

Hit me with a missed call: *The use of missed calls at the bottom of the pyramid*

Nirmali Sivapragasam, Ayesha Zainudeen and Dimuthu Ratnadiwakara

Abstract:

'Missed calling' is an innovative way of communicating, growing in use among the 3+ billion mobile users that exist today. Supported by caller identification facilities and built-in address books that most mobile phones come equipped with, the practice allows mobile users to pass on the cost of communication to others,. This has allowed many at the bottom of the economic pyramid (or BOP) to fulfill a variety of communication needs at virtually no cost. This paper explores the use of missed calling as a means of cost-minimization at the BOP in five emerging Asian countries. The paper draws on findings from a five-country, 8600+ sample study conducted in 2006. Contradictory to much of the existing literature, this article finds that the practice is as popular among non-BOP mobile owners as with BOP mobile owners. What may have originated as a cost-minimizing strategy may in fact now have become a 'strategy of convenience' used at all levels of the economic pyramid.

Keywords: missed calls, beeping, Asia, mobile communication, bottom of the pyramid, telecommunication,

1.0 Introduction

The next billion and *the bottom of the pyramid* are increasingly common terms used in the telecom industry. Fuelled by factors such as falling handset prices and the spread of prepaid service packages, it is widely accepted that the *next billions of subscribers* will, or are in fact coming from emerging markets, particularly India, China and other Asian countries, and within these markets, those at the bottom of the economic pyramid (BOP).

Research has shown that consumers in emerging markets spend significant shares of their income on mobile services, especially low-income consumers (Gillwald, 2005; Intelcon, 2005; Souter et al., 2005; Intven, 2000; Richardson, Ramirez and Haq, 2000). Accordingly, studies have found that a significant number of such users resort to various types of cost-minimizing 'strategies' in an effort to cut costs. These can range from the complete restriction of outgoing calls, to the use of text messages in place of calls, to much more innovative uses such as the use of 'missed calls,' in order to communicate in a cost-free manner.

Missed calling, also referred to as 'beeping,' 'flashing,' 'pranking,' and probably many other names in other parts of the world, essentially refers to the act of dialing a number and intentionally disconnecting the call before it is answered; the caller lets the phone ring at least once so that the call is registered in the recipient's call log before ending the call; if the recipient's phone has the caller identification facility activated and the recipient's number stored in its address book, the caller's details are also registered. This allows communication of some form to take place between the two parties. It is important to distinguish between "intentional" and "unintentional" missed calls. The former refer to the kind where the caller takes a conscious effort to ensure that the call does not get completed (or answered by the recipient). The latter refers to genuinely uncompleted calls, where the caller has no intention of disconnecting the call without talking to the recipient; these are the cases where the recipient, for example, doesn't hear the phone ring and therefore does not answer the call. This paper deals only with intentional missed calls.

This paper intends to explore the use of missed calls (intentional, unless otherwise specified) as a cost-minimizing strategy among BOP mobile owners in emerging Asia, looking at the characteristics of missed callers, to ascertain the extent to which it is used as a cost-minimizing strategy. The positive and negative impacts of the practice are also discussed.

The paper is based on an 8600+ sample survey conducted in 2006, on telecommunication use at the BOP in five emerging Asian countries. Section 2 reviews existing literature on missed calling, while Section 3 explains the survey design and methodology. Section 4 presents an in-depth analysis of missed call use at the BOP based on the survey findings, and also examines the benefits and costs of the practice. Section 5 examines the policy implications, and Section 6 concludes.

2.0 Literature Review

The literature on missed calling has been sparse until recently; much of the documentation at present constitutes qualitative case-studies and popular press articles. Though this documentation does provide rich insights into the phenomenon, only a handful of quantitative studies, at least in the public domain, exist which can attest to how 'widespread' the phenomenon truly is. The existing evidence does, nevertheless, seem to indicate that this practice is indeed multi-regional, multi-cultural and growing, especially in emerging markets.

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² The authors are grateful for the valuable comments and suggestions from Harsha de Silva, Rohan Samarajiva, participants of the LIRNEasia colloquium held on 21 October 2008, CPR*south3* referees and information provided by Erwin Alampay and Saowaluk Cheevasittiyanon.

'Missed calling,' 'beeping,' 'flashing' or 'pranking' all refer to the same practice: a caller dials a mobile number, allows it to ring once or more, and then intentionally ends the call before the recipient answers. Given the caller identification facility, the caller's number (or name, if it has been previously stored in the recipient's phone) is registered on the recipient's phone indicating that a call has been missed. The missed call allows communication between the caller and the recipient without them having to talk or type a message. This innovation is user-driven, one which has evolved independently in different parts of the world, but essentially serves a similar range of communication needs.

Missed calling has been perceived largely as a 'low-income' user phenomenon, allowing such users to minimize their communication costs. It has been seen to be a common practice in African mobile markets. Three significant large-sample studies have provided evidence for missed calling in Africa as early as 2001-2003. The first one, conducted among low-income communities in Botswana, Ghana and Uganda between 2001 and 2003, found that missed calling was prevalent in Uganda, not just among mobile owners, but non-owners too. Thirty-eight percent of those studied reported having made missed calls, from public-access points (both mobile and fixed), booths (generally mobile) as well as personal or household mobiles (McKemey, Scott, Souter, Afullo, Kibombo & Sakyi-Dawson, 2003).

