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Infrastructure and rural development: insights from a Grameen Bank village phone initiative in Bangladesh[☆]

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Abstract

The intention of the present paper is to evaluate the role of telecommunications within the contexts of rural development in general and of poverty reduction in particular. Bangladesh has been selected as a case study due to the uniqueness it displayed in an innovative program for expanded telecom infrastructure, in which Grameen Bank (GB) of Bangladesh, the village-based micro-finance organisation, leased cellular mobile phones to successful members. GB calls these phones village pay phones (VPPs). The effects of VPPs are assessed from two angles: sellers of services (telephone lessees/owners) and buyers of services (villagers). The findings of the study lead to two basic conclusions: first, pursuance of pragmatic policies can turn telephones into production goods, especially through lowering transaction costs, and second, the services originating from telephones in villages are likely to deliver (even) more benefits to the poor than to the non-poor. The VPPs also seem to have perceptible and positive effects on the empowerment and social status of phone-leasing women and their households. For villagers in general, phones offer additional non-economic benefits such as improved law enforcement, more rapid and effective communications during disasters, stronger kinship bonding, etc. GB's style of managing communications can help significantly to expand access to this vital information input for all segments of the population, reduce inequality and thus enhance the broad-based, pro-poor orientation of rural development activities. © 2001 Elsevier Science B.V. All rights reserved.

Keywords: Telecommunications technology; Microfinance; Grameen Bank; Rural development; Gender

One should hardly have to tell academicians that information is a valuable resource: knowledge is power. And yet it occupies a slum dwelling in the town of economics. Mostly, it is ignored...

Stigler (1961)

1. Introduction

In Bangladesh, as in many other countries of the developing world, the role of telecommunications in economic development does not seem to be duly appreciated. The telecom sector has received scant attention from policy makers, and the country has witnessed slow expansion of its network over the years. The country's present infrastructure is considered to be inadequate in scope, technology and the quality of services. A report produced jointly by World Bank and Bangladesh Center for Advanced Studies (BCAS) presented the limitations of telecom services in Bangladesh (World Bank and BCAS, 1998, pp. 55):

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- the telephone density of 0.39 lines per 100 people is one of the world's lowest (India: 1.0, Nepal: 0.5, Pakistan: 2.1, Sri Lanka: 1.0, Thailand: 2.5);
- the waiting time for a connection is more than 10 years and the installation charge of US\$ 450 for a new line is one of the highest in the world (e.g. Pakistan US\$ 90, India US\$ 60);
- the charge for calling the UK, US\$ 1.50/min, is about six times higher than the charge for calling Bangladesh from the UK;
- on average, only 2 of 10 calls are successfully completed; the complaint rate averages 50 complaints per 100 lines per year, clearly indicating the poor quality of services.

By and large, the present underdevelopment and poverty of Bangladesh — a country with a per capita income of US\$ 300 and half of its population living below the poverty line — is related to the underdevelopment of basic infrastructure, both physical and human. The vast majority of rural areas remain largely inaccessible and are consequently unable to take advantage of opportunities conducive to growth and development by, for example, the diffusion of modern technology, extension services, and rapid and effective measures for dealing with disasters such as floods. A number of studies have established a causal link between deficient infrastructure and the slow rate of development in rural areas of Bangladesh (e.g. Ahmed and Hossain, 1984, pp.121; Kessides, 1993, pp. 14–23).

Given this gloomy situation, the Grameen Bank (GB) of Bangladesh stepped into providing some solutions. The GB introduced cellular mobile phones in some rural areas — so-called village pay phones (VPPs) — to be operated under its micro-credit programs. The GB entered into the rural telecom sector based on the following basic premises. First, asymmetry in the realm of information is one of the principal causes of inequality, backwardness and poverty. The lack of access to information is a powerful factor tending to perpetuate poverty in rural areas. Second, telephone services can have a perceptible influence on production, marketing and other important economic decisions confronting rural households. Third, technology per se cannot be the solution to the problems of rural development and poverty reduction unless the issue of 'who controls the technology' can be resolved. Fourth, even if specific individuals are unable to buy

a phone, they should have access to phone service as and when they need it.

