

Initial development of the doctoral research on

“The use and appropriation of the mobile telephony technologies by the rural Bangladeshi farmers”

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1.0 Introduction:

This research investigates the use and appropriation of the mobile telephony as the means for achieving agricultural development in Bangladesh. It examines how the farmers make use of the mobile telephony technology, how the technology is integrated with their lifestyles and what impact results from such interaction.

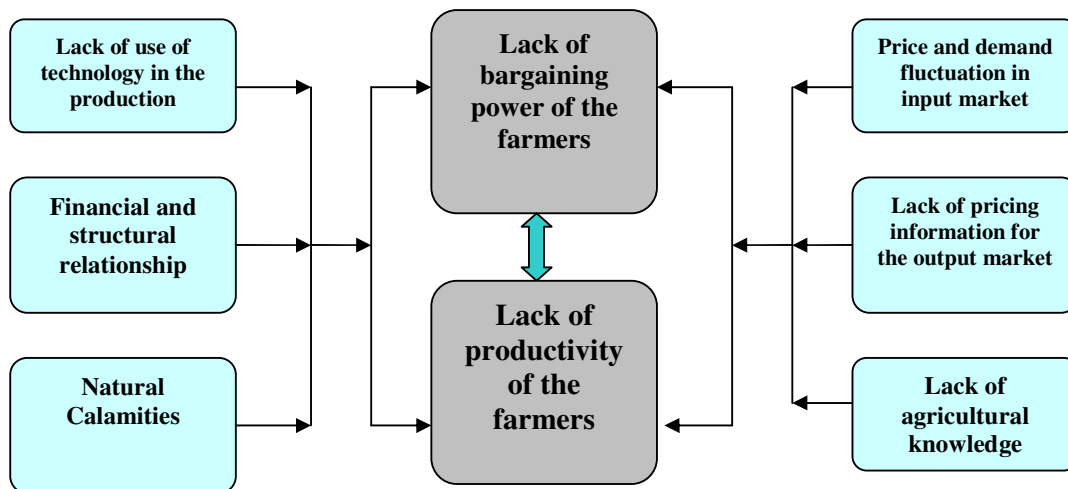
It has been claimed that through social networks, farmers can obtain information (e.g. on prices or the weather) that they can use to improve their farm income, and their lives, leading to rural development. It has been suggested that farmers in rural villages can use voice and data services over mobile telephones to benefit from such information. However, it is also necessary to comprehend how the farmers make use of this technology/application. The appropriation of the mobile telephony technologies by the rural Bangladeshi farmers along with the potential benefits, resulting from such initiatives are investigated in this research.

1.1 Background of the research

Agricultural system in 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, Harris-White and Bose, 1999). Small farmers are entangled within a vicious cycle because of sharecropping, tenancy, money lending and other structural and financial relationship with owners and traders (Crow, 1999). The situation of the vulnerable farmers is exacerbated by the land erosion, drought, flood, deforestation and other natural calamities. This together with lack of financial muscle 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 can be summarized by the figure-1.

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



Can ICT be a panacea? : As ICT diffusion started to grow in many developing countries, the application of ICT to agricultural and rural development began to draw the attention of both researchers and policy makers. Various studies have suggested that ICT could play an important role in the agricultural development. A microwave-radio telephone system installed in the remote region of Tumaca, Columbia, along with community access points resulted in better trade and market opportunities (Lio and Liu, 2006). Rural telephone and community radio services initiated in India and Sri Lanka received remarkable response from the farmer communities (James, 2004). International Institute of Communication Development (IICD) and Manobi, an

African telecom company have initiated a collaborative program to help the farmers of Burkina Faso, Ghana, Mali, Uganda and Zambia to have access to market price information via text messages, Wireless Application Protocol (WAP), or the mobile internet as well as personal computer and personal digital assistant (PDA)¹. Bayes (2001) has identified that the Village Phone Program (VPP) of Grameen Bank of Bangladesh can convert the telephones into production goods by lowering transaction costs. However, cautious scepticism is conveyed in many research works regarding the effectiveness of the use and appropriation of ICTs in the developing countries. There can be a number of ways to analyze how and to what extent ICTs can be used in different spheres of development activities and what could be the resulting impact of such intervention. This research has taken mainly an ethnographic approach.