The second study, a similar large-sample study of rural telecom use in Mozambique, Tanzania and the Indian state of Gujarat, found that in the absence of a cheaper fixed line alternative (which was available to the Gujarati users), users in the two African countries used text messages and missed calling as a way to use mobiles more cost-effectively (Souter, Scott, Garforth, Jain, Mascarenhas and McKemey, 2005).

The third study, conducted in 11 African countries to assess levels of ICT access in urban as well as rural areas, found missed calling to be popular in Botswana, Cameroon, Ethiopia, Namibia, Rwanda, South Africa, Uganda and Zambia, with the practice being reported to be used by as many as 66 percent of users in Zambia and 64 percent in Botswana (Gillwald, 2005).

In Latin America and the Caribbean (LAC), a recent seven-country large-sample survey among low income mobile users, indicated that missed calling was present in all seven countries studied. Levels of missed calling ranged from highs of 47 percent of mobile users in Jamaica and 43 percent in Colombia to lows of 21 percent in Trinidad and Tobago and 16 percent in Peru (Galperin and Mariscal, 2007). De Angoitia and Ramirez (2007), reporting on the same study, note the lower level of use (32 percent) in Mexico, compared to other regions where it is very commonly used, could be in part due to differences in the 'degree of maturity of users, in terms of the skills developed in using mobile phones' (2007; p. 26).

Qualitative evidence and reports are more widely available. One of the most insightful is a qualitative study based on interviews with 13 small business owners and two students in Rwanda which illustrated how mobile users regularly used missed calls to convey different kinds of messages depending on the number of rings as well as the given context (Donner, 2007). A similar study consisting of 15 in-depth interviews conducted in three rural locations in Uganda, also reports of the practice of missed calling, prevalent especially among price-sensitive consumers (Chipchase & Tulusan, 2007). Similar studies conducted in other parts of Africa, also report of the use of missed calls as a cost-minimizing strategy, especially among low-income users (Oestmann, 2003; Samuel, Shah, & Hadingham, 2005).

In Asia, the use of missed calls has been reported widely in popular media in Pakistan (Ahmad, 2007), India ('Etiquettes go missing', 2006), particularly in rural India (Bhagat, 2007), Sri Lanka (Gunasekera, 2007) and Bangladesh (Chakraborty, 2004). Aminuzzaman (2005) studies mobile phone usage among 300 university students in Bangladesh, finding that 85 percent of respondents regularly made use of missed calls to communicate a symbolic message of some kind. Fjuk, Furberg, Geirbo, & Helmersen reporting on a study of missed calls and SIM-switching in Bangladesh find that 'these practices have become important and integrated parts of communication and the daily lives of the Bangladeshis' (2008; p23), as Geirbo and Helmersen (2008) similarly observe.

Clearly missed calling is a growing phenomenon in these emerging markets; but what are the driving forces behind this growth? Donner (2007) points out two important factors which may have contributed to the wide and extensive use of missed calling: changes in the user-base of mobile phones and changes in billing structures and technology. It is estimated that emerging markets have together accounted for 85 percent of new connections today; China, India, as well as Russia and Brazil together have contributed 30 percent of the third billion subscribers alone (GSM Association, 2008);³ South Asia is expected to lead Asian growth (Research and Markets, 2008). Mobiles are increasingly becoming a common feature among low-income earners across the world. The current study estimated in mid-2006 that over 115 million subscribers at the BOP would get connected by mid-2008, the majority of these being mobile (de Silva & Zainudeen, 2007). These users on low incomes are more likely to resort to cost-cutting strategies according to many commentators on the subject, including Donner, especially where the majority use prepaid connections (de Silva & Zainudeen, 2007; Galperin & Mariscal, 2007; Alhassan, 2004), unlike in more developed markets. Prepaid service allows those without bank accounts or regular billing addresses to get connected; such low-income earners are more likely to resort to cost-cutting behavior, which is facilitated by prepaid systems. Moreover, prepaid package users are likely to be more conscious of how their telecom expenditure is spent, with the risk of their prepaid credit at a given point in time running out (Donner, 2008; Geirbo and Helmersen, 2008).

The changes in communication technology brought on by mobile handsets, such as caller identification facilities and in-built address books have also been major factors in the uptake of missed calls (Donner, 2007; McKemey et al., 2003; Robbins & Turner, 2002), though it is possible to communicate through missed calls without such functionalities, given sufficient context of relationships, timing and/or location.

In addition to these two 'changes,' the growth of missed calls has also been attributed to the existence of calling party pays (CPP) regimes, prevalent in most countries, whereby it is only the calling party which pays for the call, and not the receiving party; this allows the entire cost of the communication (initiated by the missed caller) to be passed over to others when the missed call is returned (Chango, 2005; Donner, 2007; Lane, Sweet, Lewin, Sephton & Petini, 2006; McKemey, et al., 2003; Robbins and Turner, 2002) essentially performing the same function as a collect call. This may have played a large part in the evolution of this new 'mode' of communication.

Donner (2007) notes the difficulty in deciphering the exact causality of these factors in the growth in beeping, but notes that adaptive structuration suggests that without both changes, it is unlikely that this practice would have so many names, or be so pervasive on mobile networks around the developing world.

