



## Impact of Rural Telecom on Women Empowerment: A Case Study of Bangladesh

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### Abstract

The telecom sector in Bangladesh, like many other developing countries, has seen growth in mobile penetration that has surpassed all expectations. In this context, a household survey-based study has been conducted to explore the impact of rural telecom on the status of daily food intake scenario in the study area. Multiple tools of methodology have been used in this study. Various techniques (both quantitative and qualitative) were employed to explore the situation of mobile phone user in rural areas of Bangladesh. Purposive random sampling and case study method have been pursued to collect information from the respondents. The major empirical findings summarized here are extracted by a thorough analysis on the data set applying basically Tobit regression analysis along with the typically descriptive statistical tools and techniques. In addition, the extracted result would provoke the government for initiating public-private partnerships to reach the village poor with mobile phone heavily subsidized so that the people with comparatively low income could have easy access to communication device thus enhancing their living standard. The analytical model sketched in this study may be useful in justifying the extension of Information and communication technologies sectors in the rural areas being one of the first its kind in Bangladesh; the study has the potential to be the basis for future studies in the context of Bangladesh.

**Keywords:** Women Empowerment; Tobit Regression; Rural Telecom

### 1. Introduction

Nowadays, one of the most prominent topics worldwide is women empowerment. Creation of an environment for women so that they can take decisions by themselves for their own profits, and their society is called women empowerment. In previous days, women had to stay at home and do household works only; they were not allowed to go outside of the house. However, now the scenario has been changed. At the present time, women can go outside of their house and become self-dependent as well as make money as the male members of the society because of women empowerment. To run a business properly, Information and Communication Technologies (ICTs) tools particularly mobile phones assist the rural women in recent times.

### 2. Literature Review

Many of the early studies on social and economic issues on the use of telephony in developing countries dealt with public call offices (PCOs) (Saunders et al., 1994). Later studies explored relationships between adoption of fixed or mobile telephony and socioeconomic characteristics of households (Samarajiva and Zainudeen, 2008). In Africa, studies have dealt with characteristics influencing impact of mobiles among micro-businesses in the weaving sector in Nigeria (Jagun et al., 2008), ownership among small enterprises in Nigeria (Adeoti and Adeoti, 2008), use of mobiles among traders in Ghana

(Overå, 2006), and mobile use among entrepreneurs in Rwanda (Donner, 2004; 2006). There is also a reasonable volume of work dealing with different aspects and consequences of internet cafes or internet use, primarily associated with privately operated telecentres, (Akpan-Obong, 2010; Falch and Anyimadu, 2003; Mwesige, 2004). Saunders et al. (1994) argued that telecommunications could contribute to economic development in various ways: Improved transport efficiency, better market information, reduction of isolation, more distributed economic development, increase in security, and increased connectivity with international economic activity. Several cross-country econometric analyses have posited positive relationships between national economic development and diffusion of ICTs (Bedi, 1999; Canning and Pedroni, 1999; Forestier et al., 2002; Röller and Waverman, 2001; Waverman et al., 2005). The World Bank (2009c) reported a 1.8% increase in economic growth for every 10% increase in broadband penetration in developing countries. Long before ICTs became ubiquitous, Saunders et al. (1994) found many businesses without their own access using PCOs for communication. Reduction in transaction costs is often associated with ICTs in developing countries (Norton, 1992), particularly among micro-enterprises (Duncombe and Heeks, 2002). ICTs substitution for travel in the supply chain is suggested by scattered evidence (Duncombe and Heeks, 2001). A mixed picture with only some journeys being substituted is found by other research works (Souter et al., 2005; Overå, 2006). Aminuzzaman et al. (2002) have conducted their studies on empowerment and poverty reduction through village pay phone (VPP) scheme of Grameen Bank. Bayes et al. (1999) concentrated around the village-based micro-finance organization, and Rahman (2008) has focused his investigation on the role of Pallitathya Kendra (Sustainable rural livelihood information network) in poverty reduction. Aminuzzaman et al. (2002) have carried out their study on 20 different locations of their project areas and found a positive impact of VPP in most of them. The most pronounced impacts of VPP as observed in the work were found with regard to a general reduction of transaction costs and uncertainty (reduced need for travel, quicker access to information, and more choice) and in reducing the isolation of many villages (Aminuzzaman et al., 2002). For women, the VPP was found to be an important channel for communications, especially with husbands living abroad as migrant workers (ibid). Their study has focused on the usefulness of the mobile phones in the project area of VPP. In a separate study, Bayes et al. (1999) have also focused light on the utility of VPP. A study has been done by Rahman (2008) in which the role of ICTs of rural poverty reduction has been reported. In the study, the community-managed information center known as the Pallitathya Kendra or Village Information Center have been focused. These is administered by national level non-governmental organizations (NGOs). A Pallitathya Kendra is a common access point in the community which is equipped with different ICTs facilities such as computer, mobile phone, internet connection, and so on to ensure access to information for the rural people (Rahman, 2008. p. 44). The area of his study is Babrijhar village under Chapra Sharomjani union, Sadar Upazilla of Nilphamari district of Bangladesh (Rahman, 2008. p. 23). Through the Kendra Rahman was failed to expand income to any specific individual as through NGOs communities handle the Pallitathya Kendra. The significance of ICTs in rural poverty diminution has been proclaimed by the author who finally came to the point that for the expansion and sustainability of such installations are necessary for the betterment of village people. In the context of home and abroad, no sufficient household survey-based study has yet been conducted the impact of the mobile phone on livelihood assets, especially in the rural sector. Further, to the best of our knowledge, no study on rural telecom endeavored to estimate the livelihood outcomes associated with livelihood assets along with its broader dimensional factors and to establish the relationship between mobile phone and food intake status. Therefore, this study has made an effective effort to bridge up the lacunas identified above.