The following are the objectives of this paper:

- To ascertain how and to what extent VPPs can promote the socio-economic uplift of villagers, especially of the poor, by affecting socio-economic parameters which tend to constrain households.
- To evaluate the economic effects of cellular mobile phones at the household and village levels: at the household level, by estimating the net increase in income derived from selling phone services and determining how this increase affects household poverty and food consumption; at village levels, by estimating the consumer surplus (CS), marketing margins, changes in productivity levels (based on case studies).
- To assess specific social impacts. These include changes in the social equilibrium, empowerment of the disadvantaged, kinship networks and the law and order situation in the villages.
- To make suggestions regarding the design and formulation of public policies which are intended to ensure broader and better access to telecom services among the poor.

The paper is organised as follows: Section 2 outlines the data sources employed. Basic information on rural phone users are provided in Section 3, while the effects of phones are discussed in Section 4. Finally, policy conclusions are drawn in Section 5.

2. Research approach and data sources

To determine how VPPs affect rural development and poverty reduction, both owners (sellers of services) and users (buyers of services) were surveyed. The sample of phone owners consisted of 50 persons in 50 different villages located at distances of 40–50 km from metropolitan Dhaka. This sample constituted about 60% of all VPP owners at the time of the survey.¹ The owners were selected at random from a list provided by the GB Head Office, Dhaka. The sample of users of VPP services consisted of 400 individuals. This sample was drawn at random from

¹ By early 2001, 700–800 village pay phones were operating in Bangladesh.

lists provided by the phone owners, and accounts for 27% of all VPP users in the villages (excluding owner-users).

This study uses both primary and secondary data. The primary data were collected through a field survey conducted in the months of June through August 1998. Structured questionnaires were administered at both the household and village levels. Focus-group discussions were held, and GB branch managers and local people were requested to provide additional input regarding their impressions of the potential and actual effects of VPPs. Furthermore, case studies of these effects were developed, which required intensive analysis. For its secondary data, the study relies on various published and unpublished documents from the government of Bangladesh and GB.

3. Basic information on phone users

3.1. Economic status of users

The economic status of phone users is shown in Table 1. Using the FAO's definition of 'poor', as discussed at length in the original research report (Bayes et al., 1999), 15% of the phone users in the sample could be categorised as poor (extremely poor 5%, and moderately poor about 10%). The majority of the users — over four-fifths — fell into the non-poor group. Of the owner/users group, 14% were moderately poor and 86% were categorised as non-poor. Of the villagers, 6, 9 and about 85% fell into the extremely poor, moderately poor and non-poor groups, respectively.

3.2. Phone calls according to economic status

During the week preceding the survey, the phone users in the sample are reported to have made 1060

Table 2

Phone use according to economic status (number of calls, % in brackets)^a

Users	Economic status		Total
	Poor	Non-poor	
Owners	76 (45.0)	93 (55.0)	169 (100)
Villagers	192 (21.5)	699 (78.5)	891 (100)
Entire sample	268 (25.3)	792 (74.7)	1060 (100)

^a Source: JU/ZEF Field Survey, 1998.

phone calls (Table 2). The combined groups of the poor made 268 calls and, thus, accounted for one-fourth of all phone calls. On the other hand, the non-poor made 792 calls, which constituted about three-fourths of the total. Within the owner/user group, the share of calls made by the poor and the non-poor appear to be more or less evenly distributed (45 versus 55%), while among the villagers, most phone calls were found to have been made by non-poor households (roughly 78%). It is noteworthy that the intensity of use by the poor is 50% greater than by the non-poor.

3.3. Phone use according to gender

The gender distribution of phone callers is shown in Table 3. Among the owners of phones, 60% of users

Table 3

Phone use according to gender (numbers of calls, % in brackets)^a

Gender	Owners	Villagers	All
Male	68 (40)	623 (70)	691 (65)
Female	101 (60)	268 (30)	369 (35)
Total	169 (100)	891 (100)	1060 (100)

^a Source: information collected through additional telephone interviews, 1998.

Table 1

Economic status of phone users (% in brackets)^a

Economic status	Extremely poor ^b	Moderate poor ^c	Non-poor ^d	Total
Owners	—	7 (14.0)	43 (86.0)	50 (100)
Villagers (users)	22 (6.1)	33 (9.3)	301 (84.6)	356 (100)

^a Source: JU/ZEF Field Survey, 1998.

^b 1850 cal per capita.

^c 2122 cal per capita.

