AIUB Journal of Business and Economics
Volume 8, Number 2
ISSN 1683-8742
August 2009 pp. 69-97

Evaluating D-Net's Pallytathya Kendra Project: An Ethnographic Approach

Bidit Lal Dey [•]
Stanley Sumon Rodrick [♣]

Abstract

This paper outlines a method to observe and evaluate the services of D-Net's Community based Technology Centre (CTC), a Microsoft Unlimited Potential Project in Bangladesh. The evaluation problem is not that of monitoring the work done in a centre, but that of understanding how the intended beneficiaries make use of, and benefit from the information and communications made accessible through that centre. If ICT is to have an impact on development, it needs to be assessed from the perspective of the beneficiaries, as opposed to the routine monitoring carried out for NGOs and funders. Ethnographic fieldwork was conducted to develop an understanding about some crucial information needs of rural Bangladeshi farmers and to explore evaluation methodology for potential and current interaction between the CTC (also known as Pallytathya Kendra) and farmer community.

[•] American International University-Bangladesh (AIUB)
[♣] American International University-Bangladesh (AIUB)

1. Introduction

The use of ICTs (information and communication technology) is cited as an effective means for supporting development initiatives. It is argued that underprivileged communities' access to ICT enabled services can effectively reduce global and regional digital divide which in turn can address different development imperatives. However, lack of substantial evidences from fields has limited the scope for developing conceivable theoretical understanding in this area. Assessing the socio-economic impacts and evaluating the roles and services of ICT intervention are still regarded as major challenges in this field. Donor funded assessments often fail to go beyond narrating anecdotal stories about ICT enabled projects. While top down approach to implementing ICT enabled projects is considered as one of the reasons for their failure, evaluation method lacking beneficiaries' perspectives can also provide myopic understanding about their roles and impacts. We argue the examination of roles and impacts of ICT initiatives is to be done from beneficiaries' perspectives. In this paper we take a bottom up approach to comprehend how farmers make use of this technology/application.

This research examines the current and potential use of D-Net's Community-based Technology Centre (CTC) in the agricultural sector in rural Bangladesh and their impacts on farmers. D-Net, a Bangladeshi NGO has been awarded to run the Microsoft Unlimited Potential Project. Four month long fieldwork was undertaken to investigate this issue. The fieldwork project enabled small farmers' groups to get connected with D-Net's CTC. Through ethnographic approach farmers' perceptions about the services of the CTCs in rural Bangladeshi settings were observed and monitored.

This is important to mention that the research is funded by the Association of Information Systems (AIS) Microsoft Research Grant 2007. American International University – Bangladesh (AIUB) provided logistic support for the research.

2. Background

The use of ICTs in the development activities has engendered remarkable interest of the researchers and practitioners across the world. While it is

widely believed that ICTs can be used to facilitate development activities, the evidence of impacts of such use still remains inadequate (Donner, 2006). The investment made to develop ICT enabled projects also faces criticism. Mutula (2005) postulates that resources utilized to bridge the digital divide could be directed to meet the basic demands of the poor population. It is argued that inappropriate and top-down implementation of ICT enabled projects have failed to produce desired benefits (Fors and Moreno, 2002). Heeks (1999) believes that appropriate use of ICTs in the developing countries is a major concern. Other researchers like Nikam, et al. (2004), Kirlidog and Aydemir (2005) and Leaning (2005) express concerns regarding the appropriation of western born ICTs in developing societies.

Agerfalk and Eriksson (2006) have identified two facets of the implementation of a technology: the instrumentality and its social goal. They argue that a technology's social acceptability depends on its social goal. If a technology's social goal contradicts a particular society's values, its acceptability tends to be affected. Galloway, et al. (2004) stress the importance of understanding and investigating local needs while designing ICT enabled projects. Research works need to be conducted to identify how ICT tools can address those needs. Before exploring the impacts of ICT enabled projects, it is important to find how a technology is used and appropriated by the people of the developing countries. It is also essential to understand what the targeted beneficiaries perceive about the utility and benefits of such projects. An ethnographic analysis is required to investigate and evaluate the operations of an ICT enabled project within the given social context.

3. Objectives

a. Evaluation of the CTCs run by D-Net from the perspectives of farmers in rural villages: What are the needs of Bangladeshi farmers with regard to the use of Information and Communication Technologies and how these needs can be satisfied through access to situationally relevant information from D-Net's Community Technology Centres (supported by Microsoft's Unlimited Potential programme)?

b. Technology appropriation: In what ways do farmers make use of mobile telephony technologies and Community-based Technology Centres to meet their agricultural information needs?

4. Literature Review

The literature review is going to investigate the following key issues:

- Problems pertaining to the agricultural development in Bangladesh. It is essential to develop a theoretical understanding about the agricultural structure of Bangladesh that constitutes the needs of Bangladeshi farmers. This section also discusses about the literature concerning the use of ICTs in the agricultural development.
- Acceptance and appropriation of technologies. This section identifies the factors that determine the behavioral intention to accept different technological applications and how individuals make use of these applications.

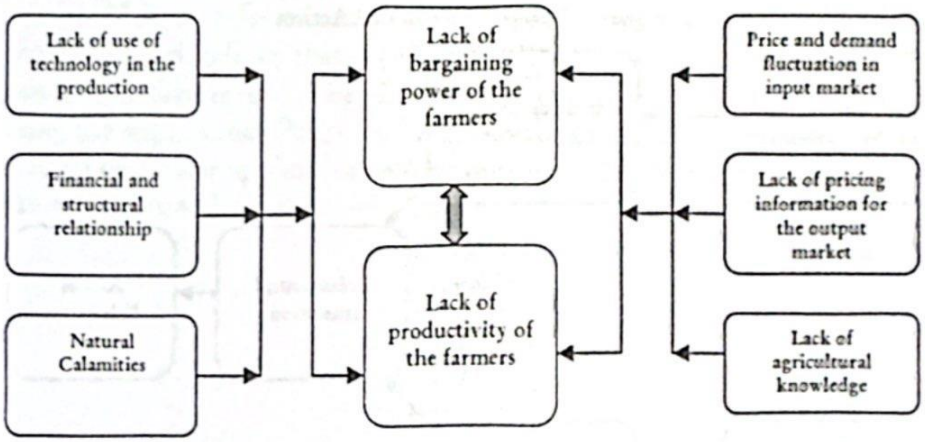
4.1 The agricultural Structure of Bangladesh

In a country like Bangladesh farms are extremely small, cultivation is dependent on the uncertainties of variable rainfall and average output is generally low. Value addition in agriculture requires technological, institutional and price incentive changes designed to raise the productivity of the small farms (Todaro, 2000). In rural Bangladesh opportunities outside agriculture sector are extremely limited. In 1991 the top ten percent of landowners owned sixty percent of the land, while the bottom sixty percent of landowners had only one percent of the land (Ullah and Routray, 2007). The structure of the agrarian system in Bangladesh is considered as a major impediment for balanced rural development (Rogaly et al. 1999). Small farmers are entangled in a vicious cycle because of sharecropping, tenancy, money lending and other structural and financial relationships with owners and traders (Crow, 1999). The situation of vulnerable farmers is exacerbated by land erosion, drought, flood, deforestation and other natural calamities. This together with lack of financial power reduces farmers' propensity to take risks.

