thailand, where women are 42.9% more likely than men to own mobile phones.

What is confirmed in this paper's findings is that whilst gender and location can matter in some instances (more so with the former than the latter), the gap is not even. This necessitates a more country specific policy (rather than a generic one) with regards to reducing (and ultimately eradicating) the digital gender divide.

4. A teleuser is identified as those who have used a phone at least once in the previous three months.

Through the looking glass: BOP perspectives on mobile phone use and ownership in Indonesia and Sri Lanka

1. Introduction

The study attempts to shed light on the underlying factors in mobile ownership among four different groups at the Bottom of the Pyramid (BOP) in two countries, namely Indonesia and Sri Lanka. The groups are urban males, urban females, rural males, and rural females. The rationale for this focus is based on a 2011 quantitative study of mobile use and access amongst the BOP known as Teleuse@BOP4. The Teleuse@BOP4 study found that mobile ownership was lower among females in comparison to males and less among rural dwellers than urban dwellers (even though the latter was not statistically significant). The study aims to explain some of the reasons for these differences. The main focus of this study is on understanding potential gender differences as well as differences in ownership based on location (i.e. urban versus rural).

This study has been conducted among BOP teleusers in Sri Lanka and Indonesia. In simple terms, a teleuser is defined as someone who has used a mobile/fixed phone in the previous three months. A teleuser does not necessarily own a mobile phone. The last use could have been for voice calls or text messaging. The study also distinguishes mobile owners and non-owners.

1.1 Teleuse@BOP 4

The Teleuse at the Bottom of the Pyramid 4 (T@BOP4) survey was conducted in six countries (Bangladesh, Pakistan, India, Sri Lanka, Thailand, and Indonesia) in June 2011. Excluding Indonesia, the samples in the other 5 countries were representative of the Bottom of the Pyramid (BOP) using the lowest Socio-Economic Classification (SEC) D and E.[5] In Indonesia, the survey is representative of only the main island of Java and the BOP was defined as those who earn less than USD 1.25 per day. The target groups in all 6 countries were between the ages 15-60 and the teleusers were defined as those who had used a phone (mobile and/or fixed) in the previous three months.

5. A teleuser is identified as those who have used a phone at least once in the previous three months.

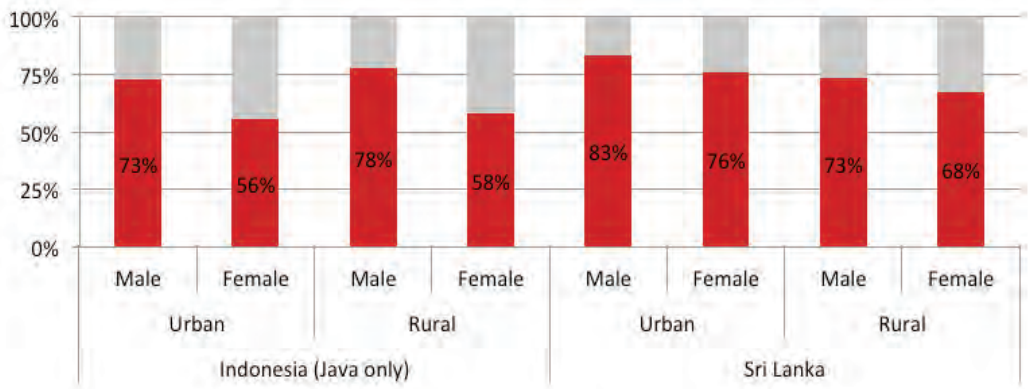

Figure 1: Mobile ownership among BOP teleusers (Teleuse@BOP4)

The descriptive statistics (Figure 1) indicate a gender and location gap when it comes to mobile phone ownership. A logit model was used as an attempt to understand the differences further. The dataset was disaggregated into Urban – Male, Urban – Female, Rural – Male and Rural – Female. The results for Indonesia indicated that having primary education increased the likelihood of mobile ownership among women in both rural and urban areas. In rural areas, as the household income increases, a stronger positive likelihood of mobile ownership was visible among women in comparison to men. In urban Sri Lanka, an increase in household income increased the odds of mobile phone ownership among men. Surprisingly, the inverse relationship was found for women living in urban areas, with their odds of mobile phone ownership decreasing when household income rose. In rural areas, the results for men and women are reversed. Greater household income increased the odds of mobile phone ownership among women, but decreased the odds of ownership for men. Annex 3 outlines the complete results from the regression model.

2. Sample selection and methodology

The study focused on understanding the qualitative differences in usage and ownership of mobile phones among different segments at the BOP. The principal focus was to understand the effect of gender and location (rural or urban) on mobile phone ownership.

The main format of the studies was Focus Group Discussions (FGDs) in Indonesia and Sri Lanka. In Indonesia four FGDs, reflecting gender and location differences, were conducted. In Sri Lanka, eight FGDs were conducted. The division of the groups was by gender, location, and age. In the case of Sri Lanka, some of the focus group participants participated in an additional one-on-one in-depth interviews.

2.1 Target respondents

The target group consisted of those who represented the BOP. The BOP was identified using the Socio Economic Classification (SEC), a classification used widely by various development studies and derived from the marketing paradigm. The study was conducted amongst participants identified as belonging to SEC D and E in both countries. SEC D and E correspond with lower (less skilled) occupations and low levels of education. According to SEC classifications, these two criteria are used as a proxy for overall household income and, by extension, their purchasing power (Annex 1 and 2 describe the SEC classifications in Indonesia and Sri Lanka in greater detail).

In Indonesia, the SEC classification considers two criteria: total monthly household expense (excluding irregular items) and appliances/assets owned (details are included in Annex 1).

In Sri Lanka, the SEC classification considers education and occupation of the head of household (more details in Annex 2). This does not preclude the possibility that other family members have higher levels of education or skill level. SEC only considers the head of the household in determining the SEC grouping for a particular household. The SEC classification works at the household level rather than at the individual level. Therefore, study participants themselves did not need to be the head of the household, but had to belong to a household classified as SEC D or E.

In selecting respondents belonging to SEC D and E, the following key criteria were used in decreasing order of importance:

2.1.1 Mobile Users (owners/non-owners)

For this study, mobile phone users were considered who could be either an owner or a non-owner. In some instances, mobile phone owners do not necessarily use their phones. They may sometimes give it to another family member to use (for example the phone may be owned/registered by an adult but it is a child that may end up using the phone). Such people were not considered for the study. Non-owner mobile phone users were also considered. They had to have used a family member's phone at least once in the previous three months. Both owner and non-owner groups could have used their phones for making/receiving calls or sending/receiving SMS messages or both. Those whose phone bills were paid by their employer were not included in the study.

2.1.2 Gender

As the focus of the study was to understand the characteristics of mobile phone use and ownership and its differences among the genders, an equal number of male and female respondents/participants were invited.

2.1.3 Location

The third main criterion was the location in terms of urban and rural. The rational here was that urban dwellers would potentially have better access to infrastructure and services (e.g. electricity, water, power sources, food, medicine, schools) whereas, in most cases, the rural dwellers had less access to such amenities. An equal number of focus group discussions and in-depth interviews were conducted in both locations.

2.1.4 Age

Different age groups behave differently and this was also considered for this study. Two groups were considered in Sri Lanka, the 24-35 age group, which is considered the economically active age group, and another consisting of the 36-50 age bracket. Due to resource constraints, only the 25-45 age group was considered Indonesia.

2.1.5 Other aspects

In addition to the above four main criteria, additional aspects were considered. They did not serve as selection criteria but were fairly represented among the respondents/participants.

- **Education (Low, moderate and high)**
  The BOP population is comprised of lower SEC classified households. Generally, these households have lower levels of income and their members also have less-skilled occupations potentially as a result of lower levels of education. Hence, these factors tend to be interrelated. For this study, the focus was on SEC D and E households and their family members. The focus group participants were selected such that they had low or medium levels of education. Individuals with high levels of education (i.e. more than secondary education) were not considered so as to minimize any effects on group dynamics as a result of different educational attainments.
- **Employment Status**
  Each group consisted of a mix of employed and unemployed mobile phone users. The majority of the males in the groups were employed and the majority of the female participants were unemployed.
- **Marital Status**
  Since decision-making can differ depending on a person's marital status, the study groups made an effort to represent both married and unmarried participants.

2.2 Methodology for Indonesia

Due to resource constraints, only four FGDs were conducted in Indonesia. The composition of each of the four groups is given in Table 1. The urban users were from Jakarta and the rural users were selected from the outskirts of Bogor.

Table 1: Focus group composition for Indonesia

Age	Urban		Rural		Total
	Male (FGD 1)	Female (FGD 2)	Male (FGD 2)	Female (FGD 4)	
25-45	8	8	8	8	32

50% mobile owners; 50% used only phones owned by other family members

2.3 Methodology for Sri Lanka

In Sri Lanka, focus group discussions as well as separate in-depth interviews were conducted. The municipal council and urban council areas are defined as Urban, and Pradeshiya Sabha areas are defined as Rural. The urban respondents were selected from Colombo Municipal Council area (the capital city), Sri Jayawardenepura Kotte (the administrative capital), and Dehiwala and Mount Lavinia Municipal Council areas. Rural respondents were selected from Thalathuoya Pradeshiya Sabha in Kandy District and the Ukuwela Pradeshiya Sabha in Matale District.

There were 8 focus groups and their composition is given in Table 2.

Table 2: Focus group composition for Sri Lanka

Age	Urban		Rural		Total
	Male	Female	Male	Female	
25-35	8 (FGD 1)	8 (FGD 3)	8 (FGD 5)	8 (FGD 7)	32
36-50	8 (FGD 2)	8 (FGD 4)	8 (FGD 6)	8 (FGD 8)	32

50% mobile owners; 50% used only phones owned by other family members

Sixteen respondents from the focus group discussions were selected to participate in an observational study, which included an in-depth interview. While the participants for this additional study were chosen randomly, the selection was opportunistic based on willingness to participate. The composition is given below in Table 3.

Table 3: Composition of participants for in-depth interviews

Age	Urban		Rural		Total
	Male	Female	Male	Female	
25-35	2	2	2	2	8
36-50	2	2	2	2	8
Total	**4**	**4**	**4**	**4**	**16**

Participants chosen randomly from the FGD sample for Sri Lanka

Each participant in the observational study was observed two separate times: once on a weekday morning and the other on a weekend evening.

The participants' were observed in their respective homes, work places, businesses, while traveling, etc. The scope of the observations covered the gamut of their daily activities as much as possible and was carried out in an unobtrusive manner so as to avoid any disruption of the respondents' daily chores. During the observation study, a 30-45 minute in-depth interview was conducted.

3. Results from the focus group discussions

3.1 Understanding the BOP mobile owner

In Indonesia and Sri Lanka, the BOP mobile owner considered the mobile phone to be an essential tool. The T@BOP4 study indicated that in Indonesia (Java only) and in Sri Lanka, mobile ownership was 67 percent and 71 percent, respectively. For this study, an equal number of mobile phone owners and non-owners were considered. Both groups are known as teleusers (meaning they had used a phone in the last three months).

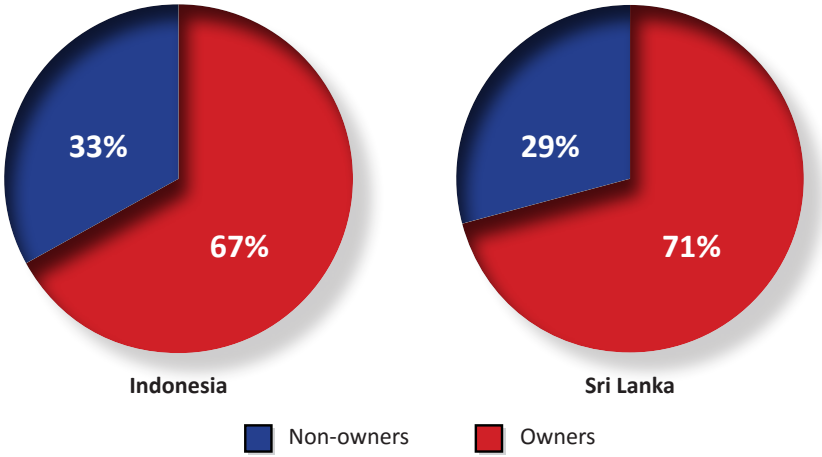

Figure 2: Mobile ownership among the BOP in Indonesia and Sri Lanka (Source: T@BOP4)

Many respondents admitted that their mobile phone was given to them as a gift by their spouse, a close relative such as an elder sibling, or an employer. Younger males preferred to purchase their phones mainly as a signal to show that they were earning and did not have to depend on "hand-me-downs" or gifts. Older men however often got their phones from someone else (an older child or even in some cases a wife). Often the decision to purchase or even to consider owning a phone was naturally preceded by the experience of using someone else's phone. The positive experiences of using someone else's phone, from the convenience of being in touch with friends and relatives, to the ability to use it for functional purposes, all factored into the decision to get their own phone.