1.2 Objective of the research:

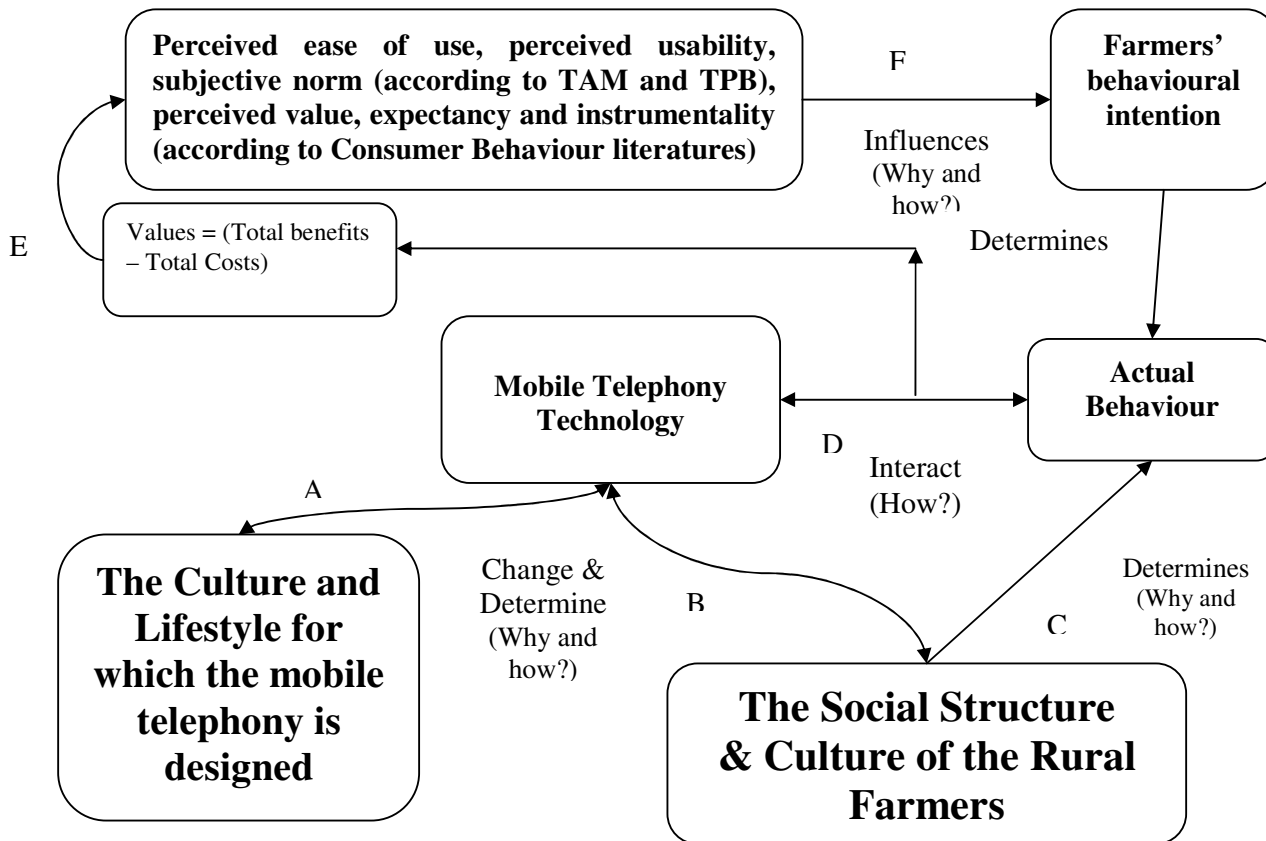
1. What are the ways ICTs can be used and appropriated in rural Bangladesh?
 - What are the needs of the farmers in regards to the use of ICTs?
 - In what ways do farmers make use of mobile telephony technologies to meet their agricultural information needs?
 - How the use and appropriation of the mobile telephony enable the farmers to confront the challenges they face in agricultural processes?
 - What are the attitudes of the farmers toward the use of mobile ICTs (i.e. mobile telephony technology)?
2. What are the farmers' perceived benefits from the use of mobile telephony technologies with regard to resolving their agricultural problems?