Their bargaining power in the input market is not very strong either. Lack of bargaining power reduces farmers' earnings against their produce. Reduced earning also makes a negative impact on farmers' productivity. The overall situation is summarized in the Figure-1.

Imperfect information and high transaction costs can constitute major impediments in the agricultural marketing process (Dao, 2004). The potential impact of lack of knowledge and other agricultural information on farmers' bargaining power and productivity is presented in the figure-1. Kizilaslan (2006) argues that proper dissemination of information for agricultural and rural communities is a crucial tool in the fight against poverty and deprivation. Information helps the poor to avail of the opportunities and also reduces their vulnerability. Kiplang'at (1999) postulates that dissemination of relevant information to the farming communities can facilitate the effective adoption of agricultural inputs, decision making on markets and adoption of scientific methods. However, lack of dissemination of information across the agricultural supply chain is a major concern in the developing world.

Figure 1: Reasons behind lack of bargaining power and lack of productivity of the farmers of Bangladesh



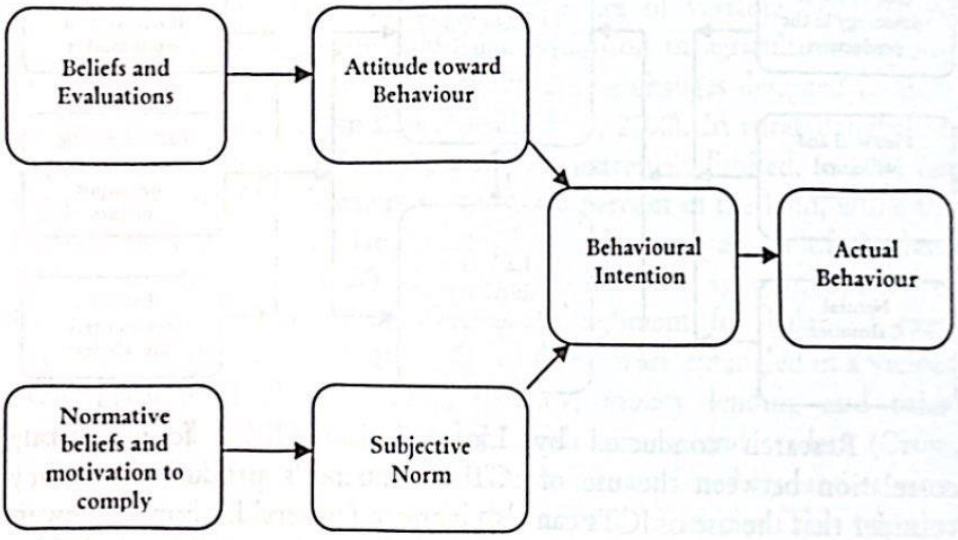
Research conducted by Lio and Liu (2004) found strong correlation between the use of ICT and farmer's productivity. They consider that the use of ICTs can also increase farmers' bargaining power. With the access to information, small scale farmers can have competitive

edge over the larger operators. They can develop knowledge regarding crop choices, develop products for the niche markets and even can market the products directly to the consumers. Without the access to knowledge and communication capabilities small farmers remain at the mercy of the global and regional market forces. However, high costs coupled with infrastructure and context related inhibitors can dilute these advantages.

4.2 Acceptance and appropriation of Technology

In the last two decades a great deal of research attention has been given to the acceptance of information technology and information system. Among the models used to illustrate the acceptance, Technology Acceptance Model (TAM) is regarded as one of the most robust and influential. The model proposed by Davis is an adaptation of the theory of reasoned action (TRA) proposed by Fishbein and Ajzen (Legris, et al. 2003). TRA attempts to find out the determinant of the behavioural intentions. TRA considers that beliefs and evaluations influence to develop the attitude toward behaviour and normative beliefs and motivation to comply develop subjective norm. Again, attitude toward behaviour and subjective norm constitute the behavioural intention which eventually determines the actual behaviour. The following diagram explains the TRA:

Figure 2 Theory of Reasoned Action

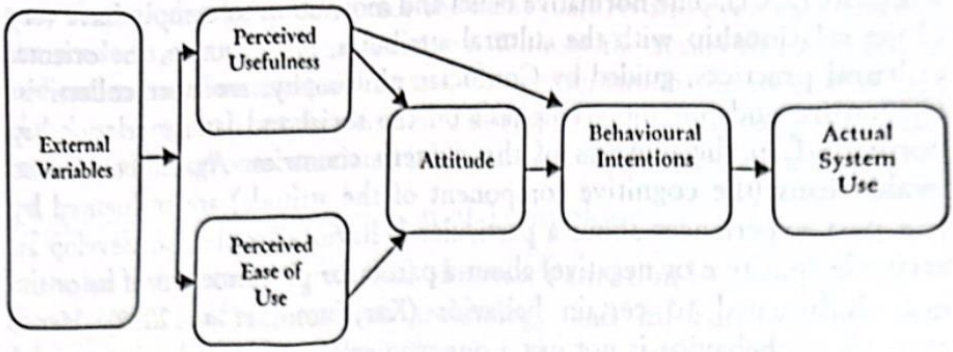


Source: Legris et al. (2003) pp 191-204

This model, however has been challenged by Malhotra and McCort (2001). The normative belief and motivation to comply have very close relationship with the cultural attributes. For example, the oriental cultural practices, guided by Confucian philosophy, are more collectivist by nature and put more emphasis on the social and family relationship compared to the cultures of the western countries. Again, beliefs and evaluations (the cognitive component of the attitude) are influenced by the past experiences about a particular behavior. People also develop an attitude (positive or negative) about a particular phenomenon, if he or she gets habituated to certain behavior (Karjaluoto, *et al.* 2002). Hence attitude to behavior is not just a one way relationship. Behavior can also constitute attitude.