‘My wife got me this phone’

Twenty-nine year old Toto is an ojex (motorcycle taxi) driver in urban Indonesia. He is married and a father of a one-year old boy. He initially did not own a mobile phone and his regular customers used to try and reach him on his wife’s phone. Since he used to park his ojex near his house, his wife could easily pass the message to him. However, over time the number of calls went up and Toto’s wife was not keen on running back and forth passing messages. Her immediate solution was to buy Toto a mobile phone despite his contention that it was an unnecessary expense.

In retrospect, he wishes he had purchased his own phone sooner. He gets more calls and can coordinate his pick-ups better. He even moved to an ojex stand further away from home where he gets much more businesses, leading to a rise in his daily income. His wife still knows his whereabouts and calls whenever she needs him to run an errand or when he is late coming home.

Those who did not have a mobile phone gave economic reasons for their decision not to purchase a phone. They considered the cost of a mobile phone to be a significant portion of their income and felt it would be better spent on basic needs such as food, shelter, medicine, and children’s education.

‘Why I don’t have a mobile phone’

Siriyawathi, from rural Sri Lanka, was asked about her reasons for not owning a phone. Her quick response was lack of income. She has had a difficult life. Her husband had passed many years earlier leaving her without a steady stream of income. As a low-skilled day laborer, she is currently the breadwinner for her family. Her eldest daughter is 24 but needs special attention, making it difficult for Siriyawathi to find steady work. There are many instances of her being called back home when she is at a nearby farm. This often happens via some relative or friend physically coming to where she is working that day to pass on the message. Her second daughter is married and lives in another village. A mobile phone would have been ideal for her and she agrees. However, her irregular income and her need for other more essential items, such as food and medicine, do not allow her to save enough to buy a mobile phone.

Almost all of the BOP uses a prepaid mobile connection. Purchasing a prepaid connection is easy to get, unlike a postpaid connection where the company requires various documents (e.g. proof of billing address), and a security deposit in addition to the connection and usage fee. Prepaid connections are available everywhere whereas postpaid connections can be only purchased at the company outlet or at one of its franchised outlets. Not surprisingly, the quantitative data from Teleuse@BOP4 indicated that a prepaid connection was most popular. All of the mobile owners amongst the rural Indonesian teleusers in the Teleuse@BOP4 survey mentioned that they had only a prepaid connection.

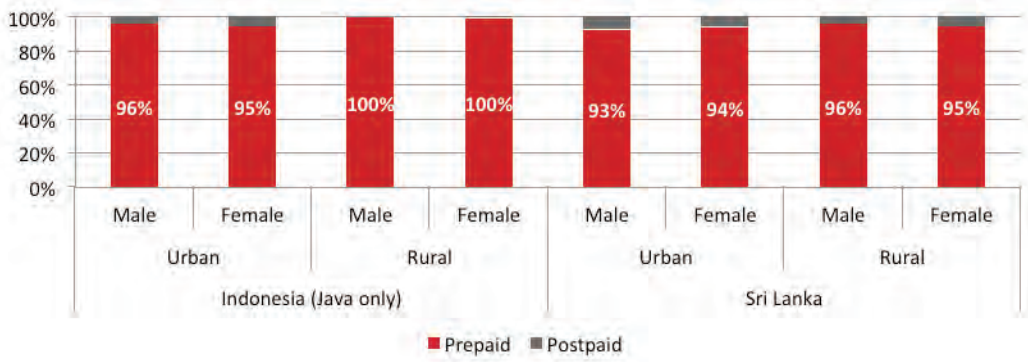

Figure 3: Prepaid versus Postpaid among the BOP mobile owners (Source: T@BOP4)

All the respondents in this study also mentioned having only a prepaid connection. Some had previously had a postpaid connection. However, they often faced disconnection because of unpaid bills. As pointed out by some respondents, one drawback of a postpaid connection was that it did not 'remind' them when to stop using it, nor did it provide instant notification of the amount spent on their last call. Hence, housewives who had a propensity to have lengthy conversations or youngsters who were very active SMS users had all faced some form of "bill-shock" when they were on a post-paid connection. Now as prepaid customers, they feel more in control of their expenditures. They would top-up/reload in small denominations on a weekly basis. Surprisingly, the sum of these weekly top-ups would in fact have led to more than what they would have spent on a postpaid connection. However, from their perspective, they did not see it as a bigger portion of their monthly expenditure. As most of them were daily wage earners, a prepaid connection allowed them to top-up as and when they got money.

In order to understand their social network, the study attempted to classify their mobile phone contacts based on two broad categories: work-related contacts and personal contacts. Their employer, buyers, sellers, co-workers, etc. were considered as work-related contacts, and the information they shared with these contacts was related to their livelihood. Friends and relatives were classified as personal contacts and the information they shared with this group could be anything. However, it should be noted that communication with personal contacts could also sometimes lead to further communication on work-related topics.

What does Teleuse@BOP4 tell us about whom the BOP call frequently?

The Teleuse@BOP4 data indicated that most teleusers called their personal contacts frequently. Calling friends was highest among males,while females tend to call their family/relatives. The frequency of calls for work-related purposes was quite low, especially among females. Figure 4 below shows the breakdown, with work-related contacts shaded in red and personal/social contacts shaded in grey.

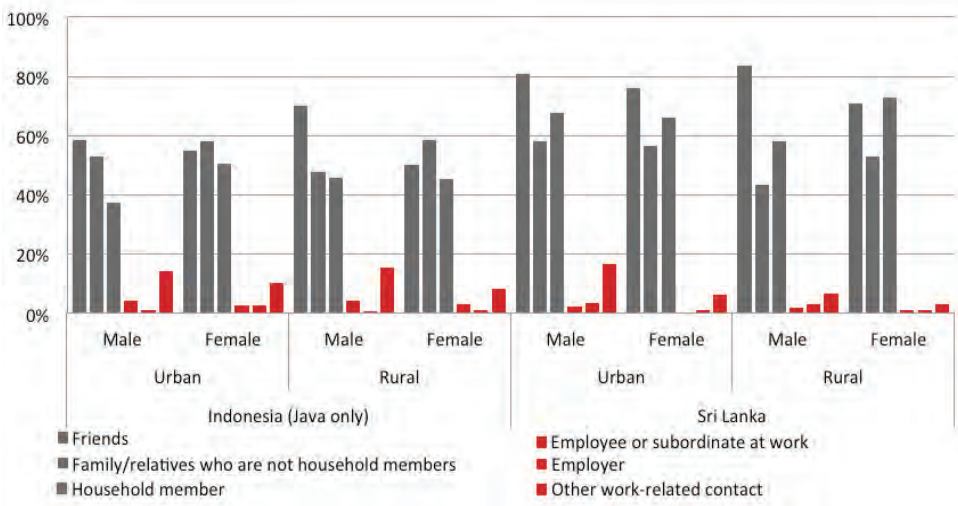

Figure 4: Whom do the BOP users call frequently (T@BOP4 dataset)

3.2 Aiding work

Almost all male participants indicated that they used the mobile phone for work-related matters and considered it an essential tool. Tasks such as calling a co-worker to make a change in their work schedule, to calling the employer and reporting their inability to report for work (due to personal or sick leave), were all done over the phone. If a man owned a small shop he would call his employees and make sure that any essential activities would be completed before he got to his shop. For some, the mobile phone reduced their travel time. Instead of having to go and see what was happening at the market, they would just call the vendor. Inquiries on the prevailing market prices, as well as negotiation on the price of goods for sale or purchase, were conducted over the phone without having to physically go to the market. Some unskilled workers said that the phone decreased their need to travel to look for work opportunities. They would simply call people (often those they had worked for previously) to inquire about potential opportunities with them or with others. Even though there were a smaller number of working females in the FGDs, the same was true for them as well.

Operating a 'PodiKaday' in a village

Sriya is the owner of a small village store ('podikaday') in rural Sri Lanka. Her husband works in another town and is home on the weekends. She has children in school and during the day runs her small store in the village. Her village does not have paved roads and not many people visit her part of the village in a vehicle, unless it is absolutely necessary. Her store has various items from packed, processed food to mobile phone reload cards. However, the sales agent assigned to her village does not visit her on a regular basis and in some cases not at all. Her solution was to buy a mobile phone and make a call when she needed goods. Sometimes the sales agent would make the visit or she will learn of the sales agent's whereabouts and go to pick up the goods herself.

Many of the respondents shared their mobile number with their current as well as prospective customers. Those whose work was more service oriented such as taxi drivers, electricians, tailors, laborers, etc. also received calls from their friends and family for work-related matters. Usually taxi drivers would park their vehicle in a place designated to them. Sometimes people would come up to them or hail them from the road. However, as mobile phone usage has increased in general, the taxi drivers now mostly get their customers through phone calls. Both unskilled and skilled laborers got calls from their customers as and when they were needed. Previously they could not organize their work tasks and/or they would miss work opportunities. But now with a phone, they had a sense of being able to organize their tasks better and, more importantly, felt that having a phone enabled greater predictability in their income. For them, the additional connectivity to customers (existing, repeat, and/or new) allowed them to be pro-active in their livelihood activities while also increasing their reach and thereby lowering the transaction costs for buyers interested in their services.

They all know my number

Samankumara is a small dam operator in rural Sri Lanka who opens waterways for irrigation purposes. All the farmers from both his village, as well as the surrounding ones, have his number. During draughts, he is in charge of closing the water gates and when that happens the number of calls he receives goes up considerably. All the callers demand an explanation for the dam closure and suggest reasons why he should immediately open the waterway. While most callers empathize with his position, and more importantly understand that he is only following the orders given by the authorities, they undoubtedly consider him to be someone who can plead their case to the authorities. In such situations, Samankumara's feels helpless especially given the pressure that the villagers put him under. Hence during a draught, he has taken to keeping his phone switched off. He hopes that this will not translate to the villagers physically attempting to contact him, since the pressure he would feel then would be greater.

Despite some cases of inconvenience, the majority of the study participants felt that mobile phones had made their lives easier because of their increased ability to coordinate activities better, reduce travel time, and make more money by not missing out on potential work opportunities.

What does Teleuse@BOP4 tell us about the extent of business use

The Teleuse@BOP4 data showed that daily usage of a household or personal mobile phone was higher amongst urban males than rural males in both Indonesia as well as Sri Lanka. The use was higher amongst men in general than amongst women, with the lowest daily usage being reported among rural females in Sri Lanka.

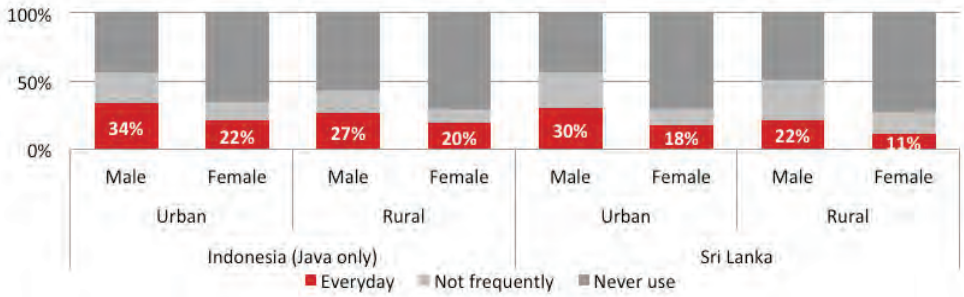

Figure 5: Use of household or personal mobile phone for financial, business or work-related reasons by the mobile owners and household common phone users (Source: T@BOP4)

3.3 Keeping in touch

Regardless of their age, gender, and location, all study participants agreed that a mobile phone is an essential tool for keeping in touch with their loved ones. Housewives would call their spouse, children, and other family members to learn their whereabouts. Working males would receive calls from their wives, children, or parents asking them to bring food, school supplies, medicine, etc. Friends would talk to each other to organize social meet-ups on a daily basis (especially if they were young and/or single) and on a weekly basis if they were older and married. Call frequency (originating and receiving) was highly dependent on the breadth of their social network. The greater the number of friends or relatives, the greater the effort they made to keep in touch by phone.

'Sunday fun-day' – Males in Sri Lanka

Asantha is a tailor and has his own shop in a small town near the village. The tailor stop's location allows him to see all the passersby. Even though he is at his shop most of the time, he is often visited by friends. On Sundays when business is slow, he or his friends give a missed-call to each other to organize a meet-up. These meet-ups are often jolly affairs involving singing and sometimes alcohol. Missed-calls are a phenomenon used for contextual communication. For example, an individual makes a call to a contact and hangs up before the receiver answers the call. That missed call means something specific to the two parties. In the case above, it could mean "it's a slow day, lets meet up at the usual spot at the usual time".