¹ (<http://www.uneca.org/aisi/picta/pictabulletin/pb55.htm>)

2.0 Literature Review

The following diagram shows the conceptual framework for the research

Figure 2: Conceptual Framework



The whole diagram has got mainly three parts. Analysis of each of the parts along with the relevant theories is presented below:

1. The relationship between technology and society (A)

This is the social shaping of technology. Technologies have social effects, at the same time social forces give rise to particular technologies (Mackay, 1995). This research is going to analyze the way mobile telephony technology makes an impact on the societies of the developing countries. At the same time the research is going to develop an understanding about how the needs of a particular society are catered by the development of mobile telephony. It is important to note that the mobile telephony technology is not developed or designed for the use of the rural Bangladeshi farmers.

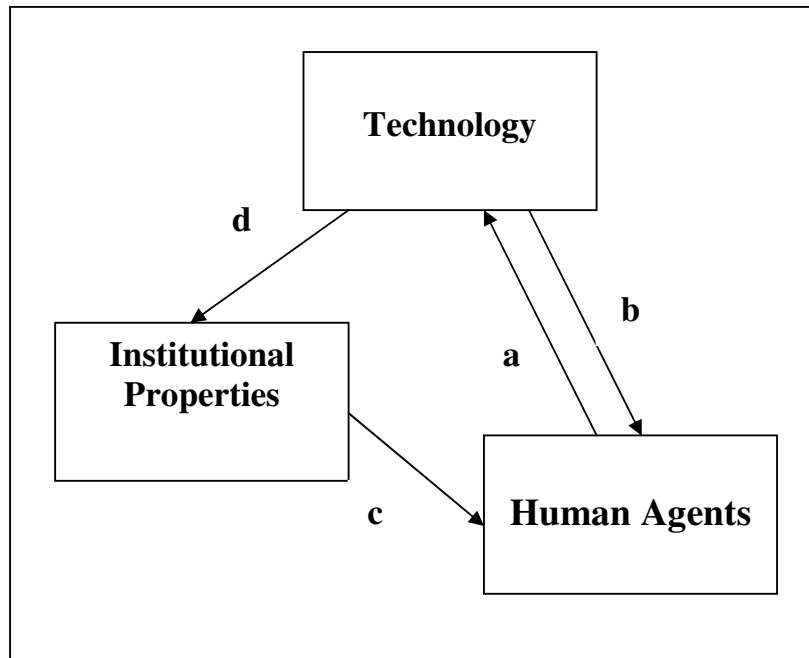
Like many other ICTs the mobile telephony is also designed to cater the needs of a broader community. In most cases the technology, developed in the western countries may only reflect the lifestyle and culture of those countries. People still make use of the technology that is not developed in the context of their countries. While society and technology shape each other, the individuals also make use of the technology according to their lifestyle. It is also important to understand the appropriation of technology – how individuals are likely to use the technologies and with what (intended or unintended) consequences in different conditions (Wiredu, 2007). People are not just malleable subjects who submit to the technology. They may reject, redefine or give meaning to the technology (Mackay and Gillespie, 1992). A western born mobile telephony technology application can have a different consequence in the developing countries. For example, a miscall is meant to provide an indication that someone has tried to call a person. In many developing countries including Bangladesh the price sensitive low end users use miscall to let the other person know that s/he does not have the credit (or does not intend to spend the credit) to make the call, hence a return call is requested.