^d Above 2122 cal per capita.

were women and 40% men. Among the villagers, however, 30% of users were women and 70% men. For the sample as a whole, 65% of all calls are reported to have been made by men, and 35% by women. Thus, it appears that VPPs provide rural women with the opportunity to use this modern communications technology.

3.4. Mode of payment

On the institutional side, Grameen Tele Communication (GTC) is the service provider buying airtime in bulk from Grameen Phone Limited (GPL), the network operator. The GTC provides cellular mobile phones to GB members under a leasing arrangement. The price of a phone is provided by the GB, and members have to repay this sum through weekly instalments within the stipulated period of 2 or 3 years. The telephone costs 18,000 Tk., but with the interest that accrues, the sum to be repaid within 2 or 3 years totals 23,050 Tk. (1 US\$ = 40 Tk.). The weekly instalment ranges from 220 to 160 Tk., depending on whether the repayment period is 2 or 3 years. It was found that 45% of VPPs were operated by the owners themselves, while 50% were operated by the owner's husband, son or daughter, and the remaining 5% were operated by other persons.

3.5. Importance of phone calls

A breakdown of the phone calls according to their respective levels of importance is presented in Table 4.

Table 4

Phone calls according to degree of necessity (% of calls made)^a

Economic status	Degree of necessity			
	Important	Less important	No need	All
Extremely poor	88.9	11.1	–	100
Moderately poor	85.5	12.0	2.5	100
Non-poor	85.0	11.7	3.3	100
Entire sample	85.0	11.7	3.0	100

^a Source: JU/ZEF Field Survey, 1998.

It appears that 85% of the phone calls made by the sample users are 'important' calls. 'Less important' calls constitute about 12% and 'could be avoided' calls 3%. The last two types of calls are usually made by the moderately poor and non-poor groups. The extremely poor group seems to make no unnecessary calls, even though their share of 'less important calls' remains more or less the same as that of other groups.

3.6. Purposes of phone calls

Keeping in mind the problems of overlap, we have categorised the calls into several groups: Economic; Health (emergency and advice); Social/Personal (family- and office-related); Remittances; and other (Table 5). The poor and non-poor groups accounted for more or less the same proportion of economic/finance-related calls (45.9 and 46.9%, respectively). Within the composite poor group, however, the extremely poor seem to use phones chiefly

Table 5

Purposes of phone calls made by users (number of calls, % in brackets)^a

Purposes	Economic status			
	Extremely poor	Moderately poor	All poor	All non-poor
Market prices of commodities	2 (2.4)	3 (4.8)	5 (3.4)	50 (5.5)
Employment opportunities	13 (15.7)	4 (6.4)	17 (11.6)	50 (5.5)
Land transactions	11 (13.2)	14 (22.2)	25 (17.1)	65 (7.1)
Business-related	5 (6.0)	13 (20.5)	18 (12.4)	231 (25.3)
Remittance	2 (2.5)	–	2 (1.4)	33 (3.5)
All economic/finance	33 (39.8)	34 (53.9)	67 (45.9)	429 (46.9)
Family/personal	30 (36.1)	16 (25.4)	46 (31.5)	323 (35.3)
Health-related	15 (18.1)	11 (17.5)	26 (17.8)	94 (10.3)
Other	5 (6.0)	2 (3.2)	7 (4.8)	68 (7.5)
Total	83 (100)	63 (100)	146 (100)	914 (100)

^a Source: JU/ZEF Field Survey, 1998.

for economic purposes, making 33.9% of all their calls with these purposes in mind. The poor group also makes relatively more phone calls for health-related purposes than the non-poor group (17.8 and 10.3%, respectively).

The non-poor group, on the other hand, makes relatively more phone calls for family/personal considerations (35 versus 32%), remittances (4 versus 1%) and business-related purposes (25 versus 12%). That the non-poor devote more of their calls to business-related purposes is not surprising, given the fact that most of the business activities in rural areas are carried out by persons falling into the non-poor group. However, even the extremely poor group indicates that about 21% of their calls are made for business-related purposes. This goes to show that even the poorest, who are involved in petty production of eggs, vegetables, puffed rice, poultry rearing, etc. make phone calls in order to keep informed about the business environment. The lion's share of the phone calls made by the poor group deal with economic and health considerations.