Males claimed that they called friends more than their family. This was mainly because they would be at work and had less time for random 'chit-chat'. Housewives, on the other hand, would call their husbands and children on a daily basis. They also called their friends, but less frequently than their immediate family (though in some cases these calls to friends happened on a daily basis), and shared their lives with them.

'Linda Langa Sangamaya' – Females in Sri Lanka

In earlier times, women in Sri Lanka would meet up and discuss their day-to-day life on a regular basis. This generally happened near a common well/tap when they went to fetch water for the household. This was the case a few decades earlier when piped water in houses was less common. This is known as 'Linda Langa Sangamaya,' which literally means 'society by the well'. This happened during the daytime, when they were less busy. They would spend an hour or so catching up on the daily happenings and sharing gossip.

Nowadays things are different. Most houses have piped water and trips to the well are not a regular occurrence. However, women keep in touch via their mobile phones. These calls are generally made during the day when their husbands are away for work and children have gone to school.

3.4 Does location matter?

The study was carried out in both rural and urban locations. The mobile phone is an indirect tool that is used to connect people to infrastructure and services that are not easily accessible. Communities that are seemingly isolated from infrastructure, such as hospitals, schools, etc., considered mobile phones as essential and handy. This was quite obvious in one of the rural areas of Sri Lanka that had less access to hospitals, education, and government services. They would use mobiles to find out when a particular doctor would be on duty, or to "channel" a doctor. Channeling is a term referring to booking a time slot to see a doctor. In Sri Lanka, it is possible to book an appointment and pay for that appointment through the phone (subject to the phone connection having sufficient prepaid credit since the charges are recovered directly from the existing phone credit).

Table 4: Walking time (in minutes) from respondents' homes to different locations

Walking time to a:	Indonesia				Sri Lanka			
	Urban		Rural		Urban		Rural	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Bus/train station	45.41	65.67	73.66	97.72	9.73	6.42	11.70	8.33
Main road	16.10	22.97	28.22	47.54	10.08	6.22	10.38	5.98
Suburb/ city/ town	62.28	74.72	105.63	120.86	14.31	7.05	15.77	10.46
Market	38.00	34.92	51.97	52.21	96.67	10.33	94.47	16.22

(Source: T@BOP4)

Rural women among the study participants were often in charge of family-related activities (both for the immediate family as well as sometimes for distant relatives). Urban females, on the other hand, often had their family living and working close-by. For urban females, amenities such as grid electricity and water were available in their homes, and essential infrastructure and services were never far away. Urban dwellers among the study participants were often better off than the rural dwellers, even in terms of earning potential. Jobs were easier to come by and their basic needs were more easily met. With fewer opportunities, the rural dwellers considered moving to more urban locations. In fact, some of the urban dwellers among the study participants had recently come from their ancestral villages.

The 'Middle-East' worker (migrant workers in Sri Lanka)

Most study participants from the rural locations, especially the women, had previously worked abroad. Hence, the households had various electrical appliances. This was also one of the reasons why a number of them had multiple handsets in their houses (some no longer working but still kept in the hope that some shop might be able to repair them). The phones are used to keep in touch with family members who are working in another country (often in the Middle East). The calls are made from the person abroad as making an IDD call is considered very expensive. However, upon their return, they have trouble adjusting to their reduced earning potential. Often their expenditures are more than their income. When this happens, women often give up using their own mobile phone. As the need arises, they use another family member's phone that they ironically had purchased for them when they were working abroad.

3.5 Does gender matter?

Gender did have some effect on how the phone is used. Women used it more for coordination: figuring out when family members would return so as to schedule chores, coordinating meeting time and location, etc. Men, on the other hand, seemed to use it more for livelihood activities and for making and maintaining social connections.

3.5.1 Men's need for a phone

Males saw the phone as a necessity for keeping in touch with others. Those that travelled more for their work considered it essential. Women had similar feelings about the need for a phone for men who were working. They felt that if their husbands, sons, and fathers had a phone, then they could always get in touch with them, not just for emergencies, but also when other needs arose such as what groceries were to be purchased on their way home.

Coordinating community work

Sumathipala has his own shop in the city. He lives in rural Kandy and travels to his shop on a daily basis. He is a very active member of the parent's committee at his children's school. That means he needs to constantly co-ordinate meet-ups with other parents. The principal and other parents see him as a very reliable contact-point to talk about school administration issues and other problems that come up. Since he enjoys this volunteer work, his mobile phone has enabled him to be active in his community, even when he is at work.

3.5.2 Women's need for a phone

Women involved in this study considered that matters related to the running of the household were their domain. Hence, they considered the mobile phone an essential tool in enabling them to carry out that responsibility effectively. This was especially true for those who had children at school or work, and husbands who had to travel a fair distance for their work. It was generally the women who initiated calls, from calling to inquire about their children's whereabouts to more mundane calls asking their husbands/children to pick up various items needed for the house such as groceries or to remind them to pay bills, etc.

"I am confident"

Rina is an urban housewife from Indonesia. She takes pride in making sure her children are cared for and that she fulfills all of her husband's expectations when it comes to the household. Rina does go out of the house almost every day to do various chores, from going to the school to drop-off or pickup her children, to going to the market or for any other household-related matters that may arise. When she goes out, she makes it a point to dress well and carry a handbag. For her, signaling confidence when she leaves the house is important so as not to be taken advantage of. The two most important items for her to signal such confidence are her handbag and her mobile phone. If her hands are free, she generally prefers to carry the mobile phone and sling her handbag over her arm.

When male participants were questioned on their perceptions regarding women owning mobiles, most of them felt they should have one and for reasons very similar to those espoused by the women themselves. However, there were gender biases, as many felt that women tended to overuse their phones. They felt this even though most mentioned that they themselves spent more on phone usage than their female family members. Unlike their female family members, the men felt their own phone usage was more important as it was related to livelihood activities. One common ground in the views of men as well as women was that women mobile phone owners got a lot more nuisance calls than men. These were often from strangers who had managed to obtain the woman's mobile number. However, even here there were differences in perception. For women, such nuisance calls did not mitigate the need for having a phone, while some men felt that this reason alone should make women reconsider owning a phone.

"My husband and I both don't have a mobile phone"

Ratna is a housewife and she lives in the outskirts of Bogor, Indonesia. Her husband travels for work while she takes care of the household. Her husband never liked to own a mobile phone, but he allowed her to have one. Ratna says that he used to say that mobile phones were the cause of infidelity. However, she once owned a mobile phone, which she used to lock up in a cupboard and take our only when he was not around. Monetary problems meant that she ended up selling the phone. Even after the financial situation in her household improved, she still has not bought another phone. She doesn't want the hassle of having to hide her phone from her husband, who still hadn't purchased one for himself.

3.6 To call or text?

In general, calling was preferred to SMS. It was seen as an easier and a more appropriate method to convey a message to someone. The respondents' perspectives were that their messages were taken more seriously and they would spend less time in coming to a conclusion (especially during business negotiations). Another reason that was given was the fact that an SMS required more concentration and they made it impossible to multi-task. Hence taxi drivers for example had to stop and read or text back, whereas answering a call (which is also forbidden by law) could be done while they drive their taxis or motorbikes.

The older group also preferred calling to sending text messages. This had more to do with their slower rate of technology adoption. The negative perceptions that they held regarding texting included the fact that they had great difficulty typing on the tiny phone keys and more importantly that they had to wait around to get a response to their query. A phone call on the other hand was easier to initiate and they could receive a response to their query without waiting around. They are aware that the costs of making a call are higher than texting. However, the urgency of the situation mitigated any cost implications.

The younger respondents seemed more geared towards using SMS as opposed to phone calls. Their reasons for doing so were partly due to cost and also because they felt texts were more discreet and would not raise as much attention as someone talking on the phone. The latter of course was the most important reason given by those wishing to be in touch with their boyfriends or girlfriends, but it was also an important reason given by women who wished to keep in touch with friends while they were at home. For the younger generation, a text message was not a sign of urgency and more for keeping in touch and feeling connected. For them, phone calls were really more for emergencies. When they had elderly parents with phones, the communication was generally via calls and not through text messages. Even then, they would mostly wait for their parents to call them rather than initiating the call themselves.

The phone features used by people according to the Teleuse@BOP4 study

Looking back at the Teleuse@BOP data from 2011, it is clear that many mobile users used their mobile phones more for phone calls than for text messages. This difference is greater in Sri Lanka than in Indonesia.

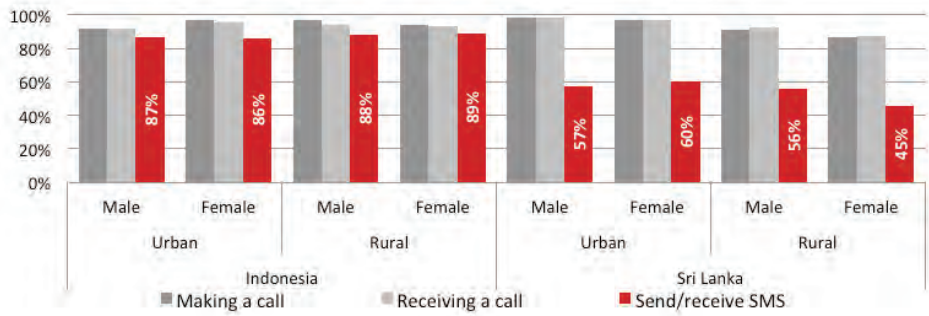

Figure 6: The purposes of mobile phone use among BOP mobile owners (T@BOP4)

3.7 Is language a barrier?

All participants were able to read and write in their own language. However, most of their phones were in English making it slightly difficult for them understand and use them. Some people had a basic knowledge of the English alphabet and some used English letters to spell out words in their native language. Those who were not familiar with the English alphabet showed no interest in text messaging. They would look at icons to recognize the services they want to access and memorize the numbers of contacts or save them against a recognizable icon.

Both countries have phones that function in their native language. In Sri Lanka, the respondents/participants found the translations a bit difficult to understand or as they said it “sounded funny”. Hence, they preferred to operate their phones in English. Such script issues did not exist in Indonesia since Bahasa - Indonesia is written in the Latin script.

3.8 Does age matter?

Mobile adoption has often taken place when individuals were part of a social network were others had mobile phones. This was a popular reason for adoption among younger participants. Older age groups, especially females who tended to use someone else’s mobile phone, did not give in to peer pressure. Most of the participants agreed that their kids were very tech savvy and adopted faster than them. Some went to their kids for help in figuring out the various functions on their mobile phone.

However, parents also feared that their children would get into trouble and lose focus on their studies if they had a mobile phone at an early age. They felt that the right time for children to own a phone was in their late teens and not before.

Table 5: Reasons why a child should or should not have a phone according to the respondents

Why my child.....

..should have a phone (pros)	..should not have a phone (cons)
• They are talented and they are teaching me to use it. • Their friends have one. • They go for extra classes and sometimes are late coming home. I can call them and see where they are. • It can be educational.	• They get nuisance calls and I have heard stories where kids had gotten into trouble. • They are less focused on their studies. • They can visit pornographic sites (true only for smart phones, but participants did not always know the difference). • They become stubborn and unresponsive as they keep on playing games on the phone.

In the parents' minds, it is a constant battle between the above pros and cons. However, most parents let their children use the phone and, after a certain age, the children themselves get a mobile phone as a gift.

I like text messaging

Samanthi had just turned 17 and her brother gifted her mobile phone. She had never owned one before but nearly all her of friends already had one. She is still doing her studies and considers the phone a useful way to keep in touch with friends while she is at home studying for tests or exams. Samanthi prefers to use SMS with her friends and, even though she sees them at classes, she generally would text them till late at night. Her parents and her brother would give money for top-ups/reloads and have generally not attempted to monitor her cell phone usage. Despite this, she does, from time to time, delete some of her text messages immediately after receipt since she does not always want her family to know what is happening with some of her friends.

3.9 Who makes the decision to purchase a phone?

The decision maker is generally the chief wage earner in the household. However, the younger mobile owners, provided that they have money and are working, would make their own decision on buying a phone. Housewives would often solicit advice from their spouses before purchasing a mobile phone, whereas husbands generally would make this decision independently.