Missed calls can be used to convey a variety of messages, or signals, broadly fitting into three categories according to Donner (2007): 'call-back,' 'pre-negotiated instrumental' (e.g., 'I am here' or 'pick me up now') and 'relational' (such as 'I'm thinking of you') beeps or missed calls. The meaning of the signals depends on the number of missed calls or unanswered rings as well as the context and is generally understood by both parties. As Donner observes, there are certain 'rules of beeping' mutually understood by users which govern use. For instance, people with limited financial resources make missed calls to people with more, not the other way around; women being courted make missed calls to the men courting them, not the other way around, etc. Such categories of missed calls and 'rules' have been corroborated across different countries and cultures (Chakraborty, 2004; Deepak and Bhamidipaty, 2008; Fjuk et al., 2008; Geirbo and Helmersen, 2008; Gillwald, 2005; Gunasekera, 2007; 'Etiquettes go missing', 2006; Bhagat, 2007; etc).

In Namibia, reports indicate that missed calls are even used to request friends or family to top-up the caller's prepaid account, or transfer air time to them (Hanes, 2008).

Fjuk et al. as well as Chakraborty report of another innovative use of missed calls: entertainment; for instance through games whereby players compete with opponents to see who can give the

³ http://www.gsmworld.com/news/statistics/pdf/qsma_stats_q4_07.pdf

other the highest number of missed calls without being 'caught' or having the call answered (Chakraborty, 2004).

Missed calling has allowed many low-income earners to cut their telecommunication costs; however, the practice is also a strategy of convenience and is not limited to lower socio-economic groups (Fjuk et al., 2008), illustrated by a 2007 account of T.V. Ramachandran, CEO the Cellular Operators' Association of India regularly giving the CEO of Bharti Airtel, Sunil Mittal, missed calls in order that he does not disturb Mittal in case he is at a meeting; Mittal understands the signal, and calls back when he is able to talk (Kurup & Gupta, 2007). There are other instances where missed calling is used for convenience purposes. Missed calls can be used as a way of swapping contacts, as an alternative to leaving voice messages when a person can't be reached (Gordon, 2008), or even as a quick alternative to typing out a text message. Some mobile users who are not literate may find it harder to compose or read a text message. Missed calling requires a minimal level of literacy (just enough to read the caller's name or recognize the number); where affordable and easy-to-use local language handsets are not available, missed calling becomes that much more attractive. Interestingly, reports also suggest that businesses are also tapping into this phenomenon, by using the 'missed call' practice to serve business purposes as well (Donner, 2008).

Though the practice has helped satisfy the communication needs of many who normally would not be able to afford telephone calls, there are costs involved. Some mobile owners report of the practice becoming a menace, often being bombarded with missed calls; in the case of 'call me back' missed calls, the receiver has to bear the cost of the phone call, depleting their prepaid credit (though, without missed calling, they would not be able to communicate with one another). From the network operator's perspective, the widespread practice has been reported to pose considerable costs, although the exact extent of this is not clear, given the lack of publicly available quantitative evidence. Network operators claim that they have to bear the costs of transmitting the missed call, even though no revenue is generated since the call is not completed (Kurup & Gupta, 2007). However, uncompleted (missed) calls may not impose the same network costs as completed calls, since the former only make use of the signaling channel of a network, while the latter make use of both the signaling and voice channels (Nuechterlein and Weiser, 2005). Network congestion is another concern; for example a Kenyan GSM network operator estimated four million missed calls were initiated daily from its network in 2005 (Mutung'u & Gakuru, 2006). A Reuters article reports that 28 percent of Sudanese network operator Zain's 485 million calls per day are missed calls (Heavens, 2007); estimates in India are in the range of 20 - 30 percent (Etiquettes go missing, 2006; Kurup & Gupta, 2007), and in Bangladesh, an astounding 70 percent (Fjuk, Furberg, Geirbo, & Helmersen, 2008). It is not clear how or if operators are able to make the distinction between 'intentional' missed calls and unintentional missed calls (genuinely unanswered calls), however.

The practice of missed calling is so popular in some countries, that network operators have even developed products and services which aim at turning missed calls and associated "costs" (at whatever level) into revenue, mostly by providing a more cost-effective way of providing 'call me back' services to the customer. However, no evidence is available on the success of such ventures. Some of these services provided by operators in Africa, and even in Asia, will be discussed in subsequent sections.

3.0 Methodology

This paper is based on a study conducted in Pakistan, India, Sri Lanka, the Philippines and Thailand in mid-2006. To define the 'bottom of the pyramid' in such a way that would allow for cross-country comparisons, Socio Economic Classification (SEC), a classification commonly used in market research, was used instead of income, to define the BOP. SEC classifies people as belonging to groups A to E based on the education and occupational status of the Chief Wage Earner of the household. For the purposes of this study, the BOP was defined as SEC groups D and E. A small non-BOP sample (SEC groups A, B and C) was also surveyed for comparison purposes.

Telephone users, the target group of the study, were defined as those who had used a phone (own or someone else's; paid for or free-of-charge) during the preceding three months. Male and female telecom users between the ages of 18 and 60, from rural and urban locations were studied.

The study consisted of face-to-face interviews using a structured questionnaire in the respondent's home. Households were selected randomly, and within selected households, respondents were selected randomly. The sample was designed to represent the BOP in each country.

A multi-stage stratified cluster sampling by probability proportionate to size (PPS) technique was used to select the target number of urban and rural centers. After determining the number of centers to be selected from each cell (strata in respective provinces), urban and rural areas were selected again using PPS on a constant population interval on geographically ordered centers within each cell.⁴

In each selected centre, a common place such as a road, park, hospital etc. was designated the starting point for contacting households.⁵ Only one respondent was selected from each household using the Kish Grid (random number chart) to ensure random selection. Within each country, data was weighted by gender, province group/zone and SEC group (A, B, and C versus D and E) to correct over or under-sampling in certain areas and socio-economic groups.⁶ An overview of the sample size and composition is given in Table 1.