The Technology Acceptance Model by Davis (1989) examines the mediating role of perceived ease of use and perceived usefulness in relation to the attitude toward a particular technology or IS application. One can argue that the beliefs and evaluations, mentioned in the TRA are disintegrated into the perceived usefulness and ease of use. Perceived usefulness and perceived ease of use, hypothesized to be fundamental determinants of user acceptance. Among the many variables that may influence system use, two determinants are especially important. First people tend to use an application if it enables them to perform their job better. This is referred as perceived usefulness. Second, even if the potential users believe that a certain application is useful, they still may not find it easy to use. The benefits can be outweighed by the effort of using the application. Perceived ease of use is user's perception about how easily a particular application can be used. PEOU (Perceived Ease of Use) can be measured by using the following tools:

Figure 3 Technology Acceptance Model (TAM)



Source: Lu et al, 2003, p 207

The Theory of Planned Behavior (TPB) proposes that in addition to attitudes toward use, subjective norms, and perceived behavior control (PVC) such as skills, opportunities, and resources needed to use the system also influence behavior. Researchers have added different factors to the original TAM and TPB based on the nature of the organization and product type. However, three major constituents can be identified in this regard:

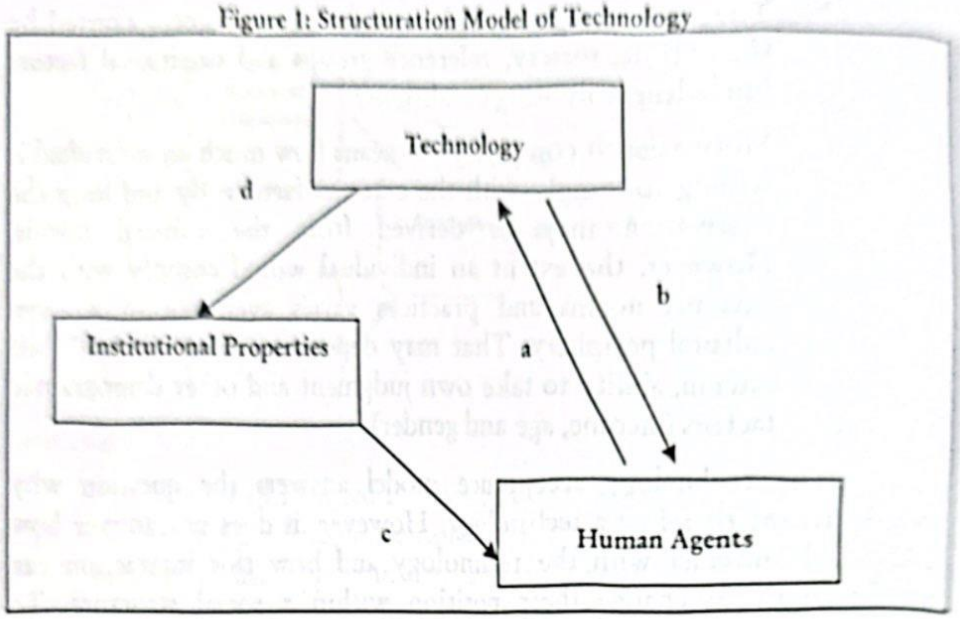
a. A user's own or internal cognition (framed by his beliefs about the perceived usability and difficulties). The concept of perceived value also needs to be discussed in this regard. Perceived value is the trade off a customer makes between the perceived utility and the perceived costs. Lee and Jun (2007) provide a broader definition of the perceived value – the difference between total utility and total costs. It is important to mention that a customer does not only consider the financial cost while making a decision for the purchase of a good or service. There are some other costs involved (i.e. time, effort, risks and convenience). The perceived benefits not only comprise of the economic benefits, but also involve social and relational benefits (Roig et al. 2006). In this research the total benefits generated by the CTCs and all forms of risks (and difficulties) perceived to be associated with such endeavor need to be analyzed.

b. The external factors: This includes the influences exerted by the culture, society, reference groups and situational factors (including facilitating conditions).

c. Motivation to comply: This means how much an individual is willing to comply with the external factors. By and large the motivation may be derived from the cultural norms. However, the extent an individual would comply with the external norms and practices varies even within a given cultural periphery. That may depend on an individual's self esteem, ability to take own judgment and other demographic factors (income, age and gender).

The technology acceptance model answers the question why people accept or refuse a technology. However, it does not answer how individuals interact with the technology and how this interaction can enable them to change their position within a social structure. To investigate this issue structuration theory and its use in analyzing the interaction between human agents and technology are used. Anthony Giddens' structuration theory purports that social structure is the result of recursive interaction among human agents, institutionalized rules and material resources. This theory has been used in this research to develop an understanding about how human agency (the rural farmers) through interaction with material resource (ICTs) and institutionalized rules (the rural lifestyle in Bangladesh) can confront or overcome the problems pertaining to the existing agricultural system. This research also attempts to identify how social structure facilitates or restricts human agents in making use of the services offered by CTCs. Orlikowski (1992) and DeSanctis and Poole (1994) have used the structuration theory in the context of organization.

Figure 1: Structuration Model of Technology



Source: Orlikowski, 1992, p 412

Arrow	Type of Influence	Nature of Influence
a	Technology as a product of human action	Technology is an outcome of human action like design, development, appropriation and modification
b	Technology as a medium of human action	Technology facilitates and constraints human action through provision of schemes facilities and norms
c	Institutional conditions of interaction with technology	Institutional properties influence (for example intentions, professional norms, state of the art in the material and knowledge, design standards and available resources) human in interaction with technology
d	Institutional consequence of interaction with technology	Interaction with technology influences the properties of an organization through reinforcing or transforming structures of domination, signification and legitimation.

The concept of the duality of technology suggested in the structuration theory can provide useful understanding for ICT intervention in the development activities. It can be argued that the use and appropriation of telecentres' (CTC for example) services are the result of the farmers' ability and intention. Again, the use of the services rendered by CTCs may facilitate or restrict farmers' action. This is duality of technology that is resulted from recursive interaction between human

agents (farmers) and technological artifacts. Nevertheless, established systems like rural lifestyle, agricultural marketing processes, social relations and communication methods make impact on how and why farmers respond to technological interventions.

5. Methodology

The bottom-up approach for introducing ICT enabled projects and the appropriation of different ICT tools in accordance with the needs and cultures of the rural populace have been stressed by researchers. In order to delineate this issue, farmers' views and opinions need to be examined. The initial planning and preparation started from 1st week of January, 2008. The first one month was engaged to mingle with farmers and learn about their problems. In-depth interviews and focus group discussions (FGD) were complemented with our own observation to comprehend farmers' life style, their means for communication, and their problems with regard to different economic and social issues. Farmers' opinions regarding the use and availability of fertilizers, use of technology in farming and non farming activities were gathered. Their perception about the CTC was also investigated during this period. Five groups of farmers (each comprising of five members) were formed.