3.10 What brand of phone to buy?

Each household generally had at least one member with a mobile phone. In some cases, nearly all family members had their own mobile phones. This did not mean that all those phones were in working condition. Incorrect re-charging practices using faulty third-party phone rechargers

as well as poor upkeep and overall mishandling meant that phones often broke down. With some brands, repair shops were often able to find alternate parts and get the phone working again, but this was often not possible for unbranded cheap phones. Those phones were often beyond repair once they broke down. But, even if alternate parts were available, sometimes the cost of getting new parts was more expensive than purchasing another second-hand phone (or in the case of the unbranded phones, a new one). In such instances, there was often a curious dichotomy at play. The general perception was that a new phone would cost more money than repairing an old one, so it was not uncommon for people to chose to spend more money to repair their existing broken down phones rather than purchasing a new one. They dismissed the advice of the repair shop owner because they suspected he was trying to pressure them to spend more and purchase a new phone. Despite the perception that the unbranded phones were as not sturdy as other makes (for example a Nokia brand is synonymous with the word 'reliability' for them), the unbranded phones remain attractive because of the multitude of features they offer (F/M radio, torchlight, etc.), which are not easily found in other brands. Also, given the fact that the unbranded phones are generally cheaper, people often end up buying them despite knowing that they were more likely to break down.

"Say no to unbranded mobile phones"

Anthony is working in Colombo. He lives with his parents and everyone in the house has a phone. He does not have a phone at the moment as he sold his to a friend. Anthony says he knows about all phone brands as he often purchases phones, which he then frequently resells to others for a small profit. Hence, he considers himself somewhat of an authority on different makes and models of mobile phone. In his view, he would never recommend an unbranded phone to someone as he has often seen them break down. For him, they are not durable and a waste of money. He recommends basic feature phones from well-known brands instead. However, he laments that known-brands often do not have some of the additional features provided by the unbranded phones and he wishes these could be offered by known brands such as Nokia, etc.

3.11 More than a phone (m-Lullaby)

Young mothers often used their phones to play music to keep infants entertained, simply replacing the actual singing of a lullaby with the playing of a music file (not necessarily a lullaby) or video on their phone. School children were accused of being addicted to phone games by their parents, but the parents allowed them to play games as they kept the children entertained and (according to their perceptions) out of trouble.

As compared urban dwellers, rural dwellers had many more uses for their phones (other than just for connectivity to others). For rural dwellers, the phone often doubled as an alarm, a wristwatch (or simply a clock) to keep track of time, a torch when they traveled in the night (streetlights are not common in many rural areas), and as an entertainment unit (playing games and music files) when they were bored or during spare time.

3.12 It's MY phone

Married women generally shared their phone with other family members. During the daytime, they would, therefore, place the phone in a common area of the household. However, at night, they would generally place it close to where they slept. Those with young children found it a constant battle to keep the phone out of their children's hands, as they had a tendency to fiddle with it and often ended up dropping and damaging the phone.

Most men shared their phones with their family as well. However, there were some instances of extra-marital affairs where the (well-founded) suspicions initially arose when men changed their behavior and stopped sharing their phones with other family members. Some of the Indonesian respondents mentioned that they knew of people who had some form of pre-nuptial agreement that forbade each spouse from going through the other's phone.

Irrespective of whether the phone was shared with others or not, at the end of the day, the mobile phone was generally considered a 'personal' device rather than a 'family' or 'common-property' device.

Table 6: Reasons for sharing or not sharing a phone

Why they share	Why they don't share
Sumida (Urban, Indonesia) She sometimes runs out of credit and, whenever that happens, she takes her husband's phone and makes the call. She says her husband does the same. **Priyani (Rural, Sri Lanka)** She uses her husband's phone as she does not have one. The only drawback is when she needs to make an urgent call and he is not around. But her husband is not possessive of the phone. **Kumara (Urban, Sri Lanka)** Kumara broke his phone while working and now he does not have a phone. He thinks that he does not need one and, when needed, he can simply borrow his wife's phone.	**Andre (Urban, Indonesia)** He is married but has been having an extra-marital affair. He does not like his wife using the phone out of fear that she may find out. **Agus (Rural, Indonesia)** He does not like to share as he thinks his wife is addicted to text messaging and he constantly runs out of credit.

4. Digging deeper: results from the in-depth interviews in Sri Lanka

4.1 Credit/Loan

Prepaid connections are more popular among the Sri Lankan BOP. Respondents found it convenient and believed that it gave them complete control over their usage. They topped up their account on a regular basis. On those rare occasions when their phone did not have enough credit, they simply switched off their phones until they purchased their next top-up/reload. Service providers in Sri Lanka have introduced a service that allows prepaid customers to request a small loan when they are out of credit. Upon request, the customer is credited an amount that allows them to make a few one-minute calls and send a few text messages. When the customer reloads the next time, the loan amount plus a service charge is deducted. Use of such credit facilities is quite prevalent among rural women who travel less and, therefore, have considerably reduced access to a place that sells reload/top-up cards. They request a loan quite regularly and find it very useful. They did not find the additional charge for this service unreasonable. In urban households, however, the perception is different. A request for a credit loan was made only if necessary and often only in emergencies. For urban dwellers, finding a reload/top-up card was not hard and they did not like the idea of paying the extra charge for the loan service.

4.2 Learning when needed

The in-depth interviews allowed some respondents to open up about their personal issues. Some of the female respondents had become aware of their husbands' extra-marital affairs and claimed that their respective partner's mobile phone helped them to ascertain it. One of the female respondents learned how to divert the calls that came to her husband's phone. Since the issue was quite personal and affected her life she had made considerable effort to learn all of the phone's features as well as the services offered by the operator. Such diligence in learning was principally motivated by her desire to learn more about her husband's affair. Had the personal issue not been a factor, she claimed she would not have taken the trouble to learn as much as she did about the phone's features.

Although most participants admitted their inability to draft, send and receive a text message many of them had used text messages to vote for their favorite reality TV contestants. They were aware of the costs, usually double the cost of a normal SMS, but they still learned to type and send their vote. However, when it came to maintaining contact with their social network, they showed no inclination to text.

4.3 Status symbol

In rural areas, a mobile phone was perceived as a status symbol. Even most poverty stricken families aspired to own a mobile phone. Hence, most households often had one or two functioning mobile phones. Usually the owner of the mobile phone had worked in another country, in an urban town or they were younger (generally about 25-30) and belonged to social network where all of the other members had their own mobile phone.

5. Conclusion

The varied perceptions on the use and ownership of mobile phones elicited from the qualitative study have one common underlying thread: that mobile phones were a normal facet of modern life, be it in rural or urban areas, among men or women, young or old. Some still saw it as a novelty that could project higher social status on the owner. For the majority, their perceptions were more geared towards the costs to their social status of not having a mobile phone rather than the status gained by owning one.

Collectively, the experiences shared by the study participants portray the mobile phone as more than just a communication tool, though ultimately that is its main benefit to them. By enabling the continuation of relationships with friends, relatives and colleagues, their phone enabled them to maintain social networks with greater ease than having to depend on face-to-face communication.

However, despite its wide-spread commonality, there were some differences in perception between respondents of different genders and between urban and rural dwellers. Men and women continue to have slightly different views on the merits and drawbacks of having a phone, though these differences are diminishing over time. Men seemed to have greater decision-making power regarding a phone purchase, even for their spouses. As the cost of owning and using a phone decrease, the phone was considered very much a personal device, irrespective of whether it was used by others in the household. The differences that came from location were more to do with the different incentives that were at play and, more importantly, the environment that they lived in. Rural phone owners were sometimes less cost-conscious than urban dwellers of how they used their phone. They felt a greater need for it, given that services were further away and more of their family members worked far from home.

While acknowledging the differences in perception between the genders and between urban and rural dwellers, what must be realized is that these differences are often not unique to aspects related to the mobile phone. The concerns, needs and benefits ascribed to the phone are more a reflection of the existing societal, familial and gender norms prevalent in their environment, rather than having been elicited by the mobile phone. The phone is, in their perception, an enabler of extant human need and desire rather than the creator of them.

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Separating myth from reality: Do location and gender really matter for mobile ownership

1. Introduction and Policy Relevance

The literature on the digital gender divide is extensive. Equally extensive are the varying explanations and the degree to which it occurs (Hafkin and Taggart, 2001; Primo, 2003; Huyer et al., 2006; Zainudeen, Iqbal and Samarajiva, 2010; de Silva, Ratnadiwakara and Zainudeen, 2010; Hilbert, 2011). However, there is no prior empirical work, as far as we know, that attempts to shed light on the digital gender divide in terms of the urban/rural context. Given the large rural population in developing Asia, an explanation of these factors in a rural context could sharpen the design of policy targeting the gender divide in ICT access and use. This is particularly important given the importance of women in rural livelihoods.

This paper attempts to shed light on potential gender differences in mobile ownership, accounting for the urban/rural setting as one of the factors that determine ownership. To do this, we use two datasets covering a nationally representative sample of teleusers at the Bottom of the Pyramid (BOP). A teleuser is defined as one who has used a phone at least once in the last three months. The sample is also representative of gender at urban and rural levels in each of the sample countries. The first dataset covers Bangladesh, India, Pakistan, Sri Lanka and Thailand, while the second covers Indonesia (only Java).

Via this study, we seek to understand country variations in the gender divide (if it exists) from an urban-rural perspective. We also consider additional factors, ranging from education to social factors, that could explain mobile phone ownership (see Table 7 for a list of all the factors that were considered).

2. Literature Review

There is a rich and varied literature on the digital gender divide (Huyer et al., 2006; Hafkin & Taggart, 2001; Hilbert, 2011; Primo, 2003; Zainudeen, Iqbal & Samarajiva, 2010). Primo (2003) found that in many countries female Internet users were a small group of educated urban elite. There were also indications that women in developed countries were indeed catching up albeit slowly (Rice and Katz, 2003). However, Hilbert (2011), in a study using data from select African and Latin American countries, found that when education and occupation were controlled for, gender no longer played a significant factor in mobile ownership. Blumenstock & Eagle (2011) also

found gender difference to be ambiguous using data from Rwanda, but did find that owners were significantly wealthier, more educated and predominantly male. In the Rwanda case study, it was the mobile ownership differences between different socio-economic groups that was significant rather than gender differences.

The above findings are contrary to a study based on data from a representative sample of the BOP from select Asian economies by de Silva, Ratnadiwakar & Zainudeen (2011). The authors in the Asian study used a logit model of mobile ownership accounting for factors such as gender, occupation and education, among others. They found gender had a high significant correlation with mobile ownership in Pakistan and India, and lesser, but still a significant correlation, in Sri Lanka. The gender effect was, however, negligible in their Philippines and Thailand samples.

2.1 Mobile ownership

Given the mixed evidence on the digital gender divide, it is prudent to understand the components of mobile ownership models that have high acceptance. In terms of mobile ownership, there are two categories of factors that have been shown to affect mobile ownership. The first category consists of determining factors, which are the basic constructs that influence mobile phone usage. The second category consists of mediating factors, which influence the afore-mentioned determining factors (van Biljon & Kotzé, 2008). Some examples of determining factors include: social influences (social pressure on individuals by groups and/or other individuals), human nature influences (influence due to motivational human needs), cultural influences, facilitating conditions (factors such as security, reliability, digital standards and web connectivity), perceived usefulness, perceived ease of use, behavioral intension and actual usage. Personal (personal preference and user beliefs), demographic and economic factors are the mediating factors. In this paper, the explanatory variables were chosen based on the above proposed model.

3. Methodology

To study the ownership of a mobile phone, this paper adopts a logit ownership model similar to the one used by de Silva, Ratnadiwakara, & Zainudeen (2011). The particular logit model used in this analysis is called a binary response model using a cumulative logistic distribution function for the underlying sample. The function for the logit model is as below

$$\text{Probability (Y)} = \frac{1}{1+e^{-(\beta_1+\sum_{i=2}^{n}\beta_i x_i)}}$$

Where Y is the dependent variable, which in this case denotes mobile ownership, with 1 denoting that the respondent owns a mobile and 0 otherwise. The explanatory variables that are denoted by x_i are the factors influencing mobile ownership. The model considers both determining as well as mediating factors (van Biljon & Kotzé, 2008) that cause an individual to adopt a mobile. x_i could be a continuous/quantitative variable or a discrete or qualitative variable. Table 7 depicts the influencing factors that are considered as explanatory variables for the model. β_1 is the logistic coefficient for the explanatory variable and β_i the coefficient.

Most of the explanatory variables are self-explanatory. de Silva, Ratnadiwakara, & Zainudeen (2011) first introduced the other variables such as: contacts (up to five) having a mobile phone, economic Perceived Benefit Index (PBI), emergency PBI, and social PBI.

Following Valentene (1996), who created a social network threshold model based on adopter categories to show how opinion leadership and external influence brought forward the diffusion of innovation, de Silva, Ratnadiwakara, & Zainudeen (2011) used the number of a person's top five contacts owning a mobile phone as a variable that would increase mobile ownership. They assumed that this would increase the social pressure and influence on the mobile phone adopter (de Silva, Ratnadiwakara, & Zainudeen, 2011).