### 3. Methodology

A suitably designed draft schedules/questionnaires were prepared toward the close of April 15, 2008, and put to pre-testing to make them more useful and effective for the purpose and realization of the objectives set. Pre-testing was duly conducted by the authoress. The draft schedules were modified or changed where necessary in the light of experience gained from the field. The schedules which were initially

prepared in English were then translated into Bengali for the convenience and easy understanding of the villagers. To ascertain the impact of rural telecom on rural livelihood assets a survey was conducted on 14 villages, namely, Boira, Boyra Panch Para, Chara Banga, Angaire, Patgram, Khoira, Hazibag, Harinal, Bora, Kolapara, Shotaki, Boubazar, Changarchor, Lachragonj from 3 districts, e.g., Manikgonj, Gazipur, and Chandpur under 3 upazillas (Singair, Gazipur Sadar, and Motlob) to collect information on a few basic socioeconomic features from the beginning the hill Tracts region was dropped because of the difficulty of administering survey. Considering the number of subscribers, the number of call shop owners, availability of network, a list was prepared according to Grameen Phone Annual Report of the 2009. After that, we choose randomly those districts. In the second stage, a list of all unions (The lowest level administrative unit) was prepared from the Report of the 2001 Population Census. The samples were drawn from the list of unions using the random number tables. The target respondents of the study were telecom users defined as who had used a phone (own or of someone else; paid for or free of charge) during the preceding 1 year. Respondents were males and females between ages 18 and 60 years from rural areas. 139 respondents were in target group, some of which were call shop owners. Someone who had not used any form of telecommunication (Who have not own or they hardly used in case of emergency either paying for or free) during the preceding 1 year. 48 respondents are in control group. This gave the scope to get a comparative picture between phone users from target group and non-phone users from the control group. Some areas were selected for control groups where there were very few mobile phones, landless people, no electricity, and no infrastructure. Three control villages were selected in one area (Lasraganj, Khoira, Patgram) under Manikgonj district. To determine the women empowerment status of the ever-married women in rural Bangladesh through indexing technique and to make out the covariates of the women empowerment by Tobit regression model an effort has been made in this chapter. The aim of doing so is to discover the impact of the mobile phone on woman empowerment. In this part of the investigation, the number of ever-married women respondents was 86. Therefore, the analysis has been performed on the data and information collected from 187 (139 from cases and 48 from controls) ever-married women respondents. Multiple tools of methodology have been used in this study. Various techniques (both quantitative and qualitative) were employed to explore the situation of mobile phone user in rural areas of Bangladesh. Sampling and case study method have been pursued to collect data from the field. The advanced research monograph has used a purposive sampling. In consonance with the conceptual framework an in-depth interview schedule was constructed to collect the data from the primary sources. Data analysis has been performed with the help of Statistical Package for the Social Sciences (SPSS) 20.0 version. In some cases, Microsoft Excel 2007 has been used. Finally, 1030 variables were entered in SPSS for analysis. The study has used several statistical tools and techniques, both descriptive and inferential to have the data analyzed.

To determine the women empowerment status of the ever-married women in rural Bangladesh through indexing technique and to make out the covariates of the women empowerment by Tobit regression model an effort has been made in this chapter. The aim of doing so is to discover the impact of the mobile phone on woman empowerment. In this part of the investigation, the number of ever-married women respondents was 86. Therefore, the analysis has been performed on the data and information collected from 187 (139 from cases and 48 from controls) ever-married women respondents.