The groups were formed on the basis of geographic, religious and family connectivity so that the farmers in a particular group could comfortably get along with one another. Each of the groups was given a mobile telephone with connection. All of the members of the groups had the opportunity to keep the phone for two weeks. The intervention continued for 10 weeks. Researchers met the groups once every two weeks. These groups had the opportunity to contact the CTC. They were supervised by a representative of Gandhi Ashram, the partnering organization of D-Net for their Microsoft UP Project at Joyag, Noakhali.

Weekly meetings within each group were regularly monitored to find out different aspects of the use of mobile phones and the interaction with the CTC by the farmers. The researchers conducted FGD and in-depth interviews with the group members and separately with the person who possessed the mobile telephone. The researchers also took note of the

informal discussions with the group members, their neighbours, family members, fertilizer traders and NGO activists.

It was interesting to see whether or not they found this process helpful for developing a network through resource and knowledge sharing. The processes and methods of operation were fine tuned based on the feedback generated from the meeting and interviews. For example, the farmers remain busy during the day time. After the first week the meeting time was set during the evening. As it has been already mentioned, the researchers took an ethnographic approach. We took the diary notes about the lifestyle, environment and social practices.

6. Findings and Discussion

This section is organized in three parts. Firstly we describe the information needs, from the farmers' perspectives, quoting their opinions. Secondly, we suggest ways that the Pallytathya Kendra project might start to address more of their needs. Thirdly, we discuss the farmers' perceptions of the Pallytathya project itself.

6.1 D-Net's Pallytathya Kendra, Microsoft Unlimited Potential Project at Joyag, Noakhali, Bangladesh:

Joyag is a small *union* (an administrative unit) and comprises of twelve villages. Joyag bazaar is located at a very significant position of Noakhali district. Two major towns of the district Shonaimuri and Chatkhil are within 30 km distance of Joyag bazaar. Joyag Union itself is in the border of two densely populated u*pazilas* (sub-district) Begumganj and Chatkhil. One particular establishment in Joyag has made this small area famous across Bangladesh more than anything else-and that is Gandhi Ashram. During the partition of the Indian sub-continent in the wake of its independence from the British Raj in 1947, Joyag and its adjacent localities of Noakhali district had one of the most violent communal riots. M. K. Gandhi, the leader of India's independence movement went to Joyag to pacify the communal bigotry. He stayed in Joyag for six months and visited different corners of Noakhali district to restore communal peace. He stayed at the place of a local landlord and philanthropist. Later on this house and the entire property were donated to Gandhi Ashram Trust. Gandhi Ashram Trust became an NGO and initiated development

activities in the region. The local people consider Gandhi Ashram as a symbol of philanthropy and public welfare.

D-Net partnered with Gandhi Ashram to set up the Pallytathya Kendra (rural information centre) as a part of the Microsoft Unlimited Potential Project. While the salary of the employee is paid by D-Net, Gandhi Ashram provides the infrastructure and logistic support. According to the Gandhi Ashram authority 90% of the project cost is covered by them, and D-Net pays for the rest.

6.2 Needs Assessment

The first one month of the fieldwork was dedicated to conduct the needs assessment. The initial needs assessment conducted by D-Net identified that the prime needs of the rural communities in Bangladesh involve the agricultural information. Our research set out to investigate the information needs of the farmer community of Joyag.

Prices and sources of the fertilizers: In Bangladesh the fertilizer is subsidized and the government fixes the price range to prevent any price manipulation by dealers. The local government and administrators are responsible to monitor the distribution of fertilizers. Still, we found that the price and availability of fertilizers are the major concerns for the farmers. As one of the farmers tried to explain the situation:

"I need to put upto twelve kg fertilizers in my land, whereas in the past five kg was good enough. We used to use the organic fertilizers in the past days. Now we are using chemical fertilizers. This is another huge concern."[1]

One farmer told us about the prices and availability of fertilizers:

"No, we do not get it (fertilizer). Even if we get the price is too high. There is a particular variant of fertilizer, known as red fertilizer, happened to cost us TK12 last year. Now the price of the same fertilizer is TK28-TK30. Now you can imagine how difficult it is for us."

The following reasons have increased the importance of the chemical fertilizers in a place like Joyag:

a. The district of Noakhali is situated in the South East corner of Bangladesh. The region is close to the seashore. It is a

[1] All quotations have been recorded and translated from Bengali by Mr. Dey

low lying area. The rice fields get submerged during the rainy season. While, farmers of most other parts in Bangladesh cultivate two crops a year, the farmers in Noakhali district can only cultivate during the dry season (from November to March). In order to maximize their income the farmers want to cultivate hybrid crops (mainly rice). They have to resort to fertilizers to enhance the production. One of the farmers describes this situation:

> *"Here we do cultivation for six months and the rest of the year we have to sit idle. There is water logging problem. The land is low lying and during the rainy season we cannot do any cultivation. Hence, we need to use technology, fertilizers and better agricultural methods to optimize the production."*

b. In today's Bangladesh farmers find it very hard to keep their own cattle. The use of cows in the cultivation is being replaced by the use of tractors. In rural Bangladesh joint families are still in existence. Normally at a given property two or more families of close relations live together. With the increase of family members they do not have enough space to accommodate cattle. Again, with the ever increasing population and consequent development of human habitant the size of grazing fields is shrinking. The cost of keeping shepherds to maintain cattle has also gone up. Farmers do not own cows these days and this in turn has reduced the use of natural fertilizers (made of cow dung and other animal wastes). As a result Bangladeshi farmers have become more dependent on chemical fertilizers. The problem is reflected on the statements of two of the farmers:

> *"We cannot use much of the organic fertilizers these days. The number of cattle has reduced."*

> *"The children are busy with their studies. There is no one to take care. During the last year's flood, a disease spread out, and couple of my cows died. So keeping cattle causes more problems than benefits."*

> *"I have cattle. I have children in the house. I need cattle for milk. But it is very difficult to maintain them. There is no grazing field these days."*