4. The effects of village pay phones

4.1. Economic effects

4.1.1. Net profit of VPP owners

As was explained above, the GB leased phones to its most successful members in the target villages. The objective was to supplement household income, rather than replace it (at least over the short term). As is the case with other business activities, the net profit achieved on telephone services equals total receipts/revenues from sales minus total costs incurred to realise these sales. To calculate the net profit earned from selling phone services, the following formula was used:

$$NP_i = (\alpha_1 \times TM_{li} + \alpha_2 \times TM_{ni} + \alpha_3 \times TM_{ji} + T_{wi}) - (I_{wi}) + OC_i + O_i$$

where NP_i is the net profit (Tk. per week) on phone services sold by household i , TM_l the total minutes of local calls per week, α_1 the returns on local calls (2.4 Tk./min), TM_{ni} the total minutes of NWD calls per week, α_2 the returns on NWD calls (5 Tk./min),

Table 6

Net profits from selling phone services (number of owners, % in brackets)^a

Net profit (Tk. per week)	Number of owners (%)
<100	8 (16)
101–300	17 (34)
301–500	20 (40)
501–1000	5 (10)
Total	50 (100)

^a Source: JU/ZEF Field Survey, 1998.

TM_{ji} the total minutes of ISD calls per week, α_3 the returns on ISD calls (7 Tk./min), T_{wi} the total tips received (Tk. per week), I_{wi} the instalment paid for the phone (Tk. per week), OC_i the opportunity costs of the operator's time (Tk. per week), and O_i is the other costs, e.g. line rent (Tk. per week).

Statistics on net profits are presented in Table 6. The VPP owners earn an average net profit of 277 Tk. per week. The profit level ranges from as high as 683 Tk. per week to as low as –35 Tk. per week. The profits accruing from phone services constitute from about one-fifth to one-fourth of the total income of the sample households. Half of the sample owners reap a net profit of >300 Tk. per week, and one-tenth earn >500 Tk. per week. However, the net profits of 16% of the sample phone owners fell <100 Tk. per week.

4.1.2. Alternative means of communication

Respondents were also asked the following question: "how would you satisfy the need for current calls had there been no VPP in your village?" the responses made by three different income groups are presented in Table 7. The most frequently mentioned alternative is that one would either go, or hire a person to go to the place concerned. The range of options across income groups is worth mentioning. Among the extremely poor group, 68% would have required physical mobility (involving time and transport). In the moderately poor and non-poor groups, the corresponding figures were 56 and 47%, respectively. In other words, if no VPPs had been available, the poor would have required greater additional physical mobility than the non-poor. Just the opposite, however, is the case when other sources of telephone service are used. The non-poor would have used relatively more of that service than the poor. By and large, it seems that the

Table 7
Communication alternatives to VPPs (% of respondents)^a

Alternatives	Economic status		
	Extremely poor	Moderately poor	Non-poor
Would not try	–	–	2.3
Telephone from other phone	26.5	36.5	43.0
Post office	5.9	7.1	6.8
Have to go/Hire person to go	67.6	56.4	47.3
Other	–	–	0.6
Total	100	100	100

^a Source: JU/ZEF Field Survey, 1998.

absence of VPPs would inflict relatively higher transaction costs for communications on the poor.

4.1.3. Consumer surplus

An estimate of the CS yielded by VPPs is presented in Table 8. The CS is defined as the difference between the price consumers actually pay and the price they would be willing to pay for a particular communication. For the purposes of the present study, CS is defined as the price users would have paid for an alternative mode of communication, minus the price they actually paid for the phone service. Thus, the surplus estimated could also be considered as the consumer's real income benefits arising out of being able to make a phone call. The calculation of the CS is based on the following assumptions:

- Time and road-transport costs are included for the potential or possible alternative means of communication. For example, we asked the respondents how much they would have to pay in time and transport

costs if their only communication alternative was road transport.

- The opportunity costs of the time spent were calculated on the basis of prevailing rural wage rates. A uniform wage rate was used for both the poor and the non-poor groups as the non-poor group may have the choice of employing wage labour to acquire information at the poor group's wage rate, rather than at their own higher reservation wage.
- The actual cost to phone users amounted to the price they paid at the time of receiving the services.

