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A Theoretical Framework for Rural Knowledge Centers

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Exponential growth in ICTs (Information and Communication Technologies) and establishment of RKCs (Rural Knowledge Centers) have been fast spreading across the globe. In the continuous process, there are tens of thousands of RKCs are being established by various agencies, to provide shared public access to ICTs for meeting educational, social, personal, economic and entertainment needs of the rural community. As most of these initiatives are relatively new, there are mixed opinions on the social and economic impacts of RKCs. There is also lack of good understanding on the conceptual and theoretical framework for planning and designing of RKCs. The authors conducted a study to fill this information gap by assessing selected ICT4D (ICT for development) project sites in rural India. Through the systemic analysis of the data and continuous interpretation of the observations, the study proposes a framework for planning and designing of RKCs. In this paper, the authors present the study results, and discuss the evolution process of RKCs and factors that influences planning and designing of RKCs.

Keywords: rural knowledge centers, framework, knowledge management, ICT for development

1ntroduction

Exponential growth in ICTs (Information and Communication Technologies) (Buskens & Webb, 2009) and establishment of telecenters (A telecenter is a public place where people can access computers, Internet, and other digital technologies that enable them to gather information, create, learn, and communicate with others while they develop essential digital skills) have been fast spreading across the globe (Rao, 2009). Telecenters equipped with ICTs have become new ways of reaching the people and delivering services in the developing countries (Gomez, Hunt, & Lamoreux, 1999). In the continuous process, these centers have been acknowledged as new institutions in the global rural milieu, to empower rural communities by bringing benefits of contemporary ICTs in their reach, such as e-governance, telemedicine, digital literacy and e-agriculture. The last decade, many organizations have launched such initiatives, known as ICT4D (ICT for Development) projects, in the rural areas of developing countries, with an aim to bridge the digital divide by providing access to information and technologies; and also for poverty alleviation, policy advocacy, local governance and educational development (Flor, 2001). Today, there are tens of thousands of telecenters throughout the world (Electronic Journal of Information Systems in Developing Countries, 2001). These are the places or centers that

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provide shared public access to ICTs for meeting the educational, social, personal, and economic and entertainment needs of the community (Gomez, et al., 1999; Fuchs, 1998; Roger, 1999; Proenza, 2001).

As most of these initiatives are relatively new, there are mixed opinions available from the literature on their social and economic impacts in the communities where they are situated. For instance, the UNCSTD (United Nations Commission on Science and Technology for Development) reported, there are many instances where the use of ICTs is bringing widespread social and economic benefits, and also there are as many instances where ICTs are making no difference to the lives of people in developing countries (or) even having harmful effects (Mansell & When, 1998). Furthermore, emerging studies have shown that many of the claims being made about the potential of ICTs for development are not supported, and point to possible counter-productive effects (Gomez, et al., 1999). There is also lack of good understanding about a sound conceptual and theoretical framework for planning and designing telecenters. This study seeks to fill this information gap by assessing selected telecenters project sites in rural India, understand various dimensions and dynamics involved in planning and designing of telecenters.

Assessment of Telecenter Projects

Most of the evaluation studies of telecenters till date have focused more on their operational aspects, such as technical, financial and managerial performances and sustainability aspects (Fuchs, 1998; Whyte, 2000; Judy, Gail, & Jeff, 2001; Latchem & Walker, 2001; Florence & Wamahiu, 2003; Balaji, Aswin, Kiran, Dileepkumar, Janaki, & Kumar, 2005), and few discussed on possible frameworks and approaches (Roger, 1999), (Gomez, et al., 1999; Whyte, 2000; Reilly & Gomez, 2001). Some studies reported on the role of telecenters in e-governance applications (Balaji, et al., 2005; Shirin & Kiran, 2001). There are no (or) very few evaluation studies focused on understanding various dimensions and dynamics involved in planning and designing of telecenters. In this particular study, an attempt has been made to conduct an assessment study by physically visiting selected telecenter project sites—Rural e-seva, E-seva, Rajiv Internet Villages, Saukaryam, Bhoomi, M. S. Swaminathan Research Foundation Information (MSSRF) Village Research Project, ITC e-choupals, Aaqua and Kisan Call Centers and understood many other projects from the literature and also interviewing the primary researchers and project personnel of the sites including Akshaya, Warana Wired Village Project, Drishtee, EID Parry, Kisan Kerala and E-Sagu. The study used multiple case study methodology, which has been discussed in detail in methodology section, to understand various dimensions and dynamics of these projects.

Type of Projects

The selected telecenter projects are different with each other, as per the public ICT access, varying in the clientele they serve, the services they provide, as well as their business or organizational model. These centers are being run by government agencies, Civil Society organizations (NGOs and CBOs), Corporate, educational institutions, etc. Each center has its own advantages and disadvantages, as the way they link communities with ICTs and bridge the digital divide.

Methodology

The aim of this study was to develop a framework for setting up of RKCs in developing countries. Since the focus of the research was in building a context aware framework which is synonymous with the theory building which Glaser and Strauss (1967) argued could be best approached with inductive qualitative research

rather than continual hypothesis testing. Therefore, it was decided to use the qualitative research method and identified case study method is much more suitable for this kind of study (Alavi & Carlson, 1992; Orlikowski & Baroudi, 1991).