We found that farmers are desperate to get fertilizers at different stages of the cultivation process. Each kind of fertilizers serves a particular purpose for the crops at a particular stage of their growth. Fertilizers are essential for the nourishment of crops and also for the desired production. However, it was evident from the interviews with the farmers that during the pick seasons the farmers believe that dealers and the members of the local government create an artificial crisis for fertilizers. Many farmers also believe that the members of the local government bodies give away fertilizers to their own acquaintances. The nepotism and politicisation leave the majority of the farmers with inadequate supplies of fertilizers. The prices of fertilizers vary from BDT 320 to BDT 340 per bag. The farmers, living in the remote villages need to visit different markets and fertilizer dealers to verify the prices. The cost for finding out the best price of fertilizers is also very high. Because:

- These days farmers tend to send their children to the schools. Many of the farmers' sons are engaged in non-farming activities. Farmers do not have too many helping hands to support them in the field. Engaging paid day labour in the fields is also very expensive. Under these circumstances, if the farmers leave the fields for looking for fertilizers, the cultivation work is affected.
- Many of the Joyag residents have their family members working in the Middle East. This demographic composition has made a huge impact on the service industry (i.e. transport) of the region. The transport by three wheeler cycle rickshaws is very expensive. Farmers often spend BDT 30 to BDT 40 to roam around different adjacent village bazaars to find the fertilizers.

Information about the Pests, Crop Diseases and Cultivation Methods:

In recent times the farmers in Joyag are facing perennial problems with the pests and plant diseases. They are not very familiar with many of the

pests and the plant diseases they come across these days. They believe the following reasons are causing these problems:

a. The weather condition: In Bangladesh the nature has been behaving in an uncharacteristic manner for the last few years. The agricultural system in Bangladesh is very much dependent on the weather. Any change in the weather condition results to the malnutrition of the plants and pest attacks. This year when the fieldwork was conducted, the winter approached much later than the usual case. Normally the winter starts from middle of December. This year the winter did not arrive till middle of January. Through out the month of February it was overcast and quite cold. February is the beginning of the Bengali spring though.

> *"This year we are unable to understand the nature's characters. We are not having any spring this year."*

The farmers believe that this uncharacteristic behaviour of the weather caused strange plant diseases which they were not familiar with. There were also some strange pests in the field.

b. Cultivation of the hybrid crops and the use of the chemical fertilizers: The elderly farmers believe that the pest attack and plant diseases have increased since they had started cultivating the hybrid crops and using the chemical fertilizers.

Most of the farmers of Joyag are semi-literate or illiterate. They do not have any academic knowledge about farming and cultivation. There are employees of the Ministry of Agriculture of the Government of Bangladesh to help farmers in resolving these problems. These people are known as block supervisors. The entire Joyag union has got only two block supervisors; the number is very inadequate compared with the total number of farmers of the region. Hence, contacting the block supervisors is a major concern for the farmers.

Output price information:

The structural and financial relationships in the agricultural production system (between farmers and landlords, between farmers and brokers and farmers and money lenders) are major impediments for farmers' empowerment and welfare. The farmers often take loans from the solvent

people in their area. These people are often their landlords or big wholesalers' brokers. These people are also their customers. The farmers need to borrow money from these individuals for the following reasons:

- Financing required for overseas employment opportunity: In Joyag, like in many other parts of Noakhali district people look for employment opportunities in abroad (mainly in the Middle East). Farmers believe that it is very hard for the landless sharecroppers to make any qualitative change in their life. A part of an in-depth interview questions and the corresponding responses is presented here

  Q: Could you buy a piece of land after working 30 years?

  Answer: No. None has done, in fact no one can.

  Q: So you believe that you cannot buy your own land by doing farming only. You are aspiring to have your own land with your son's foreign remittance. Aren't you?

  Answer: No actually my first target is survival. The way things are going these days, we can hardly maintain mere survival, let alone getting any additional property.

  By and large for them a better life is synonymous to owning their own lands and securing a solvent life for the next generation. It has been observed that many of the landless farmers were able to make their own land and they gradually became solvent landlords after working abroad. The semi skilled and unskilled jobs in the Middle East (whatever the wages they earn) can make a handsome living in rural Bangladesh. We found that one farmer had borrowed money from a broker to get the required finance for sending his son to Saudi Arabia. The farmer borrowed the money on a condition that he would give the lender his produce to pay off the debt. The monetary amount of this pay off was much lower than the regular market price.

- Financing required during the cultivation: At different stages of the cultivation farmers require hard cash to buy fertilizers, pesticides, to pay off diesel and electricity bills. Particularly by the end of the season they need financial support to pay off all

the debts. They also need to pay the day labourers that help them during the harvest season. When they are in dire need of the hard cash they borrow money from the landlords or the brokers.

> *"They pay (the brokers) us less; often they cheat on us while measuring the crops. Basically at the end of the cultivation season we need hard cash. We need to pay debts; we need to pay the labour. This is why we do not wait for anything. Say even if the normal price of one maund [2] of rice is TK500, we often end up getting TK400 per maund due to such pressure".*

If the farmers had not taken any loan from any of their customers, they could be in a position to sell their produce at the market price. It is often argued that through the use of the ICTs the farmers can learn about the wholesale price and thereby can achieve more bargaining power. This may be true for the fishermen and for the vegetable producers, may not be the case for the Bangladeshi rice producers. They are least concerned about the wholesale price. Because:

- The traditional trading system: Traditionally the brokers of the big wholesalers or millers (who convert the paddy to rice) visit the village farmers. They move around from door to door to buy the produce. As a result often farmers do not have any chance to verify the price at the local market. Farmers told the researchers that they normally discuss within themselves to find right price of the produce though.
- Risk of keeping the paddy/rice for longer time: Farmers are often concerned about keeping the paddy/rice for longer period at their disposal. Rain water, rats and insects may damage their hard earned harvest. Hence they prefer to sell off the produce as soon as they can.
- Risk of taking the produce to the bazaar: Farmers often cannot afford the cost of taking the produce to the nearest bazaar. The financial risk is quite high as well. This is why they prefer to sell it from their door steps.