#### 4. Construction of Woman Empowerment Index (WEI)

To evaluate the perception-based intangible things - such as women empowerment and indexing - is the influential method. Women empowerment on rural married women of Bangladesh has been presented by six broad dimensions such as household decision making, household economic decision making, physical movement exposure to mass media, women attitude toward wife beating, other relevant situations in terms of traditionally social fabric, structure, and reality although they do not lead to the same number of indicators and weight. These six dimensional factors of woman empowerment entail different number of indicators and different weights.

The first, second, and the 3<sup>rd</sup> dimensional factors consist of four indicators. Each of the indicators functions as a Likert-type item on the Likert scale. Therefore, in total 12 Likert-type

items in the first section, 9 Likert-type items in the second section, 4 in the third section, 5 in the fourth section have been measured to make the WEI. 46% weight is allocated to the factor of household economic decision making, the factor of physical movement and the factor of household decision making in agreement with the importance of the dimensional factor on woman empowerment, very logically while only 12% weight is allocated to the factor of exposure to mass media. 15% weight is assigned to the factor of women attitude toward wife beating. 27% weight is assigned to the factor of others. The logic lying with the assignment of different weights to the respective factor is obvious.

As the women are the most powerful in the household economic decision making and vice versa, the first section holds the highest score. As money is the most powerful tool which has a great effect on the human life, household economic decision-making power is the center of everything in the family. The next important factor is physical movement. If the women can go outside liberally, they will be more powerful in the household. The third important factor is decision making. The indicators of the 2<sup>nd</sup> dimensional factor of household decision making have been exposed by performance of responsibilities in terms of the natural division of labor which women take successfully. The second highest weight should be given to the questions which were asked to the respondents about the age of their marriage, having account, control over assets, law and security related to them, etc. Some women state that husband is right in hitting or beating for the five reasons such as argues with him, refuses to have sex, burns the food, goes out without telling him or when she neglects the children. As a result, the third highest weight should be given to this section. At last, one of the most important sources of information and exposure to new ideas, alternative role models, and non-kin based power structure is the mass media. Similar to education and health, media is another source of empowerment. At last, it has become the least weight powerful section. Therefore, the weights have been given here consequently and very logically.

Table 1 represents all of the indicators in terms of Likert-type items against the corresponding dimension including the codes of potential responses and the value for each perceived response. Each score is given weight in 100, for example: For each decision making (item-1). We assign a weight of 4 out of 100; its weight will be = 4/100 = 0.04. Each score will be weighted by its weight. Hence, the composite index will be

$$\text{Score 1} \times 0.04 + \text{Score 2} \times 0.04 + \dots + \text{Score 5} \times 0.4 \text{ etc.}$$

Let us consider that score are  $x_1, x_2, \dots, x_n$  then

$$W_1x_1 + W_2x_2 + \dots + W_nx_n \\ = \sum W_i x_i$$

Each respondent will have one composite index.

Codes for Section - 10A (as per questionnaire Section 10A.1.2).  
 Indicators of household decision and economic decision making including the 1<sup>st</sup> indicator of the 3<sup>rd</sup> dimensional factor: 1=Respondent alone, 2=respondent and spouse, 3=respondent and other person, 4=spouse alone, 5=someone else, 6=decision not made/not applicable.  
 Codes for the past three indicators of physical movement (as per questionnaire 10A.3): 1=Yes, alone, 2=yes with children, 3=yes, with other person/relatives, 4=no.  
 Codes for the section - as per questionnaire 10. B.C. section - 11: 1=Yes, 2=no.  
 Values arbitrarily given against the selected codes for perceived and documented responses to the Likert-type items of the first and the 2<sup>nd</sup> dimensional factors including the first Likert-type item of the 3<sup>rd</sup> dimensional factor on a four-point Likert interval scale: 4 for code-4; 3 for code-2; 2 for code-1 and 1 for code 3; 0 for codes 5 and 6. Regarding the rest three Likert-type items of the 3<sup>rd</sup> dimensional factor, values have been put as 5 for code-1; 3 for code-3; 2 for code-2 and 0 for code-4.  
 Regarding the rest three Likert-type items of the 3<sup>rd</sup> dimensional factor, values have been put as 3 for code-1; 2 for code-2; 1 for code-3 and 0 for code-4.  
 Regarding the rest three Likert-type items values have been put as yes for 1, no for 0.