Table 1: Quantitative sample overview

Country	Population (millions)	Sample Size			Error margin at 95 % CI
		SEC A, B & C	SEC D & E	Total	
Pakistan	166	731	1,081	1,812	3.0%
India	1,000	652	3,348	4,000	1.5%
Sri Lanka	16 ⁷	596	481	1,077	3.0%
Philippines	87	92	1,008	1,100	3.0%
Thailand	65	348	352	700	7.0%
Total sample size:				8,689	

In addition, six extended focus group discussions (EGDs)⁸ in each country were conducted to enrich the findings of the quantitative survey. Each had an average of eight respondents, including telecom users as well as non-users.⁹

Among many other questions, phone owners (mobile as well as fixed) were asked to indicate from a given list, whether or not they used various 'short-cuts' as a way of minimizing their call charges. Missed calling was one of such short-cuts listed.¹⁰ A limitation of the data is that information on the frequency of missed calls, as well as the share of missed calls that are received versus sent was not captured.

⁴ For this purpose, the cumulative population of all geographically ordered centers was calculated within urban and rural areas of each province. To find out the sampling interval the total population of these centers was divided by the required number of cities to be sampled from that cell. To select the first center, a random number was generated. The center where that random number fell was the first selected center. By adding the sampling interval to that random number, the next center was selected and so on.

⁵ Around each starting point, a maximum of ten interviews were conducted. The number of starting points was determined in accordance with the total number of interviews to be conducted in each center.

⁶ As a result of weighting by SEC in some countries the SEC A, B, and C weighted sample size becomes larger than the SEC D and E weighted sample size where the former group forms a higher proportion of the country's population.

⁷ Excluding two provinces

⁸ EGDs are longer than an average focus group – 3 hours or so as opposed to one and a half to two hours. The advantage is that respondents are not rushed in an EGD.

⁹ Someone who has not used any form of telecommunication during preceding 3 months.

¹⁰ Others were: the use of the phone only to receive calls, making use of (lower) night-time/weekend call rates, making mobile-mobile calls only, making fixed-fixed calls only, using one kind of connection to make calls and a different one to receive calls, sale of talk time, use of load-sharing/transferring talk time and the use of SMS.

4.0 Findings

4.1 Who's (missed) calling?

The data reveal that missed calls are made use of in all five countries studied among mobile owners at the BOP (Table 2); in response to the question of whether the respondent used missed calls (at all) to cut down communication expenditures, between about 40 to 60 percent of mobile owners at the BOP in the countries studied indicated that they used missed calls in this manner. With the exception of Galperin and Mariscal's finding in Colombia and Jamaica and Gillwald's in Botswana and Zambia, these numbers are far higher than the estimates of missed call use among low-income users from the other studies cited earlier.

Table 2: Missed call use (percentage of mobile owners at BOP who use missed calls)

<i>Socio-economic group</i>	Pakistan	India	Sri Lanka	Philippines	Thailand
BOP (D and E)	58.82%	66.06%	46.09%	67.58%	42.32%
Non-BOP (A, B and C)	66.03%	57.60%	53.55%	67.64%	39.40%

Interestingly, and contrary to the notion of missed calling being a low-income user innovation, analysis of use among mobile owners in the non-BOP sample¹¹ yielded similar levels of missed call use (as a cost-minimizing strategy) as at the BOP. In fact, at a 95 percent confidence interval, the data showed no significant differences in the use of missed calls between BOP and non-BOP mobile owners (despite seemingly large differences in levels of use based on the percentages). Though data on the frequency of missed call use is not available, this is an important finding, which contradicts many previous reports which purport missed calling to be a 'low income' user phenomenon, but confirms the Ramachandran-Mittal level use seen earlier; Geirbo & Helmersen also make similar observations in Bangladesh (2008).

Table 3: Missed call use at BOP and age (percentage of mobile owners at BOP who use missed calls)

<i>Age group</i>	Pakistan	India	Sri Lanka	Philippines	Thailand
18-24	62.86%	75.96%	61.16%	76.28%	59.60%
25-34	61.81%	67.19%	34.92%	62.04%	47.05%
35-44	54.94%	52.56%	46.18%	62.57%	39.89%
45-60	41.62%	64.12%	30.05%	65.53%	27.29%

Findings revealed that the mean age of regular users of missed calls was significantly lower than those who did not, among all five countries studied (at a 95 percent confidence interval) confirming that missed calls appear to be used more by younger age-groups, as found in other research studies. The analysis of missed call use among different age groups (Table 3) seems to concur with Aminuzzaman's finding of very high use among university students: mobile owners belonging to the younger age categories were found to be higher users of missed calls. As Table 3 indicates, missed calls were used by about 60 to 75 percent of the youngest respondents (18-24 years), while the numbers reduced among the older age groups, except in the Philippines, where missed call use, while highest in the 18-24 year-old group, did not differ very much among the remaining age groups. Oksman & Turtiainen (2004) also found that missed calling (referring to it as 'bomb-calling') was popular among 13-15 year-olds in Finland.