---

[2] a local unit of rice, equals to 37 kg approximately

6.3 Farmers' perception about the Pallytathy Kendra:

The following factors constitute farmers' behavioural intention about the Pallytathya Kendra:

i. Farmers' perceived value: Here there are two factors involved:

a. Perceived usefulness: The farmers of Joyag need to have the belief (organized pattern of knowledge) that the Pallytathya Kendra can satisfy their information needs. In other words, farmers need to believe that the Pallytathya Kendra is going to be useful for them. It has been observed that the training programmes of the centre are preferred by local young population. They consider these training courses will be extremely helpful for them to secure overseas employment opportunities. As a result local teenagers and young adults (many of their fathers are into farming activities) assemble at the centre. One of the trainees told the researchers:

> *"I came to the centre to learn computer. I believe this learning would be helpful for me in future. I pay BDT1200 for the entire course, which is reasonably expensive. But this is worth it."*

b. Perceived ease of use: The services farmers receive from the Pallytathya Kendra need to be easily available. The "Jion" package, introduced by D-Net answers many of the basic agriculture related questions. However, farmers do not know how to operate the laptop and they may not have enough time to visit the centre quite often. As, accessing the computer based learning mechanism is difficult and inconvenient for them, the farmers of Joyag are less interested to avail of this opportunity. Farmers even do not know what computers can do for them. As they register during the interviews:

> *"What can I do with the computer?"*

> *"No I have not used the computer at the Gandhi Ashram, because when we are free the office is closed. And we do not have time to go to the Gandhi Ashram and explore the computer."*

"No I do not have any clue about what they (computers at Gandhi Ashram) are for".

ii. External factors: The following issues can be mentioned in this regard:

a. **Opinion leaders and reference groups:** Mr. Raja of Gandhi Ashram has successfully created farmers' groups in the region over the last couple of years. It was observed that the farmers respect the suggestions given by Mr. Raja. Unlike many other NGO activists or the block supervisors Mr. Raja has proved himself honest to the farmers. Farmers believe that Mr. Raja is a real well wisher for them. Because of Mr. Raja twenty five farmers took part in our project. An opinion leader like Mr. Raja can make an impact on farmers' behavioural intention. Again farmers are also influenced by the members of their reference groups (i.e. families, friends and relatives).

b. **Culture:** Bangladesh predominantly holds a collectivist society. We noticed that farmers feel comfortable to share information and other resources. Traditionally they consider it to be a moral and social responsibility to extend cooperation to their friends and neighbours. They share tractors, they share spray machines and they share their knowledge and experiences. Community based use of technology is very much welcomed by them. Pallytathya Kendra and any other form of CTC can facilitate their socialization and can also use this sense of collectivism in making their services popular.

iii. M otivation to comply: From the interviews and FGDs it was evident that the farmers of Joyag tend to cooperate with each other and they conform to their groups' norms.

6.4 Pallytathya Kendra's operation and the social structure of Joyag

Farmers in Joyag have their own way to accomplish their tasks. They have been following certain traditions and practices for years. Some of these practices have been continuing from generation after generation.

Some of these practices are more of recent phenomenon, while some are very much embedded in their culture and lifestyle. For example, the crisis of chemical fertilizers is more of a new phenomenon. Farmers tend to move from one bazaar to another to learn about the prices and sources of fertilizers. We observed that farmers easily accepted the use of the mobile telephony to enquire the prices of fertilizers. This was possible, because the traditional practices could easily be facilitated with the use of the technology. Farmers were still contacting the same people (other farmers or the dealers) about the same issue (prices and sources of fertilizers). Without changing the human agents (farmers and the people they contacted for information) and the nature of communication, a cheaper and easier mechanism could be developed with the help of the technology. As one of the farmers happily accepts the use of mobile phones:

> *"Yes now I understand. If I go to three different shops it costs me the whole day and can cost me 50 TK for the rickshaw fair. Now I can save this time and 50 TK by making three phone calls costing me maximum 9 TK."*

Here we can see that social structure and the use of technology are facilitating each other. The use of the technology gets embedded within the social practice and generates an important and new dimension of its use. This can be attributed as a typical example of the appropriation of the mobile telephony within the social structure of the rural Bangladeshi life.

Not all the traditions and practices support simple technological intervention. We noticed that at first farmers try to solve a problem of their crop (pest attack or disease) with the help of their own experience and knowledge. If they fail to get any solution they get in touch with their neighbours and other farmers. Again, getting help from the block supervisors or government officials is not very easy. As some of the farmers argued:

> *"Getting access to the block supervisors is not a concern; it is the people that matter. These people will keep us dodging. We do not think the mobile phone (as a means to communicate with the block supervisors) can make any difference in this regard. You even will not get the block supervisors in the office. The agricultural officers and block supervisors take ages to test the soil and give the report. You cannot expect anything from these people."*

"At times we see them (block supervisors). But it is nothing very common. We would have met them if they were around. They have their own set of information, which we know pretty well. They do not offer the crucial information or solution which we need."

"My main problem is the plant disease that has attacked the eggplant field. The leaves are getting dry. Gradually the leaves are withering. I have been to the block supervisor who could not offer me any solution."

"It is not easy to get hold of them (the block supervisors) first point. We actually try to find the solution by consulting the fellow farmers first before we resort to block supervisor or any other expert persons. We share our experience and thereby try to get the solution."

As a result even today farmers try different measures to overcome crop diseases or pest attacks until they get the success. In most cases these measures are either learnt from their experiences or suggested by their fellow friends/neighbours. Now, the use of the software package like "Jion" or getting photographs of the plant/pest and sending it to the nearest CTC may require a total change of the traditional process. This is why the intervention was not very successful in this regard. A technology is embodied in a set of social institutions to make it work. So, e.g., the use of chipboard requires training courses for carpenters, otherwise carpenters will use nails or screws, and split the panels.

7. Conclusion

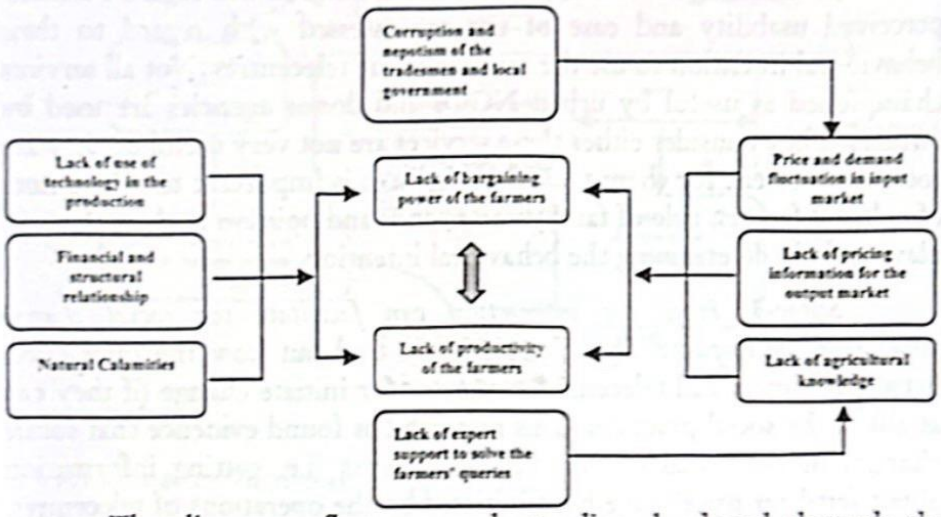
7.1 Evaluation Process

We can segregate the entire evaluation project into a number of sequential stages:

Stage-1: *Understanding about the social structure and lifestyle and needs assessment (Analyzing the readiness):* The operations of telecentres and their interaction with farmers are just part of their social structure and lifestyle. Telecentres are just some facilitators to support the rural life. The operations of the telecentres need to be consistent with the social structure and practices. Social structure and lifestyle can determine how successful an adoption to a technological application can be. Again the

social structure and lifestyle constitute needs. For example, the use of tractor has increased the demand of chemical fertilizers (as the farmers do not need to keep cattle for ploughing the land) and thereby has created farmers' needs for fertilizer prices and availability information. However, needs may be created because of other reasons like weather conditions. Again, this stage provides an extension of the theoretical understanding about farmers' information needs.