From the data in Table 8, it can be seen that the availability of VPPs provides average users in all income strata with a fair amount of CS. For example, while the cost of alternate communication is 71.58 Tk., using VPP's costs only 16.82 Tk., yielding a surplus of 54.77 Tk. per call or 165 Tk. per user per week (assuming three phone calls a week). This compares with household income of 1500 Tk. per week. In other words, the surplus so created amounted to 11% of the household income of families with telephone users. The most important observation to be made in Table 8 is, however, that the CS of the poor, at 77.86 Tk., is 50% higher than that of the non-poor. This amount of CS, if converted at present rural prices, could purchase 12 kg of coarse rice. Furthermore, the moderately poor gain a CS of 91.64 Tk., followed by the extremely poor (61.30 Tk.). The non-poor (50.78 Tk.) extract the lowest amount of CS. That the poor would reap the maximum CS following the advent of VPPs is apparent. The poor usually do not have much in the way of alternatives to communicate with the outside world, neither relatives to help with a phone call, nor relatives to provide a ride to the destination. For the poor, the advent of VPPs

Table 8
Estimates of consumer surplus (Tk. per phone call)^a

Economic status	Hours required by alternative methods	Transport costs entailed in alternative methods	Opportunity costs of time required for alternative methods	Total costs of alternative methods	Total costs of village pay phones	Consumer surplus/phone call
Extremely poor	3.08	54.97	26.41	81.38	20.08	61.30
Moderately poor	4.15	65.82	40.89	106.71	15.07	91.64
All poor	3.67	60.89	34.32	95.21	17.35	77.86
Non poor	2.54	45.80	21.71	67.51	16.73	50.78
Entire sample	2.70	48.02	23.57	71.58	16.82	54.77

^a Source: calculated from JU/ZEF Field Survey Data.

opened up a lower-cost alternative for exchanging information.

4.1.4. *Prices of products and input supplies*

One of the important effects of VPPs may be that they help avert sharp swings in demand, supply and the prices of commodities. The proponents of VPPs hypothesise that the dissemination of market information to remote villages would help raise farm output prices and lower farm input prices through the mechanism of information diffusion. Admittedly, differences that could be discerned (either moderating prices or smoothing supply) might be attributable not only to telephones, but to a variety of other factors such as roads, mass media, etc. The related ‘perceptions’ of the local people regarding the utility of the services were considered to be of value for this research. Similarly, attempts were made to determine what views were held in control villages. A summary of the economic and non-economic benefits, as perceived by the villagers, is presented in Table 9. The average prices of agricultural commodities (especially of paddy and eggs) were higher in target villages (with phones) than in control villages (without phones).

For example, farmers in the target villages received 70–75% of the paddy prices paid by final consumers, as opposed to 65–70% in control villages. The argument that market efficiency is improved is highlighted by one example in particular: the price of eggs in target villages was reported to be 13 Tk. per hali during the period of the survey, compared to 12 Tk. per hali in control villages. Likewise, vegetable growers in a target village informed us that VPPs helped them by providing them with easy and instant access to the prevailing market demand and supply situation and, thus, aided them in making appropriate production decisions. Besides, they argued, VPPs have reduced the role of middlemen who often used to deceive them in the absence of market information.

The supply of agricultural inputs such as diesel and fertiliser is reported to be smoother and more stable in target villages than in control villages. According to dealers who do business with these inputs, VPPs have made it possible to develop an impression of the supply situation throughout the year, making it possible to guard against unforeseen contingencies. On the other hand, the lack of such communication facilities in control villages has been reported to promote occasional shortages and price hikes, adding to

Table 9
Assessment of selected benefits^a

Variable	Target villages (<i>N</i> = 50, averages)	Control villages (<i>N</i> = 10, averages)
Prices		
Paddy (% of final consumer prices)	70–75	65–70
Eggs (Tk. per hali; hali = 4)	13	12
Exchange rate (Tk. per Ryal)	12.50	11.50
Cost of information/knowledge (Tk.)	17	72
Chickens/ducks	Higher	Lower
Chick feeds	Lower	Higher
Supply of inputs		
Diesel	Stable	Fluctuating at times
Fertiliser	Regular	Occasional problems
Others		
Poultry mortality rate	Lower	Higher
Law and order situation	Improved	Same
Communication during disasters	Quick, effective	Slow, less effective
Communication with relatives	Anywhere, any time/day	Anywhere, but fixed time/day
Transmission of new ideas	Improved	Same
Mobility of people	Higher	Lower
Spoilage of perishable products	Less	More
Access to health-care services	Faster/effective	Slower/less effective