**Table 1: Different indicators of women empowerment**

Indicators	Weight
Goes for shopping or exercising voting right	0.04
Goes outside of the village/town/city	0.04
Goes to a health center or hospital	0.04
Final say on visits to other families or relatives	0.04
Decision on family planning	0.04
Final say on food to be cooked each day	0.04
Final say on child health care	0.03
Final say on own health care	0.03
Final management/livestock/poultry farm	0.04
Final say on household purchases of daily needs	0.04
Final say on large scale household purchases	0.04
Decide how to spend money	0.04
Socio economic position improve due to mobile business	0.04
Exercising voting right	0.04
Feeling after starting mobile business	0.04
Having bank account	0.04
Financial support from parents or guardians in cash or kind	0.04
Have access to and control over assets	0.04
Age at marriage	0.04
Satisfactory law and order situation of security enough for physical movement	0.04
Number of children	0.04
Read newspaper everyday	0.04
Listen to radio everyday	0.04
Watch TV everyday	0.04
Knowledge about modern contraception	0.04
Opinion about wife beating is justified if she goes without telling husband	0.04
Opinion wife beating is justified if she argues husband	0.04
Opinion wife beating is justified if she neglects children	0.04
Opinion wife beating is justified if she refuses to have sex	0.04
Opinion wife beating is justified if burns the food	0.04

In brief, the following steps have been taken to construct the WEI:

1. Three broad dimensions have been considered for assessing the woman empowerment in six broad dimensions: (1) Household decision making, (2) household economic decision making and (3) physical movement (4) exposure to mass media (5) women attitude toward wife beating (6) other relevants though they do not entail the same number of indicators and weight first section has four indicators, respectively, where each indicator is considered as a Likert-type item.
2. The probable responses against each of the Likert-type items or indicators of the first 2 dimensional factors and the first indicator of the 3<sup>rd</sup> dimensional factor were coded on a six-point Likert ordinal scale ranging from 1 to 6; 1 for respondent alone, 2 for respondent and spouse, 3 for respondent and other person, 4 for spouse alone, 5 for someone else, and 6 for decision not made/not applicable. On the other hand, the responses against each of the rest three indicators of the 3<sup>rd</sup> dimension were coded on a four-point Likert

ordinal scale ranging from 1 to 4; 1 for yes, alone; 2 for yes, with children; 3 for yes, with other person/relatives; 4 for no. Codes for the section- 2, 3, 4: 1 = Yes, 2 = no.

3. Values arbitrarily given against the selected codes for perceived and documented responses to the Likert-type items of the first and the 2<sup>nd</sup> dimensional factors including the first Likert-type item of the 3<sup>rd</sup> dimensional factor on a four-point Likert interval scale: 4 for code-1; 2 for code-2; 4 for code-3 and 1 for 0 codes-5 and 6. Regarding the rest three Likert-type items of the 3<sup>rd</sup> dimensional factor, values have been put as 5 for code-1; 3 for code-3; 2 for code-2 and 0 for code-4.  
Regarding the rest three Likert-type items values have been put as yes for 1, no for 0.
4. Responses from 187 respondents (ever married women, one from each household) were collected and properly documented for all the Likert-type items.
5. The documented responses for the Likert-type items of the 1<sup>st</sup> dimensional factor includes four indicators, the second one includes four indicators and the third one also includes four indicators. Each of the indicators functions as a Likert-type item on the Likert scale. Therefore, in total 12 Likert-type items in the first section, 9 Likert-type items in the second section, 4 Likert-type items first 2 dimensional factors along with the first indicator of the 3<sup>rd</sup> dimensional factor were given values on a four-point Likert interval scale.
6. The values were summed up for each case and for each dimension to have a summative Likert score.
7. Ultimately, a composite weighted WEI has been constructed where the weights are considered 46% weight is assigned to the factor of household economic decision making, the factor of physical movement and the factor of household decision making. 12% weight is assigned to the factor of exposure to mass media. 15% weight is assigned to the factor of women attitude toward wife beating. 27% weight is assigned to the factor of others as 47% for.
8. Finally, the mean WEI has been estimated at 0.44-2.04 for the ever married women in rural Bangladesh where the overall value of WEI ranges from 0 to 5.

The estimated mean value of the WEI clearly reveals a very considerable level of woman empowerment status of the ever-married women in rural Bangladesh on an average.

## 5. Relationship between Mobile Phone and Woman Empowerment

The rural settings, women are supposed to be soft and doing household works. Women are also engaged in farming in the courtyard and in field, but their labor is not taken valued by family or society as economic inputs. There is one typical aspect for women: They go for shopping, selling their farm produces. This also not a new idea for women to earn some money, rather women were engaged in works such as sewing and weaving. Staying right in house and finishing all household works. But in our study, production tax credits (PTC) run by the women obviously a new concept.

The women are paid by the villagers for giving communication services to the villagers. The choices and views of women are valued by the head of the family for this situation.