Figure 5: An extension of Figure-1, developed on the basis of findings



The diagram reflects an understanding developed through the needs assessment. The findings have made an extension of the conceptual framework developed in the figure-1.

Figure-1 shows that lack of agricultural knowledge negatively affects on farmers' productivity. One of reasons behind farmers' lack of agricultural knowledge is the lack of expert support. The number of government employed block supervisors is too insufficient to support the large farmer community. As a result farmers are unable to tackle vital problems like pest attacks and plant diseases.

Our theoretical understanding has identified the crisis of inputs including fertilizers as a major problem for Bangladeshi farmers. The fieldwork suggests that the nepotism and corruption by the members of the local government and dealers have worsened the fertilizer crisis. The findings of this research also reveal why farmers do not have much of

bargaining power in the output market. The existing structure of the agricultural trading system does not offer too much of space for the farmers to exercise their bargaining power. They are tied and trapped within the system which is difficult to escape. Our intervention made an attempt to find how and to what extent these problems encountered by rural Bangladeshi farmers could be addressed through telecentres' (CTC) services.

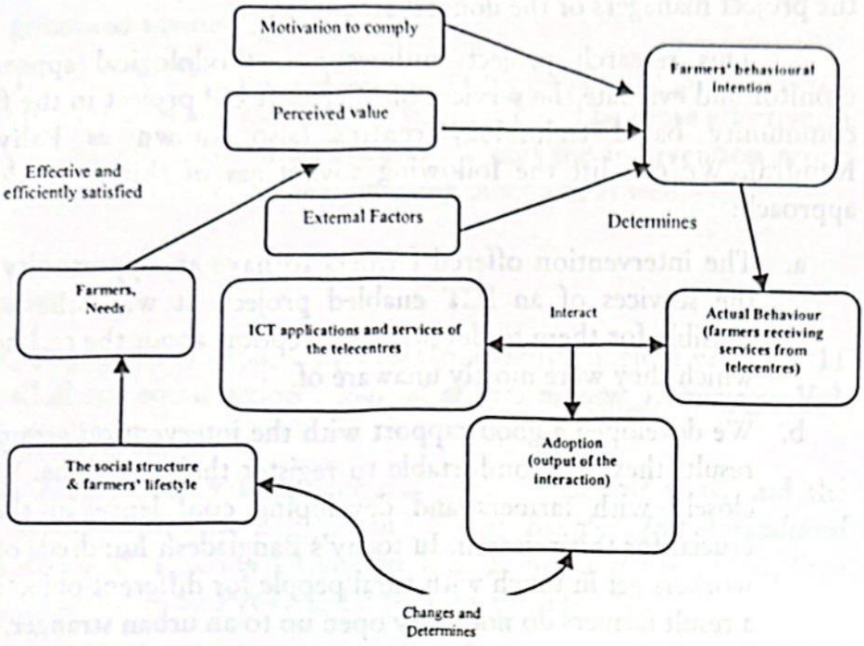
Stage-2: Understanding the factors determining farmers' behavioural intention (Analyzing the intermediate and adoption): In this regard Farmers' perceived usability and ease of use are assessed with regard to their behavioural intention to use the services of the telecentres. Not all services championed as useful by urban NGOs and donor agencies are used by farmers. They consider either these services are not very useful or they are too inconvenient for them to access. Again it is important to take a note of cultural factors, role of family and friends and opinion leaders, that can play a role in determining the behavioral intention.

Stage-3: How the interaction can facilitate the social change (analyzing the impact): This phase tries to find out how the interaction between farmers and telecentres make and/or initiate change (if they can at all) in the social practices. This research has found evidence that subtle changes in the social communication process (i.e. getting information about fertilizer price) have been initiated by the operations of telecentres. However, it is important to be realistic about the impact and benefits generated by the operations of the telecentres. The popular notion about telecetnres' utility in disseminating output price information needs to be reconsidered for the sharecropper paddy growers in Joyag.

It is important to mention that it may require quite a long time to experience any change in social structure, precipitated by ICT enabled intervention. Again, if there is any change in the lifestyle, there can be further problem resulting to some additional needs. For example if farmers get used to enquiring about market price information through mobile telephony, quick and remote top up of the mobile credit will become a crucial need for the agricultural marketing. Hence this evaluation model accepts the dynamic nature of social change and its relation with ICTs.

The following diagram summarizes the whole process:

Figure 6: A framework to evaluate how the operations of telecentres can be used and appropriated by rural farmers



7.2 Guideline for future research & Conclusion:

Given the subtle interactions in this model, we need to use evaluation techniques that can pull out dynamic behavior and attitudes, in order to stand a chance of predicting whether this will succeed or fail. Here we stress behavior intentions, perceived usefulness and ease of use and the dynamics of change. Qualitative techniques work better when dealing with beliefs and intentions, and changes over time (unlike snapshot questionnaires). When a technology is new to the intended users (e.g. mass use of mobile phones, a new telecentre), it is necessary to intervene, to make the technology accessible to a group of beneficiaries. There is no point asking questions about a technology only few people have previously used. That is why TAM questionnaires don't work in the early stages. Once the intervention has taken place, then we need to follow carefully how they appropriate the technologies into their lives. Different stakeholders in telecentres have different needs and objectives. Contrast here what the donors want to achieve, what the different NGOs are

doing, and farmers' needs. Unless they are brought into alignment, either the projects or the society will fail. To discover these need/supply gaps, we need to evaluate projects from multiple perspectives, not just that of the project managers or the donors' accountants.

