Making Mobile Phone Work for the Poor: A Socio-Economic Case Study

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Abstract: The paper follows a case study approach to understand the dynamics of social innovation caused by the expansion of mobile phone services to third world countries. References are made to China, India, Zimbabwe, South Africa, and Bangladesh. This paper tried to look at how this international experience of social innovation can be replicated and even be applied in greater dimension in other developing countries. The paper argues that, technological innovation and expansion should not only improve the life of a few, but it should also be accessible to the poor, who would in turn, would use this service for various income-generating purposes. For this to happen, the price of this service must be within the reach of the poor. This paper tried to explain the social impact of expansion of mobile phone services, and attempted to calculate the price elasticity of this service for the poor. The study found that, the demand for mobile phone service to the poor is relatively price-elastic at upper price range, which supports our proposition that service-accessibility to poor will increase if price can be brought within the reach of them. This in turn, will magnify the social innovation impact on the poor.

Keywords: Mobile phone services, price elasticity, mobile phone for the poor, social responsibility of mobile phone operators, social innovation.

1. Introduction

Mobile phones have long been considered a luxury gadget in the western world. Prices of cell phones and pricing of air-time necessarily reflects this target market in developed countries. So the popularity and expansion of mobile phones among executives and business owners in western world would not surprise anybody. However, the rapid expansion of mobile phone services in low-income developing countries in Asia, Africa, and Latin America surprises many. The driving force of this growth should be placed in proper perspective. Whereas the developed world has sufficient land-phone infra-structure and highly urbanized landscape, this is necessarily missing in most developing countries. Applications for new phones could be in queue for months, if not years. The cost of connection could possibly be out of reach of average citizens. Even when you get the connection after passing through all these hurdles, there would be no guarantee that the connection will stay operative in most of the time of the year. The solution that has already been proved to be effective to overcome these limitations is to rely on mobile phone services in developing countries. Mobile phone operators in developing countries are, therefore, not "complementing" the use of land-phones as is the case with developed countries; rather they are providing an effective "substitute" to land-phone services. Therefore, the primary beneficiary of mobile phone operators in developing countries should not be the few rich of the society, but the general public of the society. Of course, we are not discouraging the use by the rich; however, the access of this service to the poor has tremendous socially innovative impact in their lives. This has been proved in countries that we are going to elaborate in the following sections.

2. Data and Research Methodology

2.1 Types and Sources of Data: The paper relies both on primary and secondary data. Country specific information are collected from trade journals, internet, and related articles published in professional journals. Primary data related to measurement of price elasticity are collected through questionnaire survey in the target group. Focus group interviews were conducted before designing the questionnaire and survey.

2.2 Methodology: This paper is structured in two parts. The first part follows an exploratory study approach, based on secondary data to appreciate the social innovation caused by mobile phone services in developing countries. Sporadic references have been made to China, India, Tanzania, Zimbabwe, South Africa, and Bangladesh, in order to appreciate the global pattern of social and economic implication of mobile phone services. Therefore, the paper attempted to see if there is a pattern of social innovation observable across the board. Special attention has been given to identify the impact of this service on the poor. The term "poor" is defined relatively in this paper, meaning that, "poor" refers to someone who could not afford land phone services because of his location or income. Therefore, we concentrated on identifying the social innovation that took place in rural areas where the poor are most likely to be concentrated around. Having identified the overwhelming nature of social innovation across the board, the paper argued that the mobile phone operators must take upon them the responsibility of making mobile phones accessible to the poor by looking at its price sensitivity to the target group.

The second part of the report follows an exploratory study approach, based on primary data about price sensitivity of mobile phone services to the poor. About 50 samples were taken through stratified random sampling from the target group in Bangladesh (persons having income less than Bangladesh Taka 5,000 per month. 1US$ = 69 Bangladesh Taka). Their price sensitivity was measured through questionnaire survey. As we know, the price elasticity of demand refers to the responsiveness of quantity demanded to the change in price, we identified three price points for mobile air-time, and their respective consumers' demand schedule was surveyed. The averages were calculated for each price point, and then three price-point averages were compared to find the price elasticity. The formula for measuring (point) price elasticity would be:

$$e_p = [\{(q_2-q_1)/q_1\} \times 100] / [\{(p_2-p_1)/p_1\} \times 100]$$

$$= (\Delta q/q_1)/(\Delta p/p_1)$$

$$= (\Delta q/\Delta p)(p_1/q_1)$$

Where, e_p = Point price elasticity
q_1 = quantity demanded before the price change (here, the air-time usage before price change)
q_2 = quantity demanded after the price changes (here, the air-time usage after price change)
p_1 = initial price of per unit air-time
p_2 = changed price of per unit air-time

This measurement will look into whether the air-time usage is price-elastic or inelastic for the poor, which in turn will show whether the strength of social innovation so far caused by mobile phone services could be magnified by making it affordable (thereby increase service accessibility) to the poor.