Women can share their views about making money in their family which has been stated by several women. Nowadays, awareness has been created among women that they can join in making money by working at some commercial sectors in their leisure time including playing their traditional family role in household activities. A study named "Mobile and Women: A Global Opportunity" done by the Cherie Blair Foundation for Women, and the GSMA states that to decrease poverty and empower women, ICTs especially mobile phones contribute a lot. The women give the money to their family which they get. That is why, they are regarded as earning members in their family as well. The choices and views of women are valued by the head of the family for this situation. Women can share their views about making money in their family which has been stated by several women. An important factor of women's decision-making capacity is the family. The women can enhance their income and

decision-making power by the use of mobile technology. The women have become self-conscious for the mobile phones. Finally, because of getting opportunities for making money, women are considered similarly as the male members in their family. Researchers have found that now the women go to the marketplaces and communicate with the people more. The women have acknowledged in the program intervention that they go outside of their house frequently and communicate with other people powerfully.

The family members of the women have received their contribution warmly which they get from their business or work. The choices of women in terms of purchasing lands, properties or other family accessories have been given more importance by the head of their family as they take part in money making for their family. The better and more satisfactory decisions will be taken if the decision-making process is cooperative. The women are regarded as decision makers of the family which have been created by the money making opportunities of them.

On the whole, it is remarkable that by calculating the amount of savings the women make and the amount of money they use up for personal expenses, income has been calculated quantitatively. This has been a trend for a long time. This measurement depends on the women decision-making capacity. The women are bound to ask and seek advice from their husbands about their needs if they do not earn money.

On the contrary, the women can avail freedom of choices in certain levels such as visiting places, organizations or institutions, communicating with the people related to their work or business and buy some entertaining amenities by themselves because of their income earning opportunities. Moreover, the involvement of women with the society has been increased by this opportunity. In general, the rural women are involved with many ritual feasts or ceremonies. Normally, the women participate in the conversations related to education and health. In terms of health and hygiene and the places or centers where they walk off for their health problems, at present the women are more conscious about themselves and their family members. Furthermore, to set up and to carry on their business properly, they open accounts to save money. In accordance of savings and loan support, a lot of women have been involved with social groups and cooperatives.

The women share their personal, family and social matters among themselves through these savings and cooperative groups. In addition, the women give a negative impression about wife beating when they argue with their husbands, neglect children, refuse to have sex and burn food. In case of making money, the involvement of women in working sectors has been treated positively by the society. Now the society is persuaded that the women can work outside of their house for making money by managing household works. Hence, a notable source of revenue to uphold them in the society is the women empowerment.

Through Tobit regression analysis, the following section deals with the proposition that the mobile phone makes the married rural women powerful.

## 6. Predictors of Woman Empowerment

For making out the determinants of woman empowerment resorting to very simple methodologies, a lot of studies has been done in the past. The statistical footing of those methodologies was not so strong. In terms of statistical footing, very strong inferential and multivariate methods have been used in this study for discovering the predictors of woman empowerment named Tobit model.

The following covariates have been measured in the models.

Access to mobile phone, sex of the respondent, occupational status and educational level of the women, gross of income, the current age and the marriage age of the women, money deposit, as well as amount of debt are the examples of these covariates.

## 7. Identification of the Predictor of Overall Women Empowerment through Tobit Regression Analysis

The Tobit model is based on the following latent variable model:

$$Y^* = \beta X_1 + U$$

Where  $X$  is a  $k$ -vector of regressors, possibly including 1 for the intercept, and the error term  $U$  is  $N(0, \sigma^2)$  distributed, conditionally on  $X$ .

The latent variable  $Y^*$  is only observed if  $Y^* > 0$ . In particular, the actual dependent variable is:

$$Y = \max(0, Y^*)$$

In terms of estimating the WEI value, Tobit regression model has been applied to assess the effect of the above-mentioned variables of empowerment on rural married Bangladeshi women. The dependent or response variable is WEI value which is a composite index between 0.44 and 2.04. This model is for metric dependent variable women index and when it is “limited” in the sense, we observe it only if it is above or below some cutoff level. Alike probit model, it is a nonlinear model as well. It is calculated through maximum likelihood estimation techniques.

Dependent variable WEI does not take only two values (a dichotomous variable), denoting an event or non-event and coded as 1 and 0, respectively.

The Tobit model is a special case of a censored regression model; censoring can be from below or from above because the latent variable cannot always be observed while the independent variable  $x_i$  is observable. A common variation of the Tobit model is censoring at a value  $y_L$  different from zero:

$$y_i = \begin{cases} y_i^* & \text{if } y_i^* > y_L \\ y_L & \text{if } y_i^* \leq y_L \end{cases}$$

Tobit regression analysis

Dependent variable: WEI

LR  $\chi^2(9) = 11.62$

$P > \chi^2 = 0.2358$

Log likelihood = 98.737044

Pseudo  $R^2 = 0.4625$

The final log likelihood (98.737044) is shown at the top of the output; it can be used in comparisons of nested models, but we won't show an example of that here.