^a Source: case studies and discussions with villagers during JU/ZEF Field Survey, 1998.

producers' cash burden at the margin. Another example involves market transparency regarding the rate of exchange between Taka and Saudi Ryal at the village level. The VPPs are also reported to have increased the productivity, capacity utilisation and profitability of small livestock and poultry enterprises by (a) facilitating the regular and easy delivery of inputs at lower cost, (b) disseminating market prices for produce and, thus, helping to ensure payment of a fair price and (c) reducing the scope of the risks associated with such business.

4.2. Poverty and food situation effects

The phone-owning households were asked questions such as: "in how many months of the year were your household members able to eat well before you entered the phone business, and in how many months of the year can they eat well now?" the difference between the number of months 'before' and the number of months 'after' was taken as a proxy variable for the change in food consumption. Since the inquiry involved the situations before and after the households had entered the phone services business, interpretation of the responses hinges on the *ceteris paribus* assumption. In order to assess this fully, however, further research on consumption effects is needed.

Table 10 indicates that none of the households reported any deterioration in the situation during the relevant periods, although 14% reported the same situation as before. One-fourth of the respondents

reported that their food situation had improved by 3 months (i.e. these households reported that they can now 'eat well' in three more months than they could earlier), and one-fifth of the households responded that their food situation had improved by >3 months. In all, 86% of the phone-owning households reported that their food situation had improved.

4.2.1. Dealing with disasters

One major benefit of VPPs was seen in July–September 1998, when Bangladesh was hit by the worst flood in modern history and two-thirds of the country's area remained submerged for >2 months. People and transport began to get stuck en route. When people got stuck in or near target villages, mobile phones proved to be invaluable for sending messages to worried relatives or informing employers or calling relief agencies. During field visits that took place after the floodwater receded, it was learned that bills for VPPs rose during the flood months to substantially higher averages than in earlier months due to the increased demand for phone services. GB officials confirmed this phenomena. On the other hand, local government officials informed us that the availability of VPPs enabled them to take stock of the situation quickly during the flood.

4.3. Socio-cultural effects

4.3.1. Law and order situation

In a few of the sample villages, it was reported that the law and order situation had improved as a result of the availability of VPPs. In the event of any burglary or theft, villagers in target villages were able to inform law-enforcement agencies rapidly by phone. In addition, law enforcement agencies in the vicinity also reported that fast communication with target villages contributed to decreasing crimes rates.

4.3.2. Overseas communication

In almost all villages, a fairly large number of people are reported to be working abroad. Many of them belong to poor families who sold land and other assets to pay for their travel. The inhabitants of target villages informed us that communication with the outside world had become very fast and regular following the arrival of VPPs in villages.

Table 10
Change in the food-consumption situation of phone-owning families^a

Extent of change in months	Number of respondents	Total (%)	Cumulative (%)
0	7	14	14
1	4	8	22
3	12	24	78
4	3	6	89
5	2	4	88
6	3	6	94
7	2	4	98
10	1	2	100
Total	50	100	100

^a Source: JU/ZEF Field Survey, 1998.

4.3.3. Health

It was pointed out earlier that roughly one-tenth of all calls deal with health-related matters, especially among poor people. As a result of the availability of VPPs, villagers can now contact clinics, doctors or ambulances rapidly, even at night. This was not possible in the past. During discussions with focus groups and interactions with the local elite and social workers, it was revealed that the greatest benefit brought about by VPPs was the capability to call doctors and clinics rapidly. In a country where the infant mortality rate is 91 per 1000 live births and the maternal mortality rate is also very high, VPPs' contribution to saving lives can hardly be exaggerated.