3. Mobile Phone Services and Economic Development

3.1 Rationale for Economic Growth: Several studies indicate that the impact of mobile phone services on the economy is far reaching. A high quality communication infra-structure is widely held to allow human capital to be deployed more productively. This could be the rationale where we can link the increase in mobile phone usage and economic growth. Since the subsequent social innovation is caused by economic development as well, we will look into the contribution of mobile phone services to economy first.

3.2 How the Rationale Worked: Since most developing countries lack high quality communication infra-structure, primarily the land-phone services, the mobile phone operator has actually filled-in the vacuum. For example, 97 percent of people surveyed in Tanzania said they could access a mobile phone, while only 28 percent could access a landline. A study undertaken by Vodafone and a group called the Center for Economic Policy Research claims that mobile phone use is growing faster in Africa than anywhere else in the world, and that those countries in Africa with the greatest use of mobile phone also saw higher growth rates. A ground-breaking study led by the London Business School in 2005 concluded that an increase of 10 mobile phones per 100 people in African developing countries would increase GDP

growth by 0.59%. Some other studies suggest that, the increase in economic growth could be as much as 1.2% (Deloitte Consulting LLP).

Despite critics to this straightforward approach to attribute economic growth to increase in mobile services penetration, several studies have found the link to be significant. Since it is not our purpose to prove whether there is a link between economic growth and increase in mobile phone usage, we will go straight to the understanding of changes that have been caused by rapid penetration of mobile phone services:

- Increased opportunity for communication has made market information quickly accessible to traders and farmers in rural areas.
- Mobile phones are being used as pay-phones for communication needs in rural areas, thereby generate income for the phone owner.
- Communication infra-structure encourages foreign direct investment, also employment.
- Tax, VAT, and fees on mobile operators go to government exchequer, which in turn, is being used to finance national budget.
- Mobile services can be used for money transfer, thereby, moving money to places where it will be spent.

It is evident from developing countries' experience that mobile phone has made the market information easily accessible for rural traders, fishermen, and farmers. Over 85 percent of small businesses run by native individuals in South Africa rely solely on a mobile phone for telecommunications. Due to quick and efficient communication among geographical markets, farmers and traders now have the easy access to market information, and thus the prices tend to converge among markets. This has eliminated the income differential due to geographical location of a farmer, thus has helped to increase the market efficiency.

In addition to that, the mobile phones that are being used as pay phones in rural areas, are actually increasing the income of those phone owners. The pioneering project was initiated by GrameePhone, Bangladesh, under the banner of Village Phone Program (VPP). VPP is a unique initiative to provide telecommunications facilities in remote, rural areas where no such service was available before. VPP works as an owner operated pay phone, the number of total subscribers stands at 230,000 (June, 2006). These phone-owners are mostly village ladies who never saw a phone before, and hand-sets are financed by micro-credit provided by renowned Grameen Bank. This program has already been successfully replicated in a number of countries including Uganda and Rwanda.

In some countries, there are services like money transfer through mobile phones. According to a report by British Broadcasting Corporation (BBC), Zimbabweans working in South Africa lose as much as half the amount they take home to their families in bribes at security checkpoints. Mobile-banking would allow them to send money safely from their mobile phones to those of their families, who would be able to redeem cash from mobile airtime sellers where they live. India's largest mobile operator, Bharti Airtel, has also trialed a similar scheme in a Himalayan village, with the help of State Bank of India.

4. Mobile Phone Services and Its Social Impact

4.1 Factors Contributing to Social Innovation: Social innovation, which may be defined as far-reaching positive social changes, has partly emanated from economic benefits due to penetration of mobile services. The following social changes have been identified across countries:

- Social changes caused by employment generation
- Promoting social cohesion through easy communication
- Empowering women through programs like VPP (Village Phone Program)
- Community services and information dissemination
- Importance during natural disaster and emergencies

4.2 Analysis of Contributing Factors: First, even though employment generation is mostly an economic phenomenon, has tremendous social impact. It will have an impact on increase in market demand for various goods and services and growth of local economy, and the quality of lives of those who are involved in supplying those goods and services. Specifically for socially vulnerable group, e.g., rural women, employment generation will have significant impact on their empowerment. The VPP program, which has been successfully replicated in other countries, has brought about changes in the lives of rural women-folks who own and operate those mobile phones as village pay-phone.