The likelihood ratio chi-square of 98.737044 ( $df = 9$ ) with a P-value of 0.0001 tells us that our model as a whole fits significantly better than an empty model (i.e. a model with no predictors).

## 8. Description of the Variables

### 8.1. Age of the respondent

It's a continuous numeric variable. This study has considered the interviewee who belonged to age ranging from 15 to 65 years.

### 8.2. Sex of the respondent

It's a categorical variable. In this study, code 1 has been used for female and 0 for male interviewees.

### 8.3. Gross income

This continuous variable measured in taka earned from their primary and secondary sources of income. For the PTC owner, primary sources of income came from their business. The phone user's and non-phone user's primary sources of income came from agricultural sector. Total income from different sources within 1 year is considered as family income, though gross monthly income is calculated for the analysis. If a family has more than one earners, earnings by all were included as income.

### 8.4. Education

Education was measured in terms of years a farmer spent in school. Only the interviewee's years of education have been considered as the variable. The study used numeric value for this variable: “Ability

of the household to maintain.” Education expenditure of the children is included as the variable of the study in the value such as code 0 for illiterate, 1 for up to primary level, 2 for up to Class VIII, 3 for SSC, 4 for HSC, and 5 for above HSC.

### 8.5. Occupation

It’s again a categorical variable. This study has used numeric value such as code 2 for business, 1 for agricultural sector, and 0 for no occupation.

### 8.6. Age at marriage of the respondent

It’s a continuous numeric variable. This study has considered the interviewee who belonged to age ranging from 18 to 50 years.

### 8.7. Phone status

It’s a categorical variable. For this variable, this study used numeric value such as code 1 for phone user and 0 for non-phone user.

### 8.8. Bank deposit

Amount of deposit money in the bank is a continuous variable which has numeric value expressed in Taka.

### 8.9. Amount of credit

Amount of debt/credit is a continuous variable which has numeric value expressed in taka. Access to credit is defined considering the sample household to have received loan from microfinance institutes in their area or through having membership with particular organization. Some control group members are receiving loan from different sources not defined as microfinance but it has been used for comparative analysis (Table 2).

## 9. Discussion of the Empirical Findings from the Tobit Regression Model

The findings of the Tobit regression model analysis reveal that age of the respondents, bank deposit (current), sex of the respondents, principal occupation (current), education level (current), gross

**Table 2: Factors influencing of women empowerment index**

Variables	Coefficient	SE	t	P>t
Age	0.018382	0.007260	2.531956	0.012188**
Sex	0.051302	0.021814	2.351814	0.019751**
Education	0.042180	0.013533	3.116918	0.002124***
Occupation (current)	0.026388	0.012456	2.118548	0.035486**
Gross income	0.008412	0.002860	2.941224	0.003694***
Phone user	0.003116	0.001086	2.870121	0.004589***
Age at marriage	0.014976	0.008047	1.861034	0.064352*
Money deposit	0.006930	0.002641	2.624006	0.009428***
Debt	0.000612	0.000412	1.486549	0.138864
Constant	1.420118	0.456077	3.113766	0.002146

\*\*\*Denotes significance at <1% level on a two tailed test, \*\*denotes significance at <5% level on a two tailed test, \*denotes significance at <10% level on a two tailed test. SE: Standard error

income, and phone status are the statistically significant determinants of WEI at micro level in rural Bangladesh. The impacts of these determinants are separately discussed below.

### **9.1. Age of the respondents**

Age of the respondent could be an important factor in determining household income. It is explored as hypothesized that age of the respondents has a highly significantly positive impact on women empowerment in rural Bangladesh population. It happens because the experience of the household head contributes in organizing coordinating productive activities which lead higher WEI. This variable facilitates the women to be highly empowered providing them opportunities to exercise power. The female family members can also obtain experience knowledge, direction, and skills which in turn, augmenting women empowerment.

### **9.2. Sex of the respondent**

The sex of the respondent has a positive impact on household women empowerment. This variable for female workers is statistically significant at <5% level on a two-tailed t-test. The significance of this variable means that female worker positively contributes to women empowerment. The estimated value of the regression coefficient pertaining to this variable reveals that a unit increase in this variable brings about 0.051 unit increase holding other independent variables constant in WEI.

### **9.3. Principal occupation**

Very naturally, occupation puts a significant impact on women empowerment. The findings of the analysis strongly support this hypothesis. Access to mobile phone is likely to enable the female households to diversify their employment opportunity. The estimated value of the regression coefficient pertaining to this variable reveals that a unit increase in this variable brings about 0.035 unit increase in women empowerment.