These findings also resonate with those of Donner (2007), (Chakraborty, 2004) as well as Fjuk et al. (2008) which illustrate that although the primary use of missed calls is to cut costs, the facility is also used for entertainment purposes and socializing among youths; they also reaffirm the generally recognized role of youths in stimulating demand for mobiles and related services. Fjuk et al. also indicate that in Bangladesh, missed calls provide youths a medium through which

¹¹ Non-representative albeit

traditional social and parental controls can be overcome, perhaps adding to the popularity of the practice among such age groups.

Table 4: Missed call use at BOP and gender (percentage of mobile owners at BOP who use missed calls)

Gender	Pakistan	India	Sri Lanka	Philippines	Thailand
Male	56.91%	65.27%	46.84%	66.54%	40.81%
Female	64.39%	67.90%	44.85%	68.61%	43.85%

It is interesting to note that there were no significant differences (at a 95 percent confidence interval) in missed call use between male and female mobile owners. This contrasts with gender divides seen in the use of text messages in the three South Asian countries, and in mobile access and ownership, in Pakistan and India (Zainudeen, Iqbal, Samarajiva, and Ratnadiwakara, 2008). In fact, missed call use was more similar to general usage patterns (call frequency and duration) which were no different between males and females¹² (Zainudeen et al., 2008); female phone owners at the BOP appeared to be as 'savvy' as males with regards to missed calls. Other studies have found missed call use to be in fact higher among women than men. Alhassan (2004) explains the more frequent sending of missed calls compared to the less frequent receipt by Ghanaian women could be a reflection of one of the 'rules' that govern missed calling, whereby men are expected to call back and reverse the bill even though the wish to talk was that of the lady (Chango, 2005; also, Donner, 2007; Fjuk et al., 2008). Additionally, unlike the case of text messaging, missed calling only requires access to a mobile; literacy (of the sender as well as the receiver) is not required, therefore missed calling is more likely to be more popular among this group than text messages.

Similar to McKemey et al. as well as Gillwald's findings in Ethiopia (2005) this study found that missed calling was not limited to mobile phone owners, though it is usually only associated with them. As Figure 1 illustrates, missed calls are used by fixed phone owners also (except in the Philippines, where the number of fixed phone owners is very low anyway) though at a far lower level.¹³ This would mostly take the form of fixed phone owners making missed calls to mobiles, with the exception of Sri Lanka; in Sri Lanka this may also include fixed phone users generating *and* receiving missed calls. Many 'fixed' phone connections at the BOP actually run on wireless (CDMA) technology and have in-built caller identification facilities, similar to GSM mobile phones. These connections have allowed many rural users to get connected over the last two years and might thus explain the relatively larger percentage of fixed phone owners using missed calls compared to other countries.

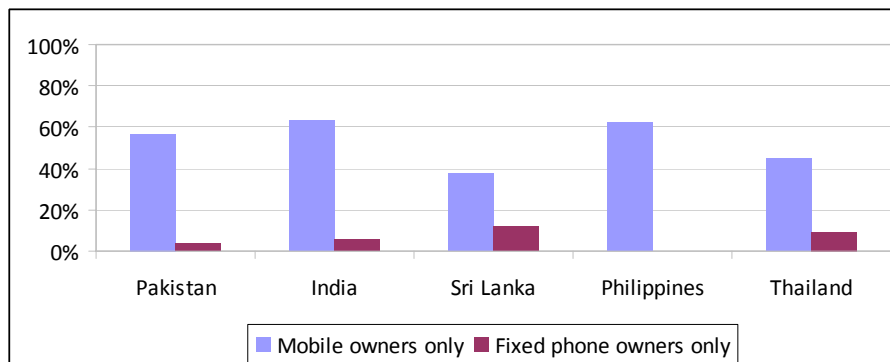


Figure 1: Missed call use by phone owners on mobiles vs. fixed phones at the BOP

¹² Except in the case of Pakistan; see Zainudeen, Iqbal, Samarajiva, & Ratnadiwakara (2008) for more detail

¹³ However, the numbers reported only include the use of missed calls by respondents who *only* used their own (or household in the case of fixed phones) mobile or fixed phone to make or receive calls. As such, this comparison does not include mobile and fixed owners who also used other phones to make and/or receive calls.

4.2 The economics of missed calling

Missed calling has been seen to provide access to telecom service, to those who normally would not be able to afford them, essentially allowing such people to transfer the cost of communication over to someone else, who (in their view) is more able to afford that cost. One would therefore expect poorer respondents to exhibit higher levels of missed calling. For instance, Gillwald (2005) observed that in Namibia as well as Rwanda respondents with lower personal incomes made missed calls more often than those with higher personal incomes; at the same time, lower-income respondents received more missed calls than they made.

Table 5: Missed call use at BOP and monthly household income level (percentage of mobile owners at BOP who use missed calls)

<i>Monthly Household income levels (USD)</i>	Pakistan	India	Sri Lanka	Philippines	Thailand
0-50	55.47%	59.36%	42.97%	25.45% ¹⁴	48.64%
51-100	54.80%	64.53%	44.70%	72.14%	52.35%
101-150	54.94%	71.15%	52.84%	66.37%	50.40%
151 and above	65.20%	84.60%	42.38%	70.30%	-

Interestingly, the data does not seem to suggest a strong or consistent relationship between the income levels (monthly household income) and the use of missed calls as a cost-minimizing strategy (Table 5) among BOP mobile owners in the five countries studied. Furthermore, findings revealed no significant difference (at the 95 percent confidence interval) in the mean monthly household income of those who regularly used missed calls and those who did not, among all five countries studied. This reinforces the earlier finding of equal missed call use in non-BOP samples. It should be noted that the current study reports only the share of mobile owners that use missed calls, rather than the relative frequency of use as Gillwald does. Though personal income levels could not be ascertained from all the respondents in this survey, it is possible that a clearer relationship may exist between missed calling and personal income levels as Gillwald finds.