4.3.4. Empowerment of women

Various studies in the context of micro-credit programs in Bangladesh argue that there have been substantial positive developments in the empowerment of women (e.g. Amin et al., 1998, pp. 36). Findings regarding empowerment are presented in Table 11. It may be observed that sample households' decision-making processes are dominated by joint decisions made by both the husband and the wife. That is, whenever household-level decisions have to be made in regard to family affairs, the utilisation of GB credit, or the spending of phone income, both members of the pair participate. For example, 72% of the respondents replied that the decisions on family affairs (e.g. schooling for children, the marriage of daughters or sons, etc.) are made by both partners on the basis of mutual consultation. The percentage is 60% when the utilisation of GB credit is at issue. When the issue involved is the spending of earnings from telephone services, however, 58% of the owners make joint decisions, while 36% decide entirely on their own. In other words, sample women appear to have greater latitude in deciding how to spend phone

income than is the case when the other two issues are involved. For example, 36% of the respondents decide entirely on their own where and how to spend phone profits, compared to 16 and 30% for the other two cases, respectively. Chi-square test results indicate that these differences are statistically significant.

Another indicator of empowerment is the degree of mobility of women in and around the village. Traditionally, Bangladeshi women are 'locked in' the house and rarely have the right to move freely around the village. Of course, the role of GB and other NGOs has broken this shackle to some extent by giving women opportunities to come out of the household and become involved in income-generating activities. However, most of those activities have been confined to the premises where they live (kitchen gardening, poultry rearing, sewing, etc.). Ownership of a mobile phone seems to have opened a new dimension in this respect. The team of researchers was able to observe that the mobile phones gave their owners greater mobility within the village than they had before. This is because incoming calls for villagers make it necessary to take the phone to them, and if no family members are found to be available, the women themselves have to rush about with the mobile phone. This job they have to perform even during the night. Since many of the phones are placed in their shops in a nearby *hat* or *bazaar* (small market), owners were found to go to the phone whenever needed. Thus, mobile phones appear to have enhanced women's mobility not only within the village, but also outside it.

Two additional aspects of the mobility issue should be mentioned. First, women in the village come to the owner's house to make phone calls, and second, sample women reported that the mobile phones expanded the scope of their mobility even beyond the local markets. For example, whenever they decided to visit relatives far away from their villages, they could

Table 11
Who makes decisions (number of responses, % in brackets)^a

Decision	Decision makers				
	Self	Husband	Both	Total	Chi-square (df)
About family affairs	8 (16)	6 (12)	36 (72)	50 (100)	33.89 (2)
About utilisation of GB credit	15 (30)	5 (10)	30 (60)	50 (100)	19.17 (2)
About spending income from phone	18 (36)	3 (6)	29 (58)	50 (100)	20.53 (2)

^a Source: JU/ZEF Field Survey, 1998.

contact their families by phone and inform them of their time of arrival, which reduces family tensions and conflicts.

4.3.5. *Changes in social equilibrium and status*

Many phone-owning households did not appear to be poor households at the time of the survey. On the contrary, they appeared to be relatively well-off within the context of their economic conditions: moderately furnished houses, some TV sets, sanitary latrines, tube-wells, etc. Between 5 and 10 years ago, however, many of these households were below the poverty line, and GB micro-credit programs helped them to gradually escape from grinding poverty. However, for their economic uplift, the women had to depend on the help of a number of their village's wealthy elite. Now, however, they are reported to be standing on their own feet. Interestingly, some of the people who came to their premises to make phone calls were the relatively wealthy villagers who had earlier helped them with food, clothing and shelter. Reportedly, patron-client relationships grew up between some of them. For example, about one-fourth of the phone owners reported that the people who depend on them for phone calls include some persons who once lent them money to help them overcome economic hardships. Similarly, 12% of the phone owners reported that some phone users had once hired them as maidservants. And 34% reported that they were helped in various ways by many of the users (Table 12).

The women in control of cellular mobile phones are proud of their present business. According to them, it has not only helped them earn additional income, but ownership has also conferred on them a certain amount of fame. Everyone in their village and in adjacent villages now knows them and identifies their

'bari' (cluster of houses) by the name of the technology they own, e.g. *Phone Bari* (house of the phone) or by the name of the owner (e.g. *Nurjahan's bari*). This was not the case when the same women used to undertake traditional activities such as poultry rearing, rice husking or grocery selling. Their social status is further enhanced by the increased income that seems to be raising their household's standard of living. Villagers now respect phone owners. Some of them are also invited to social functions (even to marriage ceremonies of the village's elite), something which would have been unthinkable in the context of rural Bangladesh earlier.