Table 7: Influential variables for the mobile ownership model

Variable	Remarks based on van Biljon & Kotzé (2008) and de Silva, Ratnadiwakara & Zainudeen (2011)
Urban-Rural	Mediating factor (Demographic) Urban mobile ownership is greater than rural, Urban = 1 & Rural = 0, Categorical variable
Gender	Mediating factor (Demographic) Males mobile ownership is greater than that of females, Male = 1 & Female = 0, Categorical variable
Age	Mediating factor (Demographic) Technology ownership is usually faster among younger generation, continuous variable
Ln_Household Income [6, 7]	Mediating factor (Economic) lack of income acts as a barrier for ownership, continuous variable
Primary Education	Mediating factor (Demographic) Yes = 1 & No = 0, Categorical variable
Secondary Education	Mediating factor (Demographic) Yes = 1 & No = 0, Categorical variable
Tertiary Education	Mediating factor (Demographic) Yes = 1 & No = 0, Categorical variable
Contacts (up to five) having a mobile phone	Determining factor (Social Influence) The higher the number of contacts having a mobile phone, the greater the probability of mobile phone ownership, Categorical variable
Economic PBI	Determining factor (Perceived Usefulness) Phone enables economic activities and communication, Categorical variable

6. Natural log of monthly income better explains the impact of monthly income on mobile ownership (de Silva, Ratnadiwakara, & Zainudeen, 2011).

7. This model has taken the household monthly income as a proxy to personal monthly income due to the lack of data.

Emergency PBI	Determining factor (Perceived Usefulness) Phone enables emergency communication, Categorical variable
Social PBI	Determining factor (Perceived Usefulness) Phone helps to maintain and improve social contacts, Categorical variable
Household fixed phone	Determining factor (Facilitating Condition) Yes = 1 & No = 0, Categorical variable
Household access to electricity	Determining factor (Facilitating Condition) Yes = 1 & No = 0, Categorical variable
Household access to television	Mediating factor (Facilitating Condition) Yes = 1 & No = 0, Categorical variable
Household access to radio	Mediating factor (Facilitating Condition) Yes = 1 & No = 0, Categorical variable
Constant	

Table 8 depicts the categorization that was adopted for the economic, emergency, and social perceived benefits indices. The table differs slightly from the model in de Silva, Ratnadiwakara, & Zainudeen (2011) since the perceived benefits to teleusers in this study were different.

Table 8: Perceived benefit indices

Category	Disaggregated benefit aspect
Economic PBI	Ability to make more money (not directly selling calls to earn money)
	Ability to find out about employment/work opportunities
	Ability to save money
	Ability to reduce travel
	Efficiency of day to day work
	Ability to contact people related to work or job
	Access to information needed in job
	Access to finance
	Ability to plan and make decisions relating to your livelihood
Emergency PBI	Ability to act or contact others in an emergency
Social PBI	Relationships with family and friends
	Social status/ recognition in the community

The respondents were asked to evaluate the 12 benefits listed in Table 8 on a Likert scale from 1 to 5; with 1 being "no change" and 5 being "improved greatly". These 12 benefits were assigned to one of three PBIs that were further categorized prior to inclusion in the model. Economic PBI has three categories: 0 when there was no improvement in any of the economic-related benefits; 1 when some of the benefits are improved (i.e. one or more benefits being reported as improved, but not all); and 2 when all aspects are reported as being improved. Since Emergency PBI had only one benefit, it was categorized as either 0 (no improvement) or 1 (improved). Social PBI had three categories: 0 when neither benefit had improved; 1 when only one benefit had improved; and 2 when both benefits improved.

3.1 Data source

This paper uses the Teleuse at Bottom of the Pyramid 4 (T@BOP4) data set to run the mobile ownership model. The T@BOP4 survey was conducted in six countries (Bangladesh, Pakistan, India, Sri Lanka, Thailand and Indonesia) in June 2011. Excluding the Indonesian data, the samples in the other 5 countries were representative of the Bottom of the Pyramid (BOP) using the lowest socio-economic classification (SEC) D and E[8]. Table 9 shows the proportions of SEC D and E in the population.

Table 9: Actual population proportions (Source World Resources Institute)

	Bangladesh (2000)	Pakistan (2004)	India (2002)	Sri Lanka (2003)	Thailand (2002)
SEC D+E (% of population)	73	59	69	44	33
Less than USD 2 per day (% of population)	84	80	74	43	25

In Indonesia, the survey is representative of only the main island of Java and the BOP was defined as those who earn less than USD 1.25 per day.

The target groups in all 6 countries were between the ages 15-60 and the teleusers were defined as those who had used a phone (mobile and/or fixed) in the previous three months. The latter was used as the screening question.

The respondents were selected using a multi-stage stratified random sampling method:[9]

- Regions (States/Provinces/Districts) to be sampled (Primary Sampling Unit) were randomly selected.

8. SEC was defined as per the chief wage earner - education and occupation (as well as a few other parameters such as condition of the home, equipment, etc. in certain countries), but closely correlated to an income level of around USD 2 per day.

9. A detailed note on the sampling methodology, including country-specific notes, is available at http://lirneasia.net/wp-content/uploads/2010/07/T@BOP4-methodology.pdf

- Within each selected region urban and rural centres were randomly selected.
- Within selected urban and rural centres, starting points were randomly selected with a fixed number of interviews conducted around each starting point. The amount of starting points selected from each centre was determined in proportion to the population of the selected centre.
- For each household visited, a Kish-grid was prepared listing the names and ages of all household members between 15 and 60 years old. A random member of the household is selected using the Kish grid.
    - If the selected member was not present, an appointment was scheduled to revisit the household when the selected member would be present
    - If the member was available, the survey began with the screening section. If the selected member did not meet our intended criteria, the survey ended and the respondent information kept in the contact sheet. The interviewer then moved on to the next unit based on the pattern stated earlier in this section. If the selected member was available, the survey began with the screening section.
- A turn-right (or left) ruling was administered in the event of reaching a junction/end of the street.

Table 10: Sample size and composition

Country	Urban		Rural		Total
	Male	Female	Male	Female	
Bangladesh	267	264	739	780	2,050
Pakistan	291	408	487	648	1,834
India	269	328	1,145	1,433	3,175
Sri Lanka	84	92	400	624	1,200
Thailand	177	170	215	238	800
Indonesia (Java Only)	155	115	416	403	1,088
Total	**1,243**	**1,377**	**3,402**	**4,126**	**10,147**

The identified teleusers were questioned about when they last used a phone and whether it was a mobile or a fixed phone. The respondents were not required to own it.

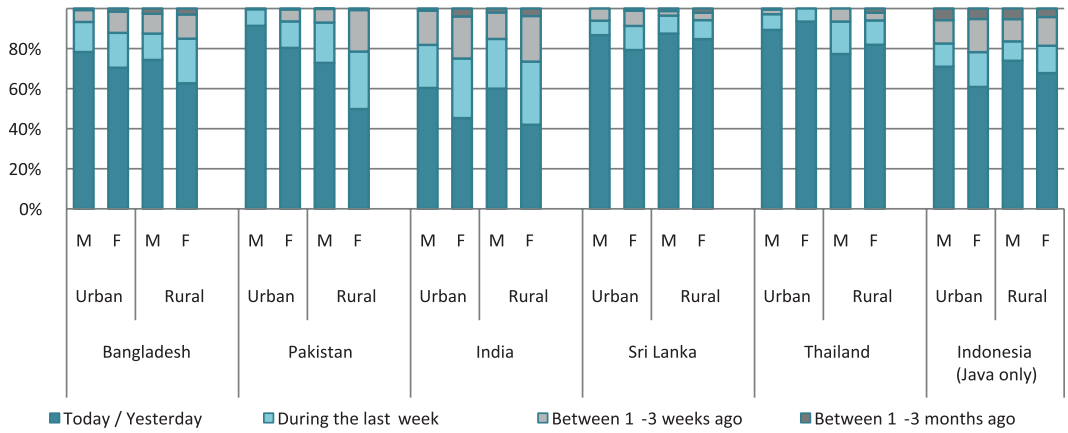

Figure 7 - Last use of a phone to make or receive a call (% of BOP teleusers)

Most of the respondents were using a phone quite regularly. Figure 7 suggests that when it comes to frequency of use, gender disparity exists in all countries except Thailand. Figure 8 shows that more respondents were using their own or household common phone (could be fixed or mobile). There is a clear pattern of lower household phone ownership amongst rural BOP teleusers when compared to urban BOP teleusers. The difference is greatest in Pakistan followed by Sri Lanka.

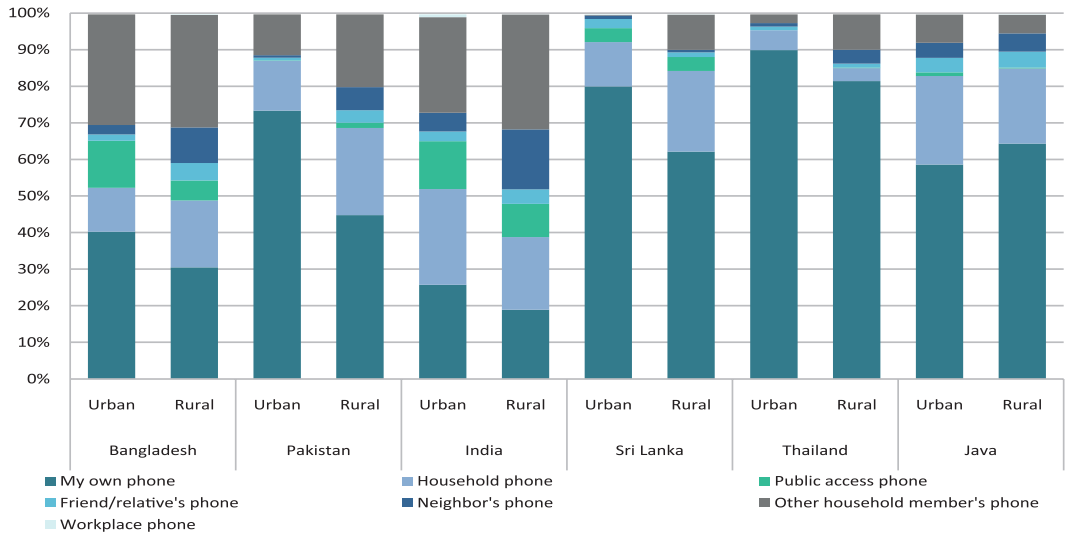

Figure 8 - Most frequently used phone (% of BOP teleusers)

When it comes to mobile phone ownership, it is higher among the urban sample than the rural sample in all countries except Indonesia (Java), where the situation is reversed (Figure 9). When it comes to obtaining a gendered breakdown of ownership, the basic statistics again clearly show

that there is greater ownership among men than women in all countries except in Thailand, where the trend is reversed (Figure 10). The gender gap is significant in Bangladesh, Pakistan and India.

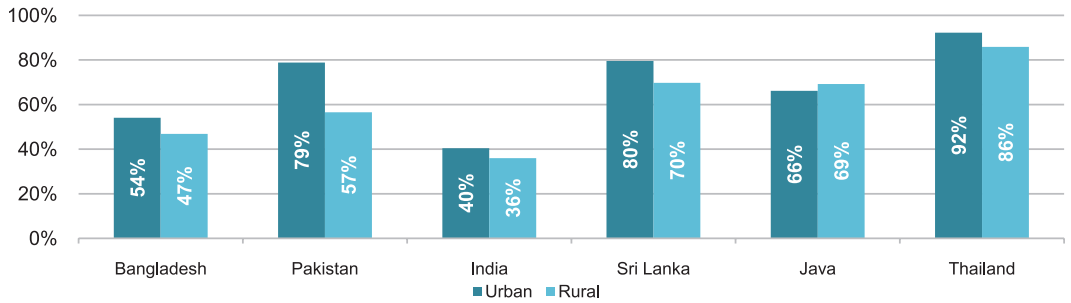

Figure 9 - Urban - Rural mobile ownership in T@BOP

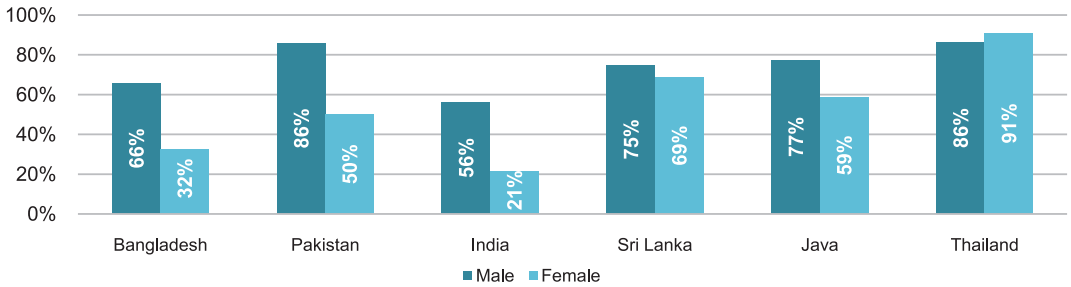

Figure 10 - Gender mobile ownership in T@BOP

4. Results and discussion

This section will discuss the individual logit models that were fitted for the samples in each of the six countries. Table 11 below shows the overall fit of the model for each of the countries. The best fit was achieved in Thailand (91.6%) while the least best fit was for Bangladesh (70%); however, it was still quite robust.