The pattern of missed call use among urban and rural respondents in the three South Asian countries on the other hand, indicated that the use of missed calls was as prevalent in rural areas as it was in urban areas.¹⁵ In the Philippines and Thailand, missed call use was more widespread in urban areas, a surprising finding if one assumes that affordability levels with respect to telecommunication may be lower in rural areas; perhaps this reflects the greater demand for communication in the former, as evidenced by the larger number of total calls (incoming plus outgoing) in urban areas of these two countries which was seen.

Similarly, given the perception of missed calling as a cost-reduction strategy, one would expect to see some positive relationship between its use and the cost of telecommunications in a given country. Based on a comparison of prepaid tariffs (reported by the ITU for August 2005¹⁶) versus missed call use (Figure 2) no relationship can be seen.¹⁷ The high call rates in the Philippines almost certainly would contribute to the high use of missed calls, as has been seen with respect to text messaging (leading to the country being dubbed the texting capital of the world). However India, with some of the lowest call rates in the world (LIRNEasia, 2008; Nokia, 2008), still has a similarly large share of its BOP mobile owners missed calling; according to one telecom analyst as reported by the Express India ('Missed calls', 2006) is that despite low mobile call rates,

¹⁴ The extremely low share of missed call users among this income category in the Philippines may be explained by a very low number of respondents which fall into this income group.

¹⁵ At a 95% confidence interval

¹⁶ In the absence of comparable tariff information for the period that the survey was conducted (mid 2006); though most network operators publish this information on their websites, they generally do not report historic information, nor do they always report the time period that it is relevant to. In this regard, comparable tariff data was taken from the 2005 ITU Report, *The Internet of Things*, which reported data as at August 2005 (the 2007 report was not available to the authors)

¹⁷ Due to insufficient data points, a statistical correlation to verify the relationship could not be performed

prepaid rates are significantly higher and are billed on a shorter pulse rate than as compared to fixed calls; furthermore, a perception that mobile call rates are high may also contribute to the high use of missed calls. Whilst one cannot interpret this finding to mean that tariff levels of a given country do not have an influence on the level of missed calling, what one can conclude is that there are other factors (possibly, cultural), in addition to tariff levels, which are likely to influence the extent of missed calling in a given country. An analysis of the levels of missed calling between users *within* a given country, and their respective *individual* tariffs applicable would be require to neutralize other factors, such as cultural, which can have an impact on a users' level of missed calling, an analysis which is not possible with data obtained from the study thus far. Additionally, future research into the frequencies of missed call use may yield a clearer pattern.

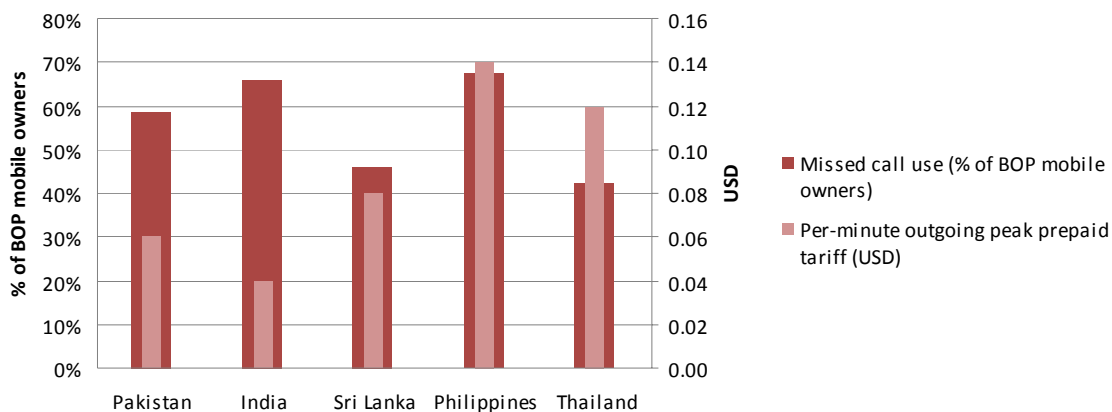


Figure 2: Missed call use at the BOP and outgoing prepaid charges per minute¹⁸

4.3 A cost-minimizing strategy or a cost?

The practice of missed calling enables users to reduce their telecommunication expenditure which is an especially useful practice for those with limited financial resources. Calculations based on a low-user prepaid mobile communication basket,¹⁹ confirm that substituting a certain proportion of calls and text messages with missed calls will reduce the user's monthly communication expenses approximately by a proportionate amount..

In addition to the cost savings, there are several other motivations behind sending missed calls including the rapid and convenient transmission of messages, entertainment as well as forging new, and maintaining existing, relationships (Fjuk et al., 2008); the discussion group responses from our study indicated that missed calls in Asia are also being used to convey relational messages, as one Pakistani female indicated: '...you can even just give each other a missed call to show that you are thinking of them.' It is difficult, however, to quantify these benefits and would require additional data on the frequency of missed calls, data which was not captured in the study.