4.3.6. *Knowledge and confidence*

Discussions with phone owners indicate that phone ownership provides not only weekly income, but also knowledge about many things which used to be virtually unknown to sample women. For example, when business people approach them to make phone calls to various markets, the women, who stand beside the caller, get to know the names of the markets and the commodities in which they generally deal. When villagers receive calls from outside the country, the phone owners get to know the names of the places from which the calls originate. Sometimes owners are told about the currency or the socio-economic conditions in that particular country. Thus, each day, owners get to know new things and expand the frontier of their knowledge. Mobile phone ownership has given these women confidence. The fact that they are reaping the rewards of their good records of repayment and the fulfilment of other criteria required by GB contributes to this confidence. Once they assumed that they would have to sell eggs, puffed rice or cow milk throughout their lives in order to eke out a living. They could hardly have dreamt that they would now own a modern communication technology such as a cellular mobile phone.

4.3.7. *Strengthening kinship networks*

Another important effect of VPPs can be seen in the strengthening of kinship networks. The advent of VPPs has enabled villagers to stay in touch with relatives living outside the village. In typical Bangladeshi society, collecting news about immediate family members and other relations in far places is a perennial concern. In the past, it was not possible to main-

Table 12
Partial social change (number, % in brackets)^a

Previous status of callers	Number
Used to lend money	12 (24)
Used to help maintain family	15 (30)
Used to hire owner as household maid	6 (12)
Used to help in various ways	17 (34)
Total	50 (100)

^a Source: JU/ZEF Field Survey, 1998.

tain a level of kinship interaction comparable to that which VPPs now allow at such low transaction costs. In the absence of VPPs, efforts to maintain kinship networks were not only expensive, but also relatively ineffective.

5. Conclusions and policy implications

The availability of village pay phones results in substantial socio-cultural benefits in rural areas. For example, the ownership of the phones by relatively poor households tends to raise their social status and pave the way for change in the social equilibrium. Mobile phones make women more mobile both within and outside their villages. In addition, increased income from phones also raises their exchange entitlements in the market and, thus, helps to reduce their poverty. Villages with phones also report that they are very useful in coping with natural calamities and improving law-enforcement. Given these multi-dimensional benefits of village phones, the study arrives at the following general conclusions and policy implications.

5.1. Parting with old perceptions

Telephones should be treated not only as a consumer good, but also as a production good, especially in poor rural areas. There, telephones are not a domain reserved for relatively wealthy, as has been thought by some, but a market in which lower income groups also have substantial stakes once they gain access. These findings call for a rapid re-orientation in the thinking of policy-makers. The development of telecom services in rural areas appears to be a factor powerfully promoting and supporting the objectives of rural development and poverty reduction. Further research on the role of communications technology is needed to increase our understanding of these links.

5.2. Deregulation and opportunities for the private sector

The BTTB, the state telephone monopoly in Bangladesh, is hardly in a position to provide/deliver telecom services to rural areas. The introduction

of VPPs in Bangladesh is a by-product of policies designed to bring about gradual deregulation, liberalisation and privatisation, which the government has been pursuing in the telecom sector for a number of years. Progress in this direction should be accelerated. Allowing the private sector to play a competitive role in the telecom business would reduce the cost of calls and increase the efficiency of the system. The BTTB should be prepared to accept the presence and activities of the private sector. The government can retain ownership of fixed lines while vesting the private sector with cellular phones. Investment must be stimulated in the sector. Quite obviously, capacity is seriously limited. A public–private partnership may be required in order to realise the investments needed, with a view to reducing international traffic jams and increasing interconnections.

5.3. Communications technology for the poor

The GB's style of managing mobile phones in villages can enhance the technology's broad-based, pro-poor orientation. In Bangladesh, the relatively wealthy sections of villages have traditionally owned, managed and led the introduction of modern technologies (e.g. irrigation). Such patterns of ownership have allegedly resulted in inequitable distributions of income and wealth. The fact that relatively poor people can also own and access modern information technology may go a long way towards reducing poverty and restoring a more equitable distribution.

The strong institutional capacities of poor peoples' organisations, such as micro-finance associations, can facilitate efforts to make the poor the managers of new technologies. This may be considered an additional pay-off on earlier investments in the formation of such rural organisations. Many such organisations in other parts of the developing world could also function as hosts for telecommunications services and thus rapidly broaden access by the poor. In this context, too, development policy, and not just the market, has an important part to play.

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