Table 11: Percentage correct for the study's logit model

Country	Percentage Correct
Bangladesh	70.0
Pakistan	84.4
India	71.5
Sri Lanka	77.2
Thailand	91.6
Indonesia (Java only)	82.5

The rest of the section is organized as follows. Each subsection discusses country specific results. Each country specific table lists four outputs: (1) the logit coefficient, which is the log-form value used in predicting the dependent variable; (2) the p-value which is the probability of obtaining a test statistic at least as extreme as the one that was actually observed assuming that the null hypothesis is true (the null hypothesis is rejected at the 5% confidence interval); (3) the odds ratio, which is the probability of an event occurring versus not occurring and helps to interpret the magnitude of the impact on the dependent variable; and (4) the change in odds, which indicates the change in the independent variable produced by the dependent when the value of the other independent variables are fixed.

The overall model summary, classification table and the associated Omnibus tests are provided in Annex 4.

4.1 Bangladesh

Bangladesh is classified as a low-middle income country with an estimated population of 159.1 million in 2014 of which 34% is urban. There is a competitive market for mobile operators and the main fixed-line operator is a state run entity. By 2011, the fixed line penetration was 0.6 percent and mobile penetration was 80 percent (World Bank and ITU, 2014).

As evident from the table below, women are less likely to own a mobile phone in Bangladesh. This negative effect is strong (78.7%). The model also suggests that mobile ownership is negatively impacted in rural locations, but the coefficient is not statistically significant.

Table 12: Logistic regression, Bangladesh

Variables in the Equation	Logistic coefficient	p-value	Odds ratio	Change in odds
Location (Rural=1, Urban=0)	-0.019	0.879	0.981	-0.019
Gender (Female=1, Male=0)	-1.545	0.000	0.213	-0.787
Age	-0.023	0.000	0.977	-0.023
Household income in Ln	0.558	0.000	1.747	0.747
Primary education	0.383	0.002	1.467	0.467
Tertiary education	2.187	0.057	8.909	7.909
One contact owns a mobile phone	0.497	0.542	1.643	0.643
Two contacts own a mobile phone	-0.294	0.697	0.746	-0.254
Three contacts own a mobile phone	0.107	0.882	1.112	0.112
Four contacts own a mobile phone	0.515	0.466	1.674	0.674
Five contacts own a mobile phone	1.279	0.068	3.594	2.594

Variables in the Equation	Logistic coefficient	p-value	Odds ratio	Change in odds
Economic PBI (Some factors were improved)	0.304	0.011	1.355	0.355
Emergency PBI	-0.273	0.730	0.761	-0.239
Social PBI (some factors were improved)	19.29	0.999	2E+08	2E+08
Social PBI (all factors were improved)	19.52	0.999	3E+08	3E+08
Household fixed phone	-0.185	0.88	0.831	-0.169
Household access to electricity	-0.147	0.293	0.864	-0.136
Household access to television	-0.672	0.000	0.511	-0.489
Household access to radio	-0.575	0.002	0.563	-0.437
Constant	-21.73	0.999	0	-1

This suggests that in Bangladesh, the gender effect exists while the location effect is negligible. This seems to be reflected even in the basic descriptive statistics (Figure 11).

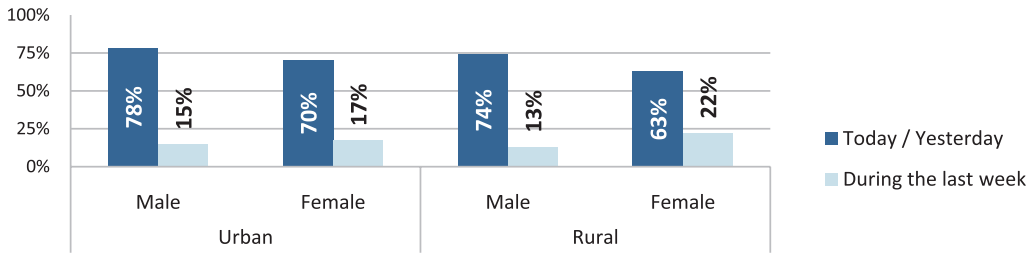

Figure 11 - Last time a phone was used to make or receive a call

Primary education has a positive impact on the mobile ownership. The model shows that those who have a primary education have a 46.7 percent chance of owning a mobile phone in Bangladesh. This value is statistically significant. Table 13 lists the overall literacy levels among urban and rural Bangladeshi men and women as per the Bangladesh Bureau of Statistics (BBS) 2009. Unlike the BBS figures for overall literacy rates, there seems to be no gender or location disparity amongst the survey's BOP teleuser sample. This suggests that education is not necessarily what is causing lower ownership among women. Perhaps the barrier might be the inability to read or write in English since most phones utilize the Latin script, but the data is not sufficient to confirm this.

Table 13: Comparing adult literacy rates in the population 15 years and over (2008) with primary education levels among BOP teleusers (2011)

	Adult literacy rate of population 15 Years and Over in 2008 (% age)		Primary education level amongst BOP teleusers in 2011 (% age)	
	Urban	Rural	Urban	Rural
Male	56.55	75.19	69.17	67.62
Female	47.86	66.56	66.53	65.56

Source: Bangladesh Bureau of Statistics (2009)[10]

Not surprisingly, household income affects mobile ownership positively. The higher the income, the greater the likelihood of mobile ownership. In this case, the positive effect is about 74.7 percent.

4.2 Pakistan

According to World Bank data, Pakistan falls under the lower-middle income group and as of 2014 the population in Pakistan was 185 million of which 62 percent were rural. In 2014, it was reported that the fixed line phone subscription was 2.65 percent while the mobile phone subscription was 73.33 percent (World Bank and ITU, 2014).

With respect to our mobile ownership model for the Pakistani BOP teleuser sample, the statistically significant variables are gender, age, primary education and contacts with mobile phones (four and five contacts own mobile phones). Table 14 below gives the overall logit regression model results.

Table 14: Logistic regression, Pakistan

Variables in the Equation	Logistic coefficient	p-value	Odds ratio	Change in odds
Location (Rural=1, Urban=0)	-0.183	0.294	0.833	-0.167
Gender (Female=1, Male=0)	-1.924	0.000	0.146	-0.854
Age	0.024	0.004	1.024	0.024
Household income in Ln	-0.306	0.109	0.737	-0.263
Primary education	1.57	0.000	4.804	3.804
Secondary education	0.064	0.783	1.066	0.066
Tertiary education	0.231	0.624	1.26	0.26

10. Source: Bangladesh Bureau of Statistics (2009). Facts and Figures of Gender Compendium of Bangladesh 2009. Available at http://www.bbs.gov.bd/WebTestApplication/userfiles/Image/SubjectMatterDataIndex/GSCompend_09.pdf

Variables in the Equation	Logistic coefficient	p-value	Odds ratio	Change in odds
One contact owns a mobile phone	0.492	0.646	1.636	0.636
Two contacts own a mobile phone	1.24	0.224	3.455	2.455
Three contacts own a mobile phone	1.851	0.065	6.367	5.367
Four contacts own a mobile phone	2.433	0.015	11.39	10.39
Five contacts own a mobile phone	3.278	0.001	26.53	25.53
Economic PBI (Some factors were improved)	20.66	1.000	9E+08	9E+08
Economic PBI (all factors were improved)	21.58	1.000	2E+09	2E+09
Emergency PBI	0.17	0.849	1.185	0.185
Social PBI (some factors were improved)	0.286	0.843	1.331	0.331
Social PBI (all factors were improved)	1.035	0.467	2.814	1.814
Household fixed phone	-1.255	0.067	0.285	-0.715
Household access to electricity	0.708	0.322	2.029	1.029
Household access to television	-1.611	0.000	0.200	-0.8
Household access to radio	-0.197	0.504	0.821	-0.179
Constant	-19.56	1	0.000	-1

Provided that all other variables are fixed, being a female in Pakistan has a negative effect of 84 percent on mobile ownership (Table 14). Gender disparity in terms of mobile ownership is nearly 36 percent (Figure 12). This is the highest gender difference when compared to the other five countries investigated in this study. While there is clearly lower ownership in rural areas compared with urban locations, the model suggests that this location effect is not statistically significant.

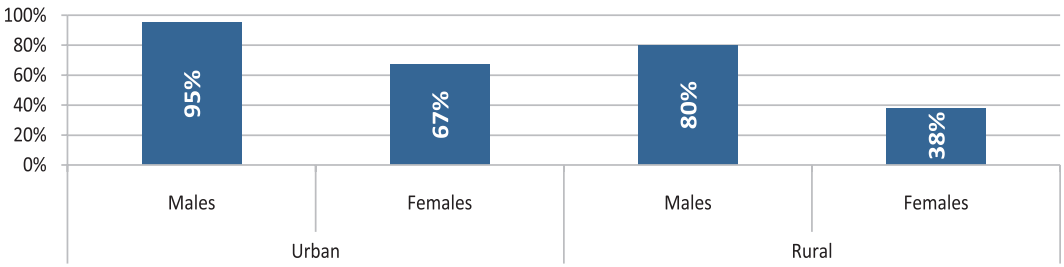

Figure 12 - Mobile phone ownership in Pakistan by gender and location (urban and rural)

The effect of primary education is very prominent among the Pakistani BOP teleuser sample. It has a strong positive effect of 308 percent. As of 2011, the adult literacy rate (15 years and above) in Pakistan was 55 percent (World Bank and ITU, 2014). Figure 13 shows the primary education levels among four categories drawn from our sample.

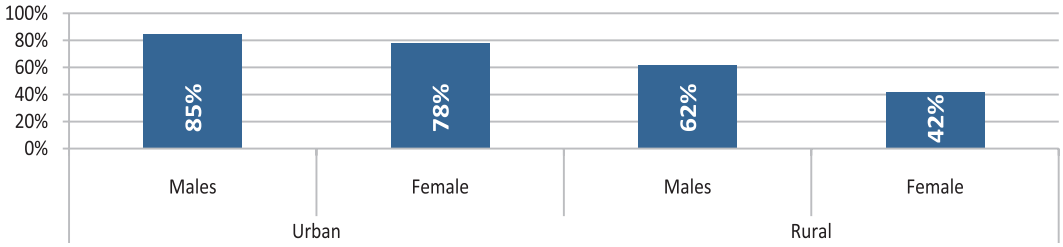

Figure 13 - Primary education levels in Pakistan among BOP teleusers

When it comes to looking at the effect on mobile ownership of having contacts with phones, an interesting picture emerges. The results all show a positive effect up to 5 contacts (the limit which the questionnaire explored). However, the results are significant only after 3 contacts. In fact having 4 contacts with mobile phones, influences mobile ownership by 1039 percent. The influence of having 5 contacts with mobile phones is even higher. This is a good example of social influences (social pressure on individuals by groups or other individuals) acting as a strong determining factor in owning a mobile phone.

4.3 India

India is a lower-middle income country with a per capita GNI of USD 1570. The total population as of 2014 was 1.295 billion of which 68 percent was rural. The fixed line subscription rate for 100 inhabitants was 2.13 and mobile subscription for rate 100 inhabitants was 74.48 (World Bank and ITU, 2014).

With respect to the mobile ownership model for India (Table 15), many factors seem to be significant for mobile ownership in India including gender, household income, education, access to electricity, and radio and social networks). The gender effect is significant with a negative impact of 79.5 percent for women. The location effect is insignificant with a p value of 0.830.