### **9.4. Education level**

The educational background of the respondent ensures a positive impact on household women empowerment. Education helps respondent to be skilled and knowledgeable in various arena. Educated person knows how to manage the household which makes them dependable for other household members. It also privileges her for employment in economic activities which directly increase women empowerment. The finding of the study strongly supports this hypothesis. This study that household education level puts a highly significant impact on household current income is estimated at 0.042 implying that with one unit increase of education level, women empowerment increases by 0.042.

### **9.5. Phone status**

It is explored as hypothesized that access to the mobile phone has a highly significantly positive impact on woman high empowerment in rural Bangladesh. Here, access to the mobile phone is the target variable. The households of female PTC owner and phone users had got more income compared to their non-phone counterparts. The estimated value of the regression coefficient pertaining to this variable reveals that a unit increase in this variable brings about 0.003 unit leads to high empowerment. Female respondent starts private mobile phone for selling airtime and other services to earn money. It can provide information which leads income generation. The reasoning here is that access to mobile create almost all the opportunities for the women and make them to avail themselves of these opportunities to exercise empowerment through all the dimensions and channels of woman empowerment.

### **9.6. Household gross income**

Naturally, income plays a key role in empowering women through accessing mobile phone. It is hypothesized that income puts significantly positive impact on woman high empowerment. The

empirical finding in this study strongly corroborates it since the estimate value reveals that the women who have income source are more likely to be highly empowered than the women who does not have income source in the study population. It happened because women were able to increase their income level after joining into the phone business by expanding economic activities, gaining various information.

### 9.7. Age at marriage

Age at marriage also plays an important role on woman empowerment. It's a driving force on the WEI value. It estimates that the women of age at marriage above 18 years are more likely to be highly empowered than their counterparts having  $\leq 18$  years of age at marriage. It happens, may be, a number of social and economic disadvantages are associated with early marriage. For example, girls who marry early typically have lower levels of educational attainment, limited or even absent peer networks, restricted mobility and less access to mass media than boys, unmarried girls or married adult women.

### 9.8. Self-fund (current)

As per the theory, household self-fund exerts positive impact on woman high empowerment. Since the higher the amount of self-fund, the higher would be the income level by investing them in business. Corroborating the theory, it is found out in this study that household current self-fund puts a highly significant impact on household current income. The estimated value of the regression coefficient pertaining to this variable reveals that a unit increase in this variable brings about 0.006 unit increase in WEI. It shows that in respect of female the more deposit money in the bank the stronger participation in the household decision making and economic decision making.

### 9.9. Amount of debt

As per the theory, household amount of debt exerts a positive impact on woman high empowerment. Since the higher the amount of debt the higher would be the WEI level by investing them in business. In this study, this variable showed a negative impact on WEI.

Overall, the findings of the model as explained by the target variable clearly explore that access to mobile phone impacts highly significantly positively on high empowerment of ever-married rural women. Female workers found to be significantly contributing household income. The social context of Bangladesh the household head usually who takes decision about economic activities of the household. Here, we found opposite scenario.

## 10. Conclusion

Access to the mobile phone has impacted significantly high on empowerment of ever-married rural women. Women empowerment on rural married women of Bangladesh has been presented in the work by six broad dimensions such as household decision making, household economic decision making, physical movement exposure to mass media women attitude toward wife beating, other relevant situations in terms of traditionally social fabric, structure and reality although they do not lead to the same number of indicators and weight. These six dimensional factors of woman empowerment entail different number of indicators and different weights through using Likert-type scale for 30 indicators. Tobit regression model has been applied to assess the effect of the above-mentioned variables of empowerment on rural married Bangladeshi women. In Bangladesh where the overall value of WEI ranges between 0.044 and 2.04, the main effects of access to mobile phone, sex of the respondent, occupational status, level of education, gross income, phone status, current age of the women, age at marriage, money deposit, amount of debt on empowerment of ever-married rural women in Bangladesh are found to be highly significant. It is also explored as hypothesized that age of the respondents has a significantly high positive impact on women empowerment in rural Bangladesh population. Access to mobile phone is likely to enable the female households to diversify their employment opportunity.

Access to the mobile phone has impacted significantly high on empowerment of ever-married rural women. A unit increase in the variable “access to mobile telephone” brings about 0.003 unit leads to high empowerment. Access to mobile create almost all the opportunities for the women and make them to avail themselves of these opportunities to exercise empowerment through all the dimensions and channels of woman empowerment. It is vitally important for government to improve the capacity for rural women communities to utilize the mobile phones through provision of PTC at cheap call rates and enlighten on the benefits of using mobile phone financial facilities, research and development and women participation with a view to making the activities self-sustaining in the changing competitive environment. The study came to the conclusion that there is a positive impact of rural telecom on livelihoods. The most important point is for the government to harness ICTs opportunities to enable rural farmers to handle information provided to them. The government should ensure that sustainable development is achieved by building strategies that can easily transfer information helping improve the quality of the people’s livelihoods.