This research project outlines a methodological approach to monitor and evaluate the services of Microsoft UP project in the form of community based technology centres (also known as **Pallytathya Kendra**). We can list the following advantages of this methodological approach:

a. The intervention offered farmers to have an opportunity to use the services of an ICT enabled project. It was otherwise not possible for them to develop a perception about the technologies, which they were mostly unaware of.

b. We developed a good rapport with the intervention groups. As a result, they felt comfortable to register their opinions. Working closely with farmers and developing confidence in them are crucial for this research. In today's Bangladesh hundreds of NGO workers get in touch with rural people for different objectives. As a result farmers do not easily open up to an urban stranger.

c. An ethnographic approach was essential for this research. Developing an understanding about a village society, inter-relationship among different actors of that society and their overall lifestyle was very useful. As a result we were able to sketch a bigger picture of the use and appropriation of technology in a rural context.

d. We had informal discussion with D-Net's officials. We also interviewed a fertilizer dealer at Joyag. However we focused on farmers' opinions for this research. This was an important aspect of the research that enabled us to understand beneficiaries' perspectives.

e. The use of the mobile telephony is crucial to keep the farmers connected with the CTC. Mobile telephony is the cheaper and easily accessible ICT tool for a country like Bangladesh that has poor land line and internet infrastructure.

The methodology had some shortcomings as well.

a. The duration of the intervention needs to be longer for a better understanding about the impact. A longer intervention could have generated a better outcome.

b. The study requires a comparative analysis. Simultaneous attachment with two different projects could be more effective. A comparison between a closed group and the intervention group could have offered some interesting outcomes as well.

References

Agerfalk, P. J. and Eriksson, O. (2006), "Socio-instrumental usability: IT is all about social action", *Journal of Information Technology*, Vol. 21, pp: 24-39.

Crow, B. (1999), "Why is agricultural growth uneven? Class and the agrarian surplus in Bangladesh", *Sonar Bangla? The Agricultural Growth and Agrarian Change in West Bengal and Bangladesh*, Sage Publications India Pvt Ltd., 1st Edition, pp. 147-171.

Dao, M. Q., (2004) "Rural poverty in developing countries: an empirical analysis", *Journal of Economic Studies*, Vol: 31, No.6, pp 500-508.

Davis, F. D., (1989), "Perceived usefulness, perceived ease of use, and user acceptance of information technology", *MIS Quarterly*, Vol. 13, No. 3, pp. 319-340.

DeSanctis, G., and Poole M. S. (1994), "Capturing the Complexity in Advanced Technology Use: Adaptive Structuration Theory", *Organization Science*, Vol. 5, No. 2, pp 121-127.

Donner, J. (2006), "Research approaches to mobile use in the developing world: a review of the literature", *conference paper presented at the International Confernce on Mobile Communication and Asian Modernities, City University of Hong Kong*, available at: (http://research.microsoft.com/~jdonner), the hardcopy was collected from the one-day workshop on Mobile and Development organized by IPDM, University of Manchester.

Fors, M. and Moreno, A. (2002), "The benefits and obstacles of implementing ICT strategies for development from a bottom-up approach", *Aslib Proceedings*, Vol. 54, No. 3, pp 198-206.

Galloway, L., Mochrie, R. and Deakins, D. (2004), "ICT-enabled collectivity as a positive rural business strategy", *International Journal of Entrepreneurial Behaviour and Research*, Vol 10, No. 4, pp 247-259.

Harris-White, B. (1999), *Agricultural Markets From Theory to Practice*, Macmillan Press Ltd., 1st Edition, pp. 1-39.

Heeks, R. (1999), "Information and Communication Technologies, Poverty and Development", Development Informatics Working Paper, available at: http://www.sed.manchester.ac.uk/idpm/research/publications/wp/di/di_wp05.htm, accessed on accessed on 23/03/2007

Karajaluoto, H., Mattila, M. and Pento, T. (2002), "Factors underlying attitude formation towards online banking in Finland", *International Journal of Bank Marketing*, Vol.20, No.6, pp 261-272.

Kiplang'at, J. (1999), "An analysis of the opportunities for information technology in improving access, transfer and the use of agricultural information in the rural areas in Kenya", *Library Management*, Vol. 20, No 2, pp 115-127.

Kirlidog, M. and Aydemir, A. T. (2005), "Determinants of Culture on a rural CI project", *Community informatics research network 2005, PhD Colloquium and Conference Proceedings*, pp: 161-175.

Kizilaslan, N., (2006), "Agricultural information systems: a national case study", *Library Review*, Vol.55, No.8, pp 497-507.

Leaning, M. (2005), "The modal nature of ICT: Challenging the historical interpretation of the social understanding and appropriation", Community informatics research network 2005, PhD Colloquium and Conference Proceedings, pp: 311-319, website address: www.cirn2005.org.

Legris, P., Ingham, J. and Collerette, P., (2003), "Why do people use information technology? *A critical review of the technology acceptance model*", *Information and Management*, Vol: 40, pp 191- 204.

Lu, J., Yu, C., Liu, C. and Yao, J. E. (2003), "Technology acceptance model for wireless internet". *Internet Research: Electronic Networking Applications and Policy*, Volume: 13, No. 3, pp 206-222.

Malhotra, N.K. and McCort, J.D. (2001), "A cross-cultural comparison of behavioural intention models Theoretical consideration and an empirical investigation", *International Marketing Review,* Vol. 18, No.3, pp 235-269.

Mutula, S. (2005), "Bridging the digital divide through e-governance: A proposal for Africa's libraries and information centres", *The Electronic Library*, Vol.23, No.5, pp.591-602.

Nikam, K., Ganesh, A.G. and Tamizhchelevan, M. (2004), "The changing face of India. Part I: bridging the digital divide", *Library Review,* Vol.53, No. 4, pp 213-219.

Orlikowski, W. J. (1992), "The Duality of Technology: Rethinking the Concept of Technology in Organizations", *Organization Science,* Vol.3, No.3, pp398-247.

Rogaly, B., Harris-White, B. and Bose, S. (1999), "Introduction: Agricultural growth and agrarian change in West Bengal and Bangladesh", in Rogaly, B, Harriss-White and Bose, S (Eds), *Sonar Bangla? The Agricultural Growth and Agrarian Change in West Bengal and Bangladesh*, Sage Publications India Pvt Ltd., 1st Edition, pp. 11-40.

Todaro, M.P. (2000), *Economic Development*. Addison Wesley Longman Inc. 1st Edition, pp. 363-375.

Ullah, A.K.M. A., and Routray, J. K. (2007), "Rural poverty alleviation through NGO interventions in Bangladesh: how far is the achievement?", *International Journal of Social Economics,* Vol:34, No.4, pp 237-248.