Second, besides creating jobs, mobile phones transform lives for many by presenting a way to communicate regularly with family members, thereby increase the social cohesion. Almost 100 million Chinese migrant workers rely on mobile phones to talk to the families they have left behind in rural areas. They also enable people to save time and money by allowing them to make inquiries by phone instead of traveling long distances. A study found that, 79% of those surveyed in South Africa and 85% in Tanzania stated that using a mobile phone improved relationships. The same study found that, over half of mobile owners in South Africa allow family members to use their handset for free, and a third does the same for friends.

Third, access to community services could be enhanced by providing easy access to service information. Access to data services to rural areas encourages local content, either via community messaging system or wireless internet, or both. It allows users to learn about local services such as healthcare, vaccination, education, and current affairs. GrameenPhone in Bangladesh has set up such model centers in rural areas where people can access internet services and also community information, download government forms without going to government offices, and get price information of agricultural products through the website of the local Agriculture Extension Department.

Fourth, when it comes to natural disasters, mobile services dramatically improve access to emergency services, which would otherwise only be available to the wealthy. It also allows families to stay in touch with each other in the event of natural disasters, communicate with relief providers and obtain information that will allow them to obtain more rapid relief. A recent study by Vodafone, titled "The Roles of Mobiles in Disasters and Emergencies" looked into the use of mobile phones in disaster relief and other evidence to understand how people used mobile phones in extreme circumstances. The research identified that mobile phones are used in the following situations: (i) Early warnings, (ii) Disaster impact, (iii) Immediate aftermath, and (iv) Recovery and rebuilding.

The important message to emerge was the benefit of the timely spread of information in response to a disaster. Superior resilience of mobile networks as compared with fixed networks, and the enhanced ability to install new capacity, was noted subsequent to natural disasters. For example, in the aftermath of the Asian Tsunami, Nokia flew in crews within a day to start the reconstruction of the mobile network. Also on the first day after the Tsunami struck, Nokia delivered the first phones and technical support to relief agencies, primarily to the Red Cross/Red Crescent. It is much easier to repair a wireless base station than hundreds of fixed-lines. This has, in turn, increased the confidence of people in the reliability of mobile phone services, and their social reliance on mobile phone services during natural disasters.

5. Quantitative Analysis of Findings about Price Sensitivity

5.1 The Key Challenge: It should be evident by now that the growth of mobile phone services in developing world has far-reaching economic and social impact. The social innovation caused by mobile penetration could therefore, be magnified if this penetration could be made faster by providing increasing access of this service to the poor. The initial focus group interviews showed that the price of air-time could be a factor in limiting the rate of penetration of mobile phone services among the poor. The paper hereby argues that, it would be advantageous for mobile operators if they attempt to increase the service accessibility by keeping the price within the reach of the poor.

5.2 Finding the Price Elasticity: This paper neither advocates in favor of selling at a loss, nor advocates what would be the sustainable price for mobile phone operators. What the paper looks into is the price-elasticity of air-time demand, so that the mobile operators can get a direction whether changing price will

result in higher revenue through better market share. Three price-points are considered, therefore two price changes can be measured. The following is the summary table of the research findings:

Table I: Price Elasticity of Mobile Air-Time
(For income group < BDT* 5,000)

Price Changes	Point Price Elasticity	Interpretation
BDT* 2.00/minute to BDT 2.50/minute	-0.637	Inelastic
BDT 2.50/minute to BDT 3.00/minute	-2.956	Elastic

*BDT means Bangladesh Taka, the currency of Bangladesh. 1US$ = approximately BDT 69.00 to date.

The finding is quite interesting. It shows that, within the range of BDT 2.00/minute to BDT 2.50/minute, the price elasticity of air-time is inelastic. This might reflect the fact that, even though price changes may affect the quantity demanded, people will not reduce the usage in the same proportion as with the change in price. However, the scenario swerves when the air-time price changes from BDT 2.50/minute to BDT 3.00/minute. Consumers will significantly curtail their talk-time to keep pace with their limited budget. Alternatively, it can be said that, the price reduction at the upper price limit will have more elastic effect on demand, than lowering price at the lower price limit.

6. Conclusion: Studies have found that penetration and expansion of mobile phone services have significant impact on economic growth, via access to market information and income generation for the poor. This has partly influenced the social changes among the poor. Besides employment generation, expansion of mobile phone services has increased the social cohesion, empowered women in rural areas, enhanced access to community services, and greatly helped during natural disasters. Appreciating the positive impacts of this service, the mobile operators should now take the responsibility of making mobile phones accessible to the poor by understanding their price sensitivity. The price elasticity analysis would be of immense value to mobile operators to find their price limits, and where they need to come down to expand market share among the poor. We found that at lower price limits, price elasticity is relatively inelastic (-0.637), whereas at upper price limits, it is highly elastic (-2.956). Considering the economic and social impact of mobile phone services in the developing world, similar studies may be replicated in other countries to find the ideal price points and use this information to make mobile phone services even more accessible to the poor.

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