Table 15: Logistic regression, India

Variables in the Equation	Logistic coefficient	p-value	Odds ratio	Change in odds
Location (Rural=1, Urban=0)	-0.025	0.830	0.976	-0.024
Gender (Female=1, Male=0)	-1.583	0.000	0.205	-0.795
Age	-0.005	0.231	0.995	-0.005
Household income in Ln	0.432	0.000	1.541	0.541

Variables in the Equation	Logistic coefficient	p-value	Odds ratio	Change in odds
Primary education	0.232	0.023	1.261	0.261
Tertiary education	1.032	0.001	2.807	1.807
One contact owns a mobile phone	0.684	0.219	1.981	0.981
Two contacts own a mobile phone	0.377	0.476	1.457	0.457
Three contacts own a mobile phone	0.648	0.206	1.911	0.911
Four contacts own a mobile phone	0.801	0.114	2.229	1.229
Five contacts own a mobile phone	1.122	0.025	3.072	2.072
Economic PBI (Some factors were improved)	-1.041	0.264	0.353	-0.647
Economic PBI (all factors were improved)	-0.724	0.443	0.485	-0.515
Emergency PBI	-0.437	0.164	0.646	-0.354
Social PBI (some factors were improved)	0.816	0.134	2.261	1.261
Social PBI (all factors were improved)	1.538	0.004	4.655	3.655
Household fixed phone	-0.228	0.525	0.796	-0.204
Household access to electricity	-0.246	0.041	0.782	-0.218
Household access to television	-0.203	0.080	0.816	-0.184
Household access to radio	-0.611	0.000	0.543	-0.457
Constant	-2.647	0.047	0.071	-0.929

Figure 14 shows the gender difference that exists in terms of primary education in both urban and rural locations. This disparity is higher in rural areas. This could be due to cultural reasons that may exist in rural India that does not consider formal education as necessary for women.

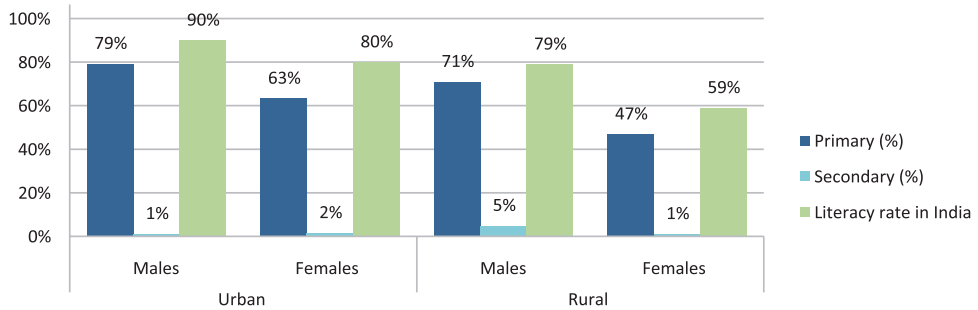

Figure 14 - Comparing primary and tertiary education levels among BOP teleusers with India's overall literacy levels[11]

11. Sources: Primary and tertiary education - Teleuser@National Sample Survey Office, Ministry of Statistics and Programme Implementation, Government of India (2010).

4.4 Sri Lanka

In Sri Lanka, only 18 percent of its 20.64 million population is considered urban. The telecommunications sector is highly competitive and the mobile subscription rate per 100 inhabitants is 103.16. This is the highest among the South Asian countries covered in this paper. Sri Lanka is a lower-middle income country (World Bank and ITU, 2014).

The ownership model for Sri Lanka (Table 16) indicates that household income is the highest factor. Unlike other countries, gender does not play a significant role in this. Age, however, is statistically significant, resulting in a negative effect of 1.4 percent. The greater number of close contacts owning a mobile phone (four and five contacts), the higher the change in odds ratio. The fixed-line connection is a significant negative factor. Interestingly, Sri Lankans perceive that a potential emergency as a reason to adopt a mobile. The change in odds ratio in 418.2 percent with a 0.004 p-value.

Table 16: Logistic regression, Sri Lanka

Variables in the Equation	Logistic coefficient	p-value	Odds ratio	Change in odds
Location (Rural=1, Urban=0)	-0.055	0.822	0.947	-0.053
Gender (Female=1, Male=0)	-0.186	0.269	0.83	-0.17
Age	-0.014	0.037	0.986	-0.014
Household income in Ln	0.597	0.003	1.816	0.816
Primary education	-0.017	0.953	0.983	-0.017
Tertiary education	0.166	0.865	1.181	0.181
One contact owns a mobile phone	0.26	0.825	1.297	0.297
Two contacts own a mobile phone	1.181	0.251	3.259	2.259
Three contacts own a mobile phone	1.661	0.096	5.263	4.263
Four contacts own a mobile phone	2.129	0.031	8.404	7.404
Five contacts own a mobile phone	3.107	0.002	22.35	21.35
Economic PBI (Some factors were improved)	0.12	0.877	1.128	0.128
Economic PBI (all factors were improved)	0.511	0.53	1.667	0.667
Emergency PBI	1.645	0.004	5.182	4.182
Social PBI (some factors were improved)	0.003	0.995	1.003	0.003
Social PBI (all factors were improved)	0.709	0.082	2.032	1.032
Household fixed phone	-1.117	0.000	0.327	-0.673
Household access to electricity	-0.132	0.801	0.877	-0.123
Household access to television	-0.203	0.632	0.816	-0.184
Household access to radio	0.417	0.21	1.517	0.517
Constant	-8.497	0.000	0.000	-1

4.5 Thailand

With a population of 67.73 million in 2014 (of which 49 percent is urban), Thailand is considered an upper-middle income country. The mobile penetration was 144.44 percent and fixed-line penetration was 8.46 percent (World Bank and ITU, 2014).

The Thai BOP teleuser sample is the only one where being a woman has a positive impact on mobile ownership. The change in odds ratio is 147.2 percent and the p-value is 0.004. Secondary education also has a positive effect and is statistically significant. Having a household fixed phone seems to negatively impact mobile ownership. The Social PBI has high positive impact of 340.9 percent.

Table 17: Logistic regression, Thailand

Variables in the Equation	Logistic coefficient	p-value	Odds ratio	Change in odds
Location (Rural=1, Urban=0)	0.357	0.425	1.429	0.429
Gender (Female=1, Male=0)	0.905	0.004	2.472	1.472
Age	-0.002	0.870	0.998	-0.002
Household income in Ln	0.372	0.492	1.451	0.451
Primary education	-0.062	0.934	0.94	-0.06
Secondary education	1.044	0.020	2.84	1.84
Tertiary education	0.665	0.317	1.944	0.944
One contact owns a mobile phone	-21.93	0.999	0	-1
Two contacts own a mobile phone	-21.14	0.999	0	-1
Three contacts own a mobile phone	-20.41	0.999	0	-1
Four contacts own a mobile phone	-19.35	0.999	0	-1
Five contacts own a mobile phone	-19	0.999	0	-1
Economic PBI (Some factors were improved)	0.193	0.732	1.213	0.213
Economic PBI (all factors were improved)	0.108	0.887	1.114	0.114
Emergency PBI	0.546	0.294	1.727	0.727
Social PBI (some factors were improved)	-0.096	0.843	0.909	-0.091
Social PBI (all factors were improved)	1.484	0.012	4.409	3.409
Household fixed phone	-2.202	0.000	0.111	-0.889
Household access to electricity	-44.24	1	0	-1
Household access to television	20.46	0.999	8E+08	8E+08
Household access to radio	0.346	0.500	1.413	0.413
Constant	39.82	1	2E+17	2E+17

The basic descriptive statistics confirm the model results regarding the impact of gender. When asked the last time a phone was used, more Thai women reported using the phone on the day of the survey than men, irrespective of whether the location was urban or rural (Figure 15). Furthermore these figures were higher in Thailand than in any of the other countries. Even on mobile ownership, more Thai BOP women teleusers owned phones than men (Table 18).

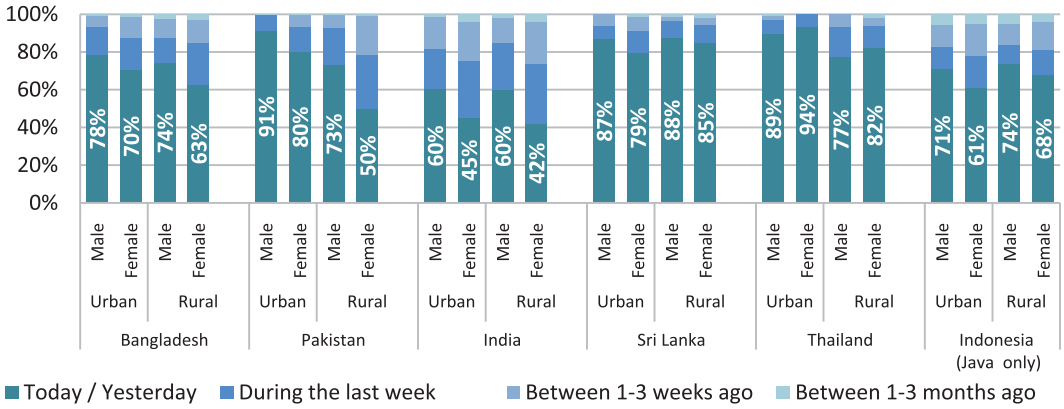

Figure 15 - Last use of a phone to make or receive a call

Table 18: Respondents who are chief wage earners and mobile owners

	Urban		Rural	
	Male	Female	Male	Female
Chief wage earner	62%	20%	67%	23%
Mobile ownership	89%	95%	84%	88%

4.6 Indonesia (Java only)

With a population of 242 million (of which 53 percent is urban), Indonesia is a lower-middle income country with a per capita GNI of USD 3630. The fixed-line penetration is 10.37 percent and the mobile penetration is 128.78 percent. Unlike the other countries in the T@BOP4 sample, in Indonesia the survey was carried out only in the island of Java where more than 55% of the Indonesian population lives. It is also the location of more than half of Indonesia's low-income earners (National Population of Census, Government of Indonesia, 2010).

In terms of mobile ownership amongst BOP teleusers in Java, the statistically significant variables are the location (rural dwelling), gender (being a woman), age, social PBI and fixed-line connectivity at home. All of these variables negatively impact mobile ownership. Having contacts that own mobile phones, access to radio and Economic PBI show positive impacts on mobile adoption. While other countries (except Thailand) showed that living in a rural area reduced the likelihood of mobile ownership, none of those results were statistically significant. Java, however, shows a negative impact (-66.9%) with statistical significance.

Table 19: Logistic regression, Indonesia

Variables in the Equation	Logistic coefficient	p-value	Odds ratio	Change in odds
Location (Rural=1, Urban=0)	-1.107	0.001	0.331	-0.669
Gender (Female=1, Male=0)	-1.555	0.000	0.211	-0.789
Age	-0.07	0.000	0.932	-0.068
Household income in Ln	0.145	0.159	1.156	0.156
Primary education	0.696	0.269	2.006	1.006
Tertiary education	0.234	0.726	1.263	0.263
One contact owns a mobile phone	2.325	0.002	10.23	9.228
Two contacts own a mobile phone	1.522	0.039	4.58	3.58
Three contacts own a mobile phone	2.222	0.003	9.226	8.226
Four contacts own a mobile phone	1.626	0.032	5.083	4.083
Five contacts own a mobile phone	2.827	0.000	16.9	15.9
Economic PBI (Some factors were improved)	1.969	0.003	7.161	6.161
Economic PBI (all factors were improved)	1.576	0.042	4.834	3.834
Emergency PBI	1.45	0.091	4.263	3.263
Social PBI (some factors were improved)	-2.362	0.004	0.094	-0.906
Social PBI (all factors were improved)	-1.665	0.047	0.189	-0.811
Household fixed phone	-2.935	0.000	0.053	-0.947
Household access to electricity	-0.406	0.536	0.666	-0.334
Household access to television	0.045	0.932	1.046	0.046
Household access to radio	0.553	0.037	1.739	0.739
Constant	0.056	0.970	1.058	0.058

Indonesians living in rural Java are less likely to own a mobile phone. The effect is negative at 66.9 percent. However, we see in Figure 9 that overall mobile ownership in rural Java is slightly higher than urban Java. But when we control for the other influencers, the logit regression shows a negative association. One strong influencing variable is gender. The change in odds ratio is a negative 78.9 percent. This shows that being a female brings down the odds of owning a mobile phone as opposed to being a male. Strangely the Social PBI, which should intuitively positively influence the ownership of mobile phone, is actually showing a negative impact. The values are significant and this indicates that the two variables are significant. Like Sri Lanka showing the highest fixed-line penetration, in Java owning a fixed-line phone impacts mobile ownership negatively. And, Java's fixed line penetration is 15.9 percent, which, in comparison to the other countries profiled in this study, is a very high figure.

Even though the Social PBI is negative, having contacts who own mobile phones (one to five contacts) has a positive impact on the odds ratios. This means that people's social network matters and it affects mobile ownership.

5. Conclusion

Given that the primary focus of this paper is on the effects of gender and location (i.e. urban or rural) on mobile ownership, the model reveals some interesting findings. While the basic descriptive statistics suggest that mobile ownership among the BOP is greater in urban areas than rural areas, the model is not able to conclusively attribute greater chances of mobile ownership to urban dwellers than those from rural areas. In all cases (except Thailand), we found that there is a negative correlation to mobile ownership when the location is rural. However, none of these results are significant with a 95% confidence interval except in Java. In Java, we clearly see that (with a 95% confidence interval), mobile ownership amongst the BOP is 66.9% less likely among the rural BOP teleuser population (while controlling for all other variables).