Missed calls could also, in theory, provide benefits to operators, albeit, more difficult to quantifiably estimate than their corresponding costs. As noted earlier, the practice allows people with limited financial resources to pass on the cost of making voice calls to others, if the call were

¹⁸ Based on data from The Internet of things, ITU, 2005

¹⁹ Based on OECD-adapted low-user mobile usage baskets (see <http://www.oecd.org/dataoecd/56/23/41049579.pdf>). The baskets were calculated using prepaid call, SMS and connection charges (as reported by the ITU as at August 2005), average minutes of use (as collected through a diary method over a two-week period) as well as SMS usage data (captured through the survey) from respondents in each of the five countries studied

to request a call-back. In the absence of this choice to communicate this “call-back” message “costlessly” in the form of missed calls, depending on the urgency and need, whilst some may decide to make the voice call themselves, others may not make the call at all. What this means is that missed calls could enable a greater number of voice calls to be satisfied, through recipients of the missed call calling the person back, than would otherwise have taken place, in effect, generating additional revenue to the operator. Though it is difficult to quantify the additional demand due to call-back missed calls, if the cost (of the total number) of missed calls is outweighed by the additional revenue generated, network operators can benefit.

Furthermore, in the longer term, the resultant lowering of expenditure on mobile communication through the regular use of such cost-cutting strategies, could, in theory, have some impact on the initial decision to get connected, particularly among those with greater financial constraints, although the extent of this is cannot be ascertained without further research.

What has been made more apparent, at least in the popular media, are the negative effects of missed calls on operators; according to service providers, missed calls can make up substantial amounts of network traffic at any given time, which bears real costs through the use of the signaling channel on a network as well as opportunity costs in the form of network congestion,, which could lead to ‘genuine’ calls not being able to be completed. Additionally, according to Geirbo and Helmerson, congestion can lead to over estimation of true demand, leading to wasteful investments in network expansion.

According to a senior telecom expert in Sri Lanka, on average, the call completion ratio (CCR) on a mobile network is around 35 – 40 percent, implying that the percentage of uncompleted calls (including missed calls) could be as high as 65 percent. On the other hand, CCRs on a fixed network in this case, Sri Lanka Telecom (SLT), Sri Lanka’s premier fixed-line communications provider, are considerably higher, in the ranges of between 45-55 % (M.B. Herath, personal communication, November 12 , 2008). Whilst one could use such figures to corroborate findings of greater use of missed calls on mobile networks, it should be kept in mind that there are other factors inherent in cellular/mobile networks such as contention in the last-mile wireless access network and failure of handover (between cells) which could account for the greater likelihood of uncompleted calls on the network.

.Nevertheless, it should be noted that since uncompleted calls only make use of the signaling channel on a network, the costs involved are lower than that of voice calls, and further research is needed for an accurate quantifiable estimation of the true costs (both real and opportunity) of missed calls on service providers.

Some operators have developed products, which could serve as substitutes to the “call-me-back” missed call, capturing that demand through affordable, and potentially, revenue-generating products. ‘call-back’ requests are one kind of services which allow customers to send short requests, either free-of-charge or for a small fee, when they are low on credit or even have no credit in their account. Zain, a Sudanese mobile operator, offers a ‘call-me-back’ service which allows customers to send open requests in the form of a very basic signal to friends for a phone call. These requests are diverted from the main network and sent through a much cheaper technology (USSD or Unstructured Supplementary Service Data), which reduces operator costs both in terms of technology as well as traffic on the network (Heavens, 2007). Similar schemes have been introduced by other operators in Africa, including Kenya’s Safaricom²⁰, Tanzania’s Mobitel²¹ and South Africa’s Vodacom²², as well as in Asia, including Pakistan’s Warid Telecom²³, Maldives’ Dhiraagu²⁴ and Malaysia’s Maxis²⁵. Such services are also aimed at increasing network

²⁰[http://www.safaricom.co.ke/index.php?id=256&no_cache=1&sword_list\[\]=call&sword_list\[\]=me&sword_list\[\]=back](http://www.safaricom.co.ke/index.php?id=256&no_cache=1&sword_list[]=call&sword_list[]=me&sword_list[]=back)²⁰[http://www.safaricom.co.ke/index.php?id=256&no_cache=1&sword_list\[\]=call&sword_list\[\]=me&sword_list\[\]=back](http://www.safaricom.co.ke/index.php?id=256&no_cache=1&sword_list[]=call&sword_list[]=me&sword_list[]=back)

²¹ As cited in Donner, 2005

²² http://www.vodacom.co.za/services/call_me.jsp

²³ <http://www.waridtel.com/consumer/product/callmeback.php>

²⁴ http://www.dhiraagu.com.mv/beta/mobile/value_added_services/callmeback.php

²⁵ http://www.maxis.com.my/personal/mobile/vas/call_me_back/call_me_back.asp

traffic, facilitating those that find airtime too expensive to transfer the cost to someone else ensuring that some revenue is generated for the network operator.

Vodacom Tanzania's 'Please call me' service has been reported to be very successful; it is funded through advertising, with text advertisements being added to outgoing and confirming messages, thus allowing the company to earn some revenue in addition to that associated with the return call. According to reports, 20 million of these messages are sent per day ('Mobile advertising', 2008). Similarly, initiatives which facilitate the redistribution of the cost of communicating without clogging up networks, as Donner suggests, such as load sharing and airtime transfer facilities, will enable people to recharge their credit even when they don't have money to do so.