Case Study Method

There are several definitions of case study, but Benbasat, Goldstein and Mead (1987) presented a comprehensive definition that drew from a variety of sources. They defined case study as a research approach that examines a phenomenon in its natural settings, employing multiple methods of data collection to gather information from on or few entities (people, groups or organizations) on a phenomenon that is not clearly evident at the outset. Case study is also good in research where no experimental control or manipulations of variables are involved. Compared to other approaches (laboratory and field experiments), researchers have less prior knowledge of what the variables of interest are and how they will be measured.

Multiple Case Studies

Yin (1994) suggested that a single case study is appropriate in a situation previously inaccessible to scientific investigation, an extreme or unique case, or for theory testing purposes, while multiple case studies provide general explanations that are applicable to individual cases in spite of differences in each individual case. Multiple cases also support the development of abstraction across cases and make the result more generalizable and reduce any possible bias (Merriam, 1988; Miles & Huberman, 1994).

These definitely require some degree of generalizability of the findings and multiple case studies in multiple locations that were, thus, seen from the beginning as appropriate. While the conduct of multiple case studies can require extensive resources and time, the evidence from multiple cases is often considered more compelling, and overall study is, therefore, regarded as being more robust.

Data Collection Methods

The study used several methods of data gathering: semi-structured interviews were complemented with short time on-site observations and surveys with quantified responses.

Data Analysis

Data analysis of qualitative data depends on the capability of the researcher to integrate evidence from multiple sources (Benbasat, et al., 1987). The analysis may not be as mechanical as the analysis of quantitative data (Patton, 1990; Miles, 1983), but the conclusions from these analyses are reliable.

Important ideas were immediately taken down in the field notes, while all the recorded tapes were later transcribed. The transcribed data was thoroughly read and particular attention was paid to discussions about issues concerning the planning and designing of RKCs. Further meaning was ascribed to the salient points that emerged from these analysis based on the insight from the observation. After reporting the first series of findings, the study proposed a framework based on a discovery from the systemic analysis of the data and the continuous interpretation of the observations through the pre-knowledge of the phenomenon.

Learnings from the ICT4D Projects

Despite good intentions and financial support, the effectiveness of ICT enabled RKCs is uncertain; and analytical understanding of the relationship between the enhanced deployment of ICTs and development outcomes is unclear or ambiguous. The inferences from the assessment of the ICT4D project sites are:

(1) There is prevalence of top-down approaches with few attempts to reflect the end users preferences and

needs;

(2) ICT and techno-infrastructure is not just computers and Internet, but also landline telephones, cellular phones, radio, television, etc. What is needed is a judicious blend of traditional and modern technologies depending on what would works best in a given situation;

(3) Production advisory services and market information access do not go together in all such efforts;

(4) Localization and customizability of content are still not practiced on a significant scale.

The study further suggested that efforts should be made to develop medium to high level of rural communities' faith in ICT enabled services. It was also suggested that participatory rural appraisals and rapid rural appraisals should be carried out to know about information needs of the rural communities and the social acceptance of the technology. Identification of the typical community problems would be the first step to start any kind of ICT4D/telecenter project. Emphasis should be given to define methodologies for transforming generic datasets into locale specific information for their effective use.

Based on these findings, a framework was proposed to set up ICT enabled RKCs and recommendations were made for their effective use.

Evolution of RKCs

Setting up of a computer center in a village does not constitute a knowledge center. The translation of a rural computer center into a knowledge center requires an intensive social process. A rural telecenter evolves into a knowledge center only when modern ICT facilitates transfer of information into knowledge. A telecenter providing market price is an information center. A telecenter, which enables the rural community to understand the differential mechanisms through which prices are influenced and determined, is a knowledge center.

Most of the rural ICT projects focus on providing information services, rather than looking at the knowledge management strategies. In agriculture and rural development, the importance of uneven distribution of knowledge in explaining variations in TFP (Total Factor Productivity) are being increasingly recognized (Chapman & Slaymaker, 2002). It was also reported by National Knowledge Commission of India in 2004. Mere information in the form of flow of messages may not be able to address the problem. Knowledge as the creative result of a flow of messages anchored on the commitment and beliefs of the actors involved in the process and resulting in human action is needed. Environment in which knowledge is built; capacity building and empowerment processes, social mobilization and organization are the important factors which have to be taken into consideration while transforming a telecenter into a knowledge center. Freire (1972) argued in the case of the pedagogy of oppressed vis-à-vis literacy programs, the need for dialogues and discourses among learners to understand the world instead of mere understanding of words. Similarly in the process of knowledge management, dialogues and discourses among the rural community are essential. Modern ICT, if properly defined, can help to broaden the canvass for dialogues and discourses among the rural community.

Information Vs. Knowledge. The differences between information and knowledge are being spelt out in many books and papers in recent times. Many authors have described the progressive processes from data to information to knowledge to wisdom in terms of purposes and contexts.