With respect to gender aspects, being female negatively impacts mobile ownership among the BOP in all countries except in Thailand. Unlike location, the findings with respect to gender in all countries are statistically significant. Thailand is the odd case among the sample countries where the chances of mobile ownership are greater for women than men.

The findings with respect to gender also contradict Hilbert (2011) who found that in select countries from Africa and Latin America, the digital gender divide disappeared when education and income were considered. We can see in our sample the strong effect of education on mobile ownership, especially in Bangladesh, India and Pakistan. But that does not mean that improving education alone would decrease the digital gender divide.

What is confirmed in this paper's findings is that while gender and location do matter in some instances (more so with the former than the latter), it is not even. This necessitates a country-specific policy (rather than a generic one) with regard to reducing (and ultimately eradicating) the digital gender divide. A comprehensive study of Thailand might reveal some lessons for other countries in South East Asia with similar cultural backgrounds.

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SEC Classification in Indonesia

Q1 and Q2 are questions to determine social class. Please use classification table to determine the suitable SEC for respondent.

Q1. Only for classification, with the showcard, please mention which group includes the routine amount of your monthly household expenses. We mean the expenditure that includes the payment of electricity, telephone bills, expenses for food, transport, and cost of vehicles/other, etc. but does not include spending on extraordinary items like mortgage payments, home/home furnishings, credit card payments, tertiary fees (vacation/leisure, shopping for supplies of clothing, etc.).

SEC	Total Household Expenditure	CODE	Including	Excluding
E	< 700,000	1	Daily Food Electricity and Water Maid's Salary School fee Gasoline Rent if paid monthly	Annual Rent Installment payments Household furniture Recreation Irregular Expenditures
D	IDR 700,001 – 1,000,000	2		
C2	IDR 1,000,001 – IDR 1,500,000	3		
C1	IDR 1,500,001 – IDR 2,000,000	4		
B	IDR 2,000,0001 – IDR 3,000,000	5		
A	IDR 3,000,001 or more	6		
	Dont know	7		
	Refuse	8		

Q2. Which of the following conveniences is your family currently using (that functions well)?

Video Tape/ Video Compact Disc (VCD)/ Laser Disc (LD)/ Video tape	1	Laptop/computer	13
AC/ Pendingin ruangan	2	Oven	14
Color TV	3	Gas Stove	15
Radio/ Kaset/ Compo/ Pemutar CD	4	Kerosene Stove	16
Phone (No. in household_____)	5	Paid TV (First media /Indovision/ Cable Vision)	17
Washing machine	6	TV LED / LCD / Plasma	18
Credit Card	7	French Refrigerator (>20 kg)	19
Refrigerator	8	Tablets (Ipad / Galaxy Tab, Playbook Blackberry) / smart phones	20
Car, 2000 model year or newer (note brand and year of manufacture _____)	9	Home internet connection	21
Motorcycle	10	Washing machine (1 tub – front load)	22
Handphone (No. _____)	11	Home theater	23
Microwave	12		

Interviewer check respondent's/participant's answer and count the number of facilities or goods owned in Q2. Then based on the table below assign to a particular SEC.

Had 12 or more facilities or goods Must have car, handphone, washing machine, and air conditioner Melingkari setidaknya 5 kode dari kode 18 – 23/5 code must be circle in kode 18 – 23	1	A+
Had 10 or more facilities/goods and must have a car and other durables, namely: washing machines, microwaves, laptops & computers, and air conditioning (at least 2 air conditioners in the home)	2	A
Had 10 or more facilities/goods and have to have a car or a motorcycle, but not including kerosene stove	3	B
Had 8 – 9 facilities and must have video/LD/VCD, but not include kerosene stove	4	C1
Had 6 – 7 facilities/goods and must have telephone or color television (can be LED TV), but not include kerosene stove	5	C2
Minimum had 2 facilities/goods, not include kerosene stove	6	D
Maximum had a radio and kerosene stove	7	E

Q7c. SEC classification

Sl. No.	Based on Household Expenditure (Q1)	Based on Ownership (Q2)	FINAL SES (Q3)
1	A+	A+	A+
2	A	A	A
3	B	A	B
4	C1	A	C1
5	C2	A	C2
6	D	A	D
7	E	A	E
8	A	B	B
9	B	B	B
10	C1	B	C1
11	C2	B	C2
12	D	B	D
13	E	B	E
14	A	C1	C1
15	B	C1	C1
16	C1	C1	C1
17	C2	C1	C2
18	D	C1	D
19	E	C1	E
20	A	C2	C2

Annex 2

SEC Classifications in Sri Lanka

Profession	Educational Qualifications				
	Uneducated	Till 5th grade	5th – 9th grade	O/L and A/L	Graduate/ Professional qualification
1. Animal husbandry/cultivation	E2	E2	E1	D	-
2. Administration/ 3. management post-senior	-	B1	B1	A2	A1
4. Administration/ 5. management post-junior	-	B1	B1	A2	A1
6. Labourer/transport/ mason – trained	E2	E1	D	C	-
7. Labourer/transport mason –untrained (Natami, cleaners etc)	E2	E2	E1	D	-
8. Clerk/secretary	D	D	C	B2	B1
9. Trade (Payment traders, etc.)	E2	E1	D	C	B2
10. Industrial trained	E2	E1	D	C	B2
11. Industrial untrained	E2	E2	E2	D	-
12. Professional (doctor, lawyer)	-	-	-	-	A1
13. Service (teacher, army)	E2	E1	D	C	B2
14. Self-employed (zero employees)/small contract	E1	D	C	B2	B1
15. Business (1-9 employees)	C	B2	B1	A2	A1
16. Business (over 9 employees)	B2	B1	A2	A1	A1

Gender and location disaggregated regressions from T@BOP4

Table 1: Indonesia (Java): gender and location disaggregated regression

	Urban				Rural			
	Male		Female		Male		Female	
	Significance	Change in odds	Significance	Change in odds	Significance	Change in odds	Significance	Change in odds
Household income (LN)	0.757	-0.161	0.972	-0.013	0.168	0.278	0.031	0.543
Age	0.163	-0.077	0.05	-0.113	0	-0.078	0.011	-0.06
Fixed phones	0.155	-0.939	0.03	-0.978	0.001	-0.942	0.025	-0.814
Primary education	0.745	-0.579	0.835	1.065	0.492	0.829	0.998	9.18E+08
Secondary education_2	0.063	19.599	0.973	0.042	0.49	-0.308	0	4.321
Tertiary education	0.999	1.89E+7	0.999	4.11E+08	0.458	-0.542	0.999	3E+08
Electricity	1	-1	1	-1	0.218	-0.799	0.796	0.347
Television	0.743	3.092	0.632	1.916	0.24	1.434	0.076	-0.86
Radio	0.435	2.064	0.313	1.993	0.797	0.125	0.118	1.018
Contacts with mobile phones	0.327	-1	0.517	-1	0.066	-1	0.086	-1
Contacts with one mobile phone	0.053	-0.988	0.79	-0.623	0.008	-0.982	0.083	-0.927
Contacts with two mobile phones	0.515	-0.813	0.145	-0.864	0.952	-0.048	0.75	-0.213
Contacts with three mobile phones	0.038	-0.982	0.097	-0.906	0.076	-0.659	0.899	0.131
Contacts with four mobile phones	0.63	5.654	0.659	-0.453	0.166	-0.586	0.042	-0.713
Contacts with five mobile phones	0.827	-0.429	0.162	-0.959	0.174	-0.64	0.022	-0.745
Economic PBI	0.397	5.286	0.963	0.064	0.626	0.339	0.197	-0.543
Emergency PBI	1	-1	1	8.01E+08	0.202	5.221	0.007	17.194
Social PBI	0.27	3.78	0.074	4.89	0.413	0.447	0.683	-0.168
Constant	1	1.74E+21	1	-0.692	0.533	3.805	0.998	-1

Key: ○ Results significant at the 95% confidence interval; ● Effect is positive

Table 2: Sri Lanka: gender and location disaggregated regression

	Urban				Rural			
	Male		Female		Male		Female	
	Significance	Change in odds	Significance	Change in odds	Significance	Change in odds	Significance	Change in odds
Household income (LN)	0.415	1.658	0.705	-0.271	0.215	-0.389	0	2.025
Age	0.478	0.028	0.68	-0.012	0.301	-0.011	0.009	-0.028
Fixed phones	0.04	-0.825	0.353	-0.454	0	-0.746	0	-0.675
Primary education	0.59	-0.645	0.662	-0.443	0.575	-0.267	0.666	0.201
Secondary education_2								
Tertiary education	1	1.63E+9	1	8.42E+8			0.649	-0.376
Electricity	1	-1			0.554	-0.49	0.643	0.349
Television	0.573	-0.656	0.959	0.156	0.382	-0.499	0.8	-0.14
Radio	0.545	1.92	0.288	-0.649	0.384	0.808	0.112	1.101
Contacts with mobile phones	0.921	-1	0.252	-1	0	-1	0	-1
Contacts with one mobile phone	1	6.23E+9	0.999	2.25E+8	0.999	8.85E+8	0.297	2.67
Contacts with two mobile phones	1	1.38E+9	0.999	6.53E+8	0.999	1.14E+9	0.231	2.857
Contacts with three mobile phones	1	4.27E+9	0.999	2.60E+9	0.999	2.12E+9	0.054	7.007
Contacts with four mobile phones	1	7.06E+9	0.999	4.55E+9	0.999	5.97+9	0.03	8.838
Contacts with five mobile phones							0.001	31.472
Economic PBI	0.669	-1			0.411	-1	0.311	-1
Economic PBI(1)	1	6.73E+8	0.459	0.972	0.533	1.089	0.705	-0.355
Economic PBI(2)	1	2.75E+8			0.327	2.417	0.881	0.2
Emergency PBI	0.112	255.315	1	1.25E+8	0.999	3.25E+8	0.087	2.093
Social PBI	0.413	-1	0.422	-1	0.033	-1	0.057	-1
Social PBI(1)	0.605	-0.912	0.801	-0.563	0.779	0.202	0.8	-0.124
Social PBI(2)	0.802	-0.694	0.981	0.083	0.151	1.63	0.363	0.647
Constant	1	-1	0.999	-1	0.999	-1	0	-1

Annex 4

Qualitative fieldwork classifications and summary

Table 1: Classification Table, Six countries

Country		Observed		Predicted		
				Mobile phone ownership (respondent)		Percentage Correct
				Doesn't own mobile	Owns mobile	
Bangladesh	Step 1	Mobile phone ownership (respondent)	Doesn't own mobile	750	295	71.8
			Owns mobile	298	634	68
		Overall Percentage				**70**
Pakistan	Step 1	Mobile phone ownership (respondent)	Doesn't own mobile	318	157	66.9
			Owns mobile	86	998	92.1
		Overall Percentage				**84.4**
India	Step 1	Mobile phone ownership (respondent)	Doesn't own mobile	1383	309	81.7
			Owns mobile	473	576	54.9
		Overall Percentage				**71.5**
Sri Lanka	Step 1	Mobile phone ownership (respondent)	Doesn't own mobile	114	171	39.9
			Owns mobile	60	668	91.8
		Overall Percentage				**77.2**
Thailand	Step 1	Mobile phone ownership (respondent)	Doesn't own mobile	45	41	51.8
			Owns mobile	19	619	97
		Overall Percentage				**91.6**
Indonesia	Step 1	Mobile phone ownership (respondent)	Doesn't own mobile	97	63	60.7
			Owns mobile	25	317	92.6
		Overall Percentage				**82.5**

Table 2: Omnibus Tests of Model Coefficients

Country			Chi-square	Df.	Sig.
Bangladesh	Step 1	Step	557.026	19	0
		Block	557.026	19	0
		Model	557.026	19	0
Pakistan		Step	773.486	21	0
		Block	773.486	21	0
		Model	773.486	21	0
India		Step	640.097	20	0
		Block	640.097	20	0
		Model	640.097	20	0
Sri Lanka		Step	239.012	20	0
		Block	239.012	20	0
		Model	239.012	20	0
Thailand		Step	196.032	21	0
		Block	196.032	21	0
		Model	196.032	21	0
Indonesia		Step	232.835	21	0
		Block	232.835	21	0
		Model	232.835	21	0

Table 3: Model summary

Country	Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R -Square
Bangladesh	1	2177.153	0.246	0.328
Pakistan	1	1143.593	0.391	0.553
India	1	3006.428	0.208	0.283
Sri Lanka	1	963.137	0.210	0.303
Thailand	1	332.269	0.237	0.458
Indonesia	1	395.373	0.371	0.520

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