In addition, the extracted result would provoke the government for initiating public-private partnerships to reach the village poor with mobile phone heavily subsidized so that the people with comparatively low income could have easy access to communication device thus enhancing their living standard. The analytical model sketched in this study may be useful in justifying the extension of ICTs sectors in the rural areas being one of the first its kind in Bangladesh; the study has the potential to be the basis for future studies in the context of Bangladesh.

## References

- Adeoti, J., and Adeoti, A. (2008), Easing the burden of fixed telephone lines on small-scale entrepreneurs in Nigeria: GSM lines to the rescue. *Telematics and Informatics*, 25(1), 1-18.
- Akpan-Obong, P. (2010), Unintended outcomes in information and communication technology adoption: A micro-level analysis of usage in context. *Journal of Asian and African Studies*, 45(2), 181-195.
- Aminuzzaman, S.M. (2002), Cellular phones in rural Bangladesh: A study of the village pay phone of Grameen Bank. In: Goldstein, A., O’Connor, D., editors. *Electronic Commerce for Development*. Paris: OECD. p161-178.
- Barrage Project, . IWFWM, BUET, Dhaka, Bangladesh: IWFWM, BUET.
- Byes, A. (1999), Grameen Telecom’s Village Phone - Case Study: HYPERLINK . Available from: <http://www.telecommons.com/villagephone>.
- Bedi, A.S. (1999), The Role of Information and Communication Technologies in Economic Development: A Partial Survey. Discussion Paper on Development Policy.
- Canning, D., Pedroni, P. (1999), Infrastructure and Long Run Economic Growth. Available from: <http://www.arts.cornell.edu/econ/cae/infrastructure-7-99.pdf>.
- Donner, J. (2007), Customer acquisition among small and informal businesses in urban India: Comparing face-to-face and mediated channels. *The Electronic Journal on Information Systems in Developing Countries*, 32(3), 1-16.
- Duncombe, R., Heeks, R. (2001), Information and communication technologies and small enterprise in Africa: Lessons from Botswana. Manchester: Institute for Development Policy and Management, University of Manchester.
- Duncombe, R., Heeks, R. (2002), Information and Communication Technologies and Small Enterprise in Africa: Lessons from Botswana. UK: Institute for Development Policy and Management, University of Manchester.
- Falch, M., and Anyimadu, A. (2003), Tele-centres as a way of achieving universal access: The case of Ghana. *Telecommunications Policy*, 27(1-2), 21-39.
- Forestier, E., Grace, J., Kenny, C. (2002), Can information and communication technologies be pro-poor? *Telecommunications Policy*, 26(11), 623-646.
- Jagun, A., Heeks, R., Whalley, J. (2008), The impact of mobile telephony on developing country micro-enterprise: A Nigerian case study. *Information Technologies and International Development*, 4(4), 47-65.
- Mwesige, P.G. (2004), Cyber elites: A survey of Internet café users in Uganda. *Telematics and Informatics*, 21(1), 83-101.
- Overá, R. (2006), Networks, distance and trust: Telecommunications development and changing trading practices in Ghana. *World Development*, 34 (7), 1301-1315.
- Rahman, M. (2008), Impact of Climate Change on Command Area Development of Teesta.

- Röller, L., and Waverman, L. (2001), Telecommunications infrastructure and economic development: A simultaneous approach. *American Economic Review*, 91(4), 909-923.
- Saunders, R.J., Warford, J.J., Wellenius, B. (1994), *Telecommunications and Economic Development*. Baltimore: Johns Hopkins University Press.
- Samarajiva, R., & Zainudeen, A., (editors.). (2008). *ICT Infrastructure in Emerging Asia: Policy and Regulatory Roadblocks*. New Delhi: Sage.
- Souter, D., Scott, N., Garforth, C., Jain, R., Mascarenhas, O., McKemey, K. (2005), *The Economic Impact of Telecommunications on Rural Livelihoods and Poverty Reduction: A Study of Rural Communities in India (Gujarat), Mozambique and Tanzania*. Report of DFID KaR.
- Waverman, L., Meschi, M., Fuss M. (2005), *The Impact of Telecoms on Economic Growth in Developing Countries*. Vodafone Policy Paper Series
- World Bank. (2009a), *Information and Communication Technologies for Women's Socio- economic Empowerment*. World Bank Working Paper Series, June 30. Available from: <http://siteresources.worldbank.org/extinformationandcommunicationand>.