> Data refers to raw materials, such as facts and figures that could be collected by an information system. Information refers to analyzed data often presented in a form that is specifically designed for a given decision-making task and transmitted to/received by decision makers. Knowledge refers to subsequent absorption, assimilation and understanding and appreciation of that information (Chapman & Slaymaker, 2002).

Newell and Simon (1972) argued that

> Knowledge is information incorporated in an agent's reasoning and made ready either for active use within a decision process or for action. It is the output of a learning process. Thus, the roles of knowledge are to: (1) transform data into information; (2) derive new information from existing ones; and (3) acquire new knowledge pieces.

Wisdom is considered as meta-knowledge, knowledge mobilized to acquire new knowledge and update it. From a philosophical angle, wisdom refers to the evaluation of knowledge vis-à-vis the norms, values and morality (Newell & Simon, 1972). Knowledge management focuses on definition of the context and validation of the information. It also increases the connections among people (who have knowledge) that would likely not occur without the help of a knowledge management system (Terra & Angelon, 2002). The process of searching answers for the following questions characterizes the dimensions of knowledge management;

Who created the information?

What is the background of the creators of information?

Where and when was it created?

How long will the information be relevant, valid and accurate?

Who validated the information?

Who else might be interested or has similar knowledge?

Where was it applied or proved to be useful?

What other sources of information are closely related?

How to test and validate some of the concepts?

In the context of rural community, the presence of traditional knowledge is another important dimension of knowledge management. The social construction of traditional knowledge and the blending of the new knowledge with traditional knowledge are the components of knowledge management. Thus, knowledge management necessitates a participatory management in which the rural community plays a crucial role in absorption, validation, critical evaluation, assimilation, understanding and appreciation of information.

According to Marwick (2001:815) knowledge management takes place at four levels: Socialization in which exchange of tacit knowledge takes place within a community; Externalization in which a set of tacit knowledge is converted into explicit knowledge; when the explicit knowledge is shared, the process of combination takes place; and finally internalization in which socialization, externalization and combination lead to further set of new tacit knowledge. Through such a process, the community plays a crucial role in converting a generic information and knowledge into locale specific knowledge. Such a system requires both vertical (between macro and meso organization and villager) and horizontal transfer of knowledge (from villager to villager) in which the knowledge creators at the macro and meso level interact with the community and through an interactive learning process both the stakeholders define the roadmap for knowledge management. The ICT enabled RKCs enhance the socialization process through broadening the horizontal transfer of knowledge. The creation of databases based on local knowledge and traditional knowledge represents the process of externalization in which the tacit knowledge is converted into explicit knowledge. ICT also facilitates the exchange of explicit knowledge within the communities and among the communities leading to a process of combination. Finally, internalization of explicit knowledge into tacit knowledge represents the framework of knowledge management. Thus, in a knowledge center, rural communities are not mere consumers of information but partners in knowledge management.

The various dimensions of RKCs vis-à-vis knowledge management are

(1) Centers of human resource management;

(2) Centers of information, such as weather, trade, market, transport, etc.;

(3) Centers of governance for delivering development with least social and economic transaction cost;

(4) Centers blending traditional wisdom with frontier sciences.

The community ownership is crucial. The various sections of the community (vis-à-vis caste, class, gender, age, religion and region) should be involved in the entire process of developing the programs, content, delivery methodologies, learning processes and assessment and in the use of innovative technologies. Such a participatory approach is necessary for ensuring the relevance of contents and technologies within the social context in which the knowledge center is operating.

According to Roling, Neils (1988), the evolution of rural knowledge center is a function of 7 C s, i.e., Connectivity, Content (Static and Dynamic), Context, Cash, Culture, Community and Communication. Ensuring the 7 Cs requires a process of Mobilization, Organization, Capacity Building, Technology Incubation, Technical Support, and System Management. Though Neils analyzed these aspects well, he forgot to include the factors influencing the process. In the proposed framework, we made an attempt to distinguish among processes, functions and influencing factors, and discussed in details how they relate with each other during the evolution of rural knowledge centers.

Framework for RKCs

Process in evolution of a RKC

Needs Assessment. Rural communities have own social dynamics and wide diversity of interests. The solutions to their problems will be highly local and highly specific. So identification of their needs, problems and technology preferences is a first step to start RKC in any location. After identification, analysis is required to provide relevant information resources through user preferred communication techniques for satisfying their information needs.

In most of the government projects, i.e., Rural E Seve, Eseva, Rajiv Internet Villages and Drishtee, the government officials assumed that they know what is needed at the grassroots and established the infrastructure for starting the activities without making any committed involvement of the local communities. That’s why most of the projects even kick started the activities very well, but they lost that tempo and resulted in failure in achieving the long-term sustainability in the long run. In the case of ITC e-choupals, though the project personnel made efforts in identifying the needs of users, they didn’t consider the user’s preferences in technology identification. This resulted in looking for alternative mode of information communication for coffee and Aqua choupals. From this, it appears that RKC project should follow combination of bottom-up and top-down approaches with community mobilization to ensure the long-term sustainability of the project.

