

Technology diffusion in rural markets: a user-centred approach

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ABSTRACT

The paper presents a brief description of the practical research approaches adopted for technology diffusion in the rural markets. Research also highlights an evolution in rural regions' socio-economic and technological culture due to the introduction of technology. Based on this viewpoint, adaptation of a user-centred approach to introduce information technology to rural regions is discussed. The approach is applied in two longitudinal studies - one in rural India and the other in rural China by the Advanced Technology and Research (AT&R), NCR, U.K. in collaboration with TATA Institute of Social Science (TISS), India and Sino-European Usability Centre (SEUC), Dalian Maritime University, China respectively. Contributions have been made to the on-going debate about the appropriateness of research methodologies to design for and with individuals in rural markets.

Keywords

Technology diffusion; rural regions; socio-economic and cultural factors

1. INTRODUCTION

An analysis of current research focusing on information technology (IT) diffusion in rural markets highlights a variety of challenges. The impact of these challenges can not only be seen on technological infrastructure but also on socio-cultural aspects of rural communities. However, research often does not investigate the role of socio-cultural aspects in technology diffusion in detail. Our research aims to a) analyse the challenges faced by IT introduction to and diffusion in rural markets and b) identify research approaches which have been adapted to address these challenges.

In this paper, the discussion proceeds in four parts. The next section identifies two distinct dimensions, namely technological and socio-cultural, along which the challenges of IT introduction and diffusion in the rural markets are discussed. Section 3 presents a brief overview of research methodologies adopted to address the challenges of IT diffusion in rural

markets. Section 3 describes the approach adopted in our research in rural India and China. The paper concludes in section 4 with an overview of the level of analysis in our research.

2. THE CHALLENGES

With a focus on the technological dimension, two main approaches, namely top-down and bottom-up, are followed to introduce technology to rural markets. In the bottom-up approach, the existing infrastructure is used as a basis to introduce technology (Galprin 2005 and Heeks 2002). In the top-down approach, a new infrastructure is developed to further support IT development. An example of bottom-up approach is the Bangladesh's Grameen Village Phone and the Internet programme developed on the existing financial Grameen infrastructure (Madon 2000). However, due to the lack of resources in the rural regions such as India, it is a challenge to maintain the technological infrastructures (Rangaswamy and Toyama 2006). It is therefore argued that technology development does not focus on a one-time investment but highlights the importance of on-going and evolution of technological requirements.

The purpose of IT introduction and diffusion is also to enhance the socio-economic progress in rural markets. Research studies focus on the pre-diffusion (such as PC_based kiosks) and post-diffusion user perceptions of and attitudes towards technology use. However, studies do not typically analyse the underlying reasons of change in user perceptions of technology use. The change in users' perceptions is a direct measure of evolution in the culture of technology use. The evolution in user perceptions due to technology use can help incorporate a certain degree of change in the technology in order to sustain its diffusion (Heeks 2002). The next section aims to overview research methodologies to analyse technology use.

3. RESEARCH METHODOLOGIES

The rural markets of countries such as India, Pakistan and China offer a rich multicultural landscape. Traditionally, ethnographic research has been carried out in countries such as China to identify cultural factors to improve technology use (Moraveji et al. 2005). Ethnographic research focuses on small indigenous societies to obtain an in-depth understanding of the question addressed. This research when adapted to study evolving rural markets often reveals methodological difficulties. First, ethnographic methodologies focus on rigidly bounded contexts. Second, these methodologies normally take into

account only researchers' views. Hence, several social science research methods such as participatory design, case studies, surveys and structured interviews have been adopted in ethnographic research (Chambers 1981). These research methods can be viewed along two dimensions.

In the first dimension, in-depth longitudinal studies within relatively smaller contexts are carried out. This approach aims to help understand the emerging trends in individuals' perceptions with respect to a technology. The second approach is less longitudinally intensive but broader scope. This approach aims to obtain a preliminary insight into individuals' perceptions and reactions toward technology use in order to introduce it on a relatively large scale. For instance, traditionally, development research was based on academic surveys (Huizer 1997).

The limitations of both dimensions can be seen in terms of time constraints and rigidity of contexts of study. It is argued that anthropological research methodologies do not meet the requirements of mobile and in transition contexts of studies (Rangaswamy and Toyama 2006). In order to address the needs of in-transition large rural market, it is important to evolve ethnographic methodologies. The next section discusses the application of a user-centred participatory approach in two longitudinal studies in rural China and India. These projects have been carried out by AT&R, NCR in collaboration with SEUC, China and TISS, India.

4. THE ADOPTED APPROACH

We have developed an appropriate approach in two longitudinal research projects in rural China and India. The main purpose of these projects is to obtain an understanding of the banking culture, current financial facilities and individuals' perceptions of modern self-service banking technology. In addition, these projects aim to obtain an insight into how modern technology can be introduced and sustained in the rural markets. As argued, sustaining technology not only requires an evolution in technology itself but also in the socio-economic conditions of the community. In our approach various methods such as field observations, case studies, focus group sessions, surveys and in-depth interviews are being employed. These methods will gather first-hand knowledge about individuals' practices, perceptions of and requirements from the modern self-service technology. Also, the longitudinal nature of our research will capture a deeper understanding of technology diffusion in the rural markets over a period of time.

Therefore, an understanding of the relationships among existing technological and socio-economic and cultural factors will be obtained. We hope that the understanding will further help analyse the potential opportunities for the sustainability of modern financial technology in rural China and India.

5. LEVEL OF ANALYSIS

The use of technology in developing regions can be analysed at various levels, namely individual, group, community and national (Walsham 2001). The analysis at individual level becomes particularly important in research within rural regions as they offer a rich landscape of cultural and socio-economic factors. At community and organisation levels, a certain degree of generality in the addressed phenomenon is assumed. It is important to focus on individual level data, which can be used to create knowledge on higher levels. For instance, the knowledge creation at individual level may help obtain an

insight into the requirements of the immediate community level. The value of community level facilities has been asserted for rural marginalised regions in research (Walsham and Sahay 2005). Based on this concept, a bottom-up approach for data analysis is likely to prove effective for applied action research in the ongoing projects in rural China and India.

At the initial stages of these research projects, a brief insight into the existing financial culture and individuals' perceptions and reactions toward modern financial technology will be obtained. The later stages of research aim to assess the impact of technology innovation on the cultural, socio-economic and development infrastructure of rural regions of China and India.

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