2. The relationship between technology, society and individuals (B, C and D)

It is also important to analyze 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 the 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 (mobile telephony) and institutionalized rules (the rural lifestyle in Bangladesh) can confront or overcome the problems pertaining to the existing agricultural system. The research also attempts to identify how social structure facilitates or restricts the human agents in making use of the mobile telephony. Orlikowski (1992) and DeSanctis and Poole (1994) have used the structuration theory in the context of organization. Orlikowski (1992) proposes the structurational model of technology. The model shows the interaction among three

entities: the human agent, technology and institutional property. These three entities interact within themselves and develop four states of interactions.

Figure 3 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.
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This particular model provides key understanding to develop the conceptual framework for this research. The technology is the outcome of human action – for this research the use and appropriation of the mobile telephony are the result of the farmers’ ability and intention. Again, the use of the mobile telephony may facilitate or restrict farmers’ action. Nevertheless, the rural lifestyle, agricultural marketing process, social relation and communication make impact on how and why farmers are going to use the mobile telephony. There is also scope to analyze how (if at all) the interaction between farmers and mobile telephony can make any impact on the overall social system.

Structure and culture are very closely related with each other. Hence, it is also important to take the cultural issues into consideration for the use and appropriation of technologies. Through a large-scale, international focus group study Jarvenpaa and Lang (2005) have found that purposes of technology use vary due to differences in cultural orientation. The purpose of the use of technology in individualistic societies (i.e. Western countries) may not be the same as the purpose of the use of technology in collective societies (i.e. Asian countries). Kirlidog and Aydemir (2005) relate the use of ICTs with social science theories of Hofstede and Hall. The rural societies of the developing countries, predominantly having high context culture, rely more on the oral communication. ICTs with more oral communication like telephone, mobile phone, radio can be more effective for the developing countries.

3. Individual’s behavioural intention and use of technology (E and F)

Despite the studies of structuration and culture analyze how technologies can be used and appropriated within a social and cultural context, the determinants for individual behavioural intention still remains unexplained. Davis (1989) develops and validates scales for two specific variables, perceived usefulness and perceived ease of use, hypothesized to be fundamental determinants of user acceptance toward technology

applications. The Theory of Planned Behaviour (TPB) proposes that in addition to attitudes toward use, subjective norms, and perceived behaviour control (PVC) such as skills, opportunities, and resources needed to use the system also influence behaviour. The original TAM model was developed to examine IT/IS adoption in the organizations. The suitability of the model for predicting general individual acceptance needs to be explored. The study of technology acceptance has its genesis rooted in the analysis of attitude, considered as the cause of intention. In consumer research attitude receives much attention. Attitude determines consumers' likelihood to adopt a particular product. In this particular research consumers' (here the rural farmers) attitude toward adopting the mobile telephony technology is analyzed. Bauer *et al.* (2005) have brought a new dimension to the study of consumer acceptance toward technological application, mobile marketing in particular. They have presented the importance of the perceived risk as a factor that negatively influences the consumer acceptance. A consumer is normally uncertain about the outcome of any action. This uncertainty causes perceived risks. There can be different types of perceived risks - physical, functional, financial, social and psychological. For someone belonging to the affluent urban middle class or higher middle class the purchase of the mobile phone may involve more of social and psychological risks, as he or she would try to find a mobile phone set or application consistent to his or her social status and life style. A poor village farmer of a developing country on contrary may consider the physical and financial risks more than anything else. The TAM model, originally developed to find the acceptance of a technology in the organizational context does not consider the individual's perceived risks. This is because in the organizational context an individual may not be directly exposed to many of the risks. However, the acceptance of any technology or application by an individual does require the perceived risks to be considered.

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 price. 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). For example, the social and relational benefits obtained from mobile telephony may be more important to the consumers than the economic benefits.

The review also resorts to consumer behaviour theories including expectancy model by Victor Vroom and theories of needs based on Maslow's hierarchy and subsequent works. Both of the theories help to analyze the behavioural intention of the farmers to use the technology.

Interrelationship among three parts

In the figure-2 A, B, C and D define the social shaping and appropriation of the mobile telephony technology. The use of the technology from technology acceptance and consumer behaviour perspective is defined through F. The experience of using the mobile telephony and its appropriation in the day to day life (or failure to do so) also change or reinforce the existing perception and attitude. This is represented through E. The entire process is like a continuous cycle. However, it requires an intervention (which enables the farmers to make use of the technology) to start with.

3.0 Methodology

3.1 Fieldwork

In this research a planned intervention was initiated to observe and monitor the consequences. Two districts of Bangladesh were chosen for the fieldwork project. One is located next to capital Dhaka city and the other is located in the south-east corner of the country (180 miles from the capital). The climatic condition and demographic composition of the two regions are different. The selection was a deliberate attempt to monitor if the subtle differences between the two regions can engender different research findings. Ten groups were formed in total (five groups in each of the districts). Each had five members. Each of the groups was given one mobile telephone set. The ownership of the set rotated among the group members so that each farmer had two weeks hands-on use of the phone. However, other farmers could still avail of the services of the mobile phones from the persons who were using it that week. The groups were formed on the basis of geographic proximity and social and religious relationship. As a result, the farmers were well connected within a

group. The groups were also connected with the local information centres that have internet connectivity. The farmers' queries regarding crop diseases or insects were sent to the expert people through these centres. The centres also sent back the solution and other services to the groups.

The first month of the fieldwork was used for planning and designing the intervention. Two local NGOs were consulted to select the farmers and form the groups. The initial focus group discussions were conducted to learn about their lifestyle, their problems, their methods for communication and their perception about the mobile telephony. Intervention continued for ten weeks. During this period I had both in-depth interviews and focus group discussions with the farmers. The in-depth interviews were conducted before and after an individual possessed the phone. I asked questions to learn about the problems they came across, how many calls they made, for which purposes they made the calls, to whom they made the calls, how they used it, if there was any special technique he followed to make the use easier and so forth. I also investigated the life history, number of the dependents, level of education of the farmers. The local NGOs are still continuing the intervention. As a result I can always get back to them through phone if there is any confusion. Finally I asked the question if they would be interested to purchase a mobile telephone after the end of their allotted period. I also probed the reasons behind the response.

3.2 Research philosophy

The objective and methodology of the research requires qualitative tools to be used. The interaction between human agents and technology requires the social and cultural context to be taken into consideration. My personal observation and diary notes are used to complement the findings gained from interviews and focus group discussions. I have decided to take up an ethnographic approach in analyzing the context. However, the basic philosophy of the research, according to my opinion needs to be guided by phenomenological approach. I believe the farmers' experience regarding the use of the mobile telephony and both complex and subtle issues pertaining to other spheres of their life need to be investigated to develop an understanding about how this technology is being appropriated. Again, the actual use of the mobile telephony by the farmers is the result of their conscious experiences. I am still learning the

subtle differences among different paradigms of qualitative research approaches. I hope the reviewers and the colloquium attendees will offer me advice in this regard.

4.0 Conclusion

I am just back from my fieldwork. I am now transcribing the interviews and focus group discussions by using a software called Transana. The transcribed data will be coded on the basis of the theoretical outline discussed in this paper. Transcribed data and observations (e.g. the landowners do not feel comfortable to share the mobile phone with their sharecroppers) will be investigated and analyzed based on the relevant theoretical underpinnings. I will be through with the transcription and coding of the data before the conference. Hence, during my presentation at the colloquium I will be able to talk about the findings of my research.

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