The profitability of these services, nevertheless, depends on several factors, including the cost of providing that service and the simplicity of the service compared to missed calling. For instance, some services require the user to punch in codes in addition to the intended receiver's phone number and well as impose quotas on the use of the service and/or limit the service to recipients on the same network. As such, the extent of the service's substitutability for missed calls is, nevertheless, questionable.

5.0 Policy implications

Previous sections have shown that missed calling is a popular practice among BOP as well as non-BOP mobile users, which whilst undoubtedly, in certain cases, providing a more affordable, alternative to actual voice calls, bears various costs on telecommunications service providers, in the form of clogged up networks caused by calls which fail to be matched by revenue. This section initiates a discussion on policy implications, which is by no means comprehensive, but rather is intended to serve as a starting point for future discussion.

Although qualitative evidence (albeit, limited) provides an indication of the costs that such practices impose on telecom providers, what is less apparent and available in the public domain, at least, is an accurate quantifiable estimate of the true costs borne on operators through this practice, which is arguably needed to provide justification for any policy action that may (or may not) need to be taken.

Furthermore, the general move towards more affordable communication through falling mobile tariffs and other changes in billing regimes and packages, could question the extent to which cost-cutting strategies such as missed calls are likely to be used in the future.

Of contextual importance is the increasing provision of packages billed on shorter pulse rates, such as per-second billing schemes, which could provide users with a greater flexibility over their mobile communication expenditure. Per-second billing systems refer to tariff plans billed by the second as opposed to longer pulse rates, such as by the minute. Since the type of message conveyed through a missed call is likely to be short in form, such schemes could lower the cost of short voice calls serving as substitutes for missed calls... Whilst it should be noted that per-second billing schemes are likely to run on higher tariff rates than their longer-pulse-rate counterparts, such schemes provide the user with more control over their expenditure and save the consumer little amounts per call which can add up to large amounts per month; estimates of savings range between 40 and 70 percent.²⁶

Presently, few mobile and fixed operators among the five countries studied offer per-second, or even 30-second, billing plans, though some offer them in the form of a limited promotion (e.g. the Philippines). The introduction of per-second billing by Vodacom in Tanzania for the first time²⁷, was very successful with a resultant 140 percent growth in subscriptions (year-on-year) (Vodacom Tanzania, 2005).

²⁶ <http://www.cbc.ca/consumers/market/files/services/cellphones/seconds.html>; <http://www.virginmobile.co.za/virgin-portal-customer/Press8.do>

²⁷ http://www.cellular.co.za/news_2003/100303-vodacom_tanzania_launches_per_se.htm

Similarly, the growing shift, if it were, from traditional linear-priced pricing schemes to flat-priced packages which offer users a fixed “bucket” of minutes and SMS, in return for a fixed price, reduces the variability of one’s expenditure in relation to their level of usage, and thus could reduce the need for such cost-saving strategies in situations where usage levels are lower than what is offered as part of the package.

Given the fact that missed calls can serve other purposes that go beyond the traditional “cost-cutting” function, as well as is increasingly becoming an accepted (possibly, habitual) form of communication, the extent of the impact of such changes on the practice is, nevertheless, questionable. Given alternative initiatives that some operators have undertaken, and the reported profitability of such services, it provides an indication that it could be in the best interest of both operators and users alike, to allow market forces alone to respond to such a phenomenon, at least until sufficient evidence is found that points otherwise.

6.0 Concluding remarks

This paper explores the use of missed calling by mobile owners as a cost-minimizing strategy. It shows that the practice is present and widespread at the BOP in emerging Asian markets, despite the fact the Asian regions boasts of some of the lowest tariffs in the world (LIRNEasia, 2008; Nokia, 2008). This indicates symptoms that perhaps mobile communication costs are still beyond the affordability of such users.

Existing literature has shown that the practice has generally been perceived as a low-income user innovation, serving to cut communication costs by redistributing those costs to those who can supposedly afford them more. However, this study reveals that the use of missed calls is as common among mobile owners at the BOP as it is among non-BOP mobile owners, and does not appear to be related to income at the monthly household level. This indicates that cost-minimization strategies are prevalent at *all* levels of the economic pyramid in the five countries studied; to a certain extent, the practice may also be used as a ‘strategy of convenience’ (as has been seen in previous studies). However, future research which further analyzes the frequencies of missed calls at different levels of the economic pyramid, would help shed further light on this area. Moreover, what started out as a means of overcoming prohibitively high airtime and text message charges, may in fact be now ingrained into the ‘culture’ of these societies, becoming just another way that people communicate; this perhaps explains the use at all levels of the economic pyramid, despite some of the lowest costs of mobile use in the world.

Because missed calls are quick, easy-to-use and costless to the user, the practice is unlikely to go away. Network operators contend that the network costs associated with missed calling are high, and are not matched by revenues; However, such practices could also serve to satisfy a certain segment of demand for voice calls, through transfer of costs from those with less financial resources to those with more.. Further quantitative evidence is required to determine whether policy action (if any) is required or not.

Some network operators have recognized the growing demand for less-costly forms of communication, and innovated with new services and products to meet it. Furthermore, market changes, such as the move towards tariff systems billed on shorter pulse rates and bucket-priced packages could also change the dynamics of consumer behavior in favor of voice calls (as opposed to missed calls), particularly those of a shorter duration. In this environment, the significance of missed calls may in fact diminish, further reducing the case for any form of policy intervention. Other operators should consider this new use of the network as a learning opportunity (Geirbo and Helmersson, 2008), and a chance to develop new products and services that cater to this demand, bringing more traffic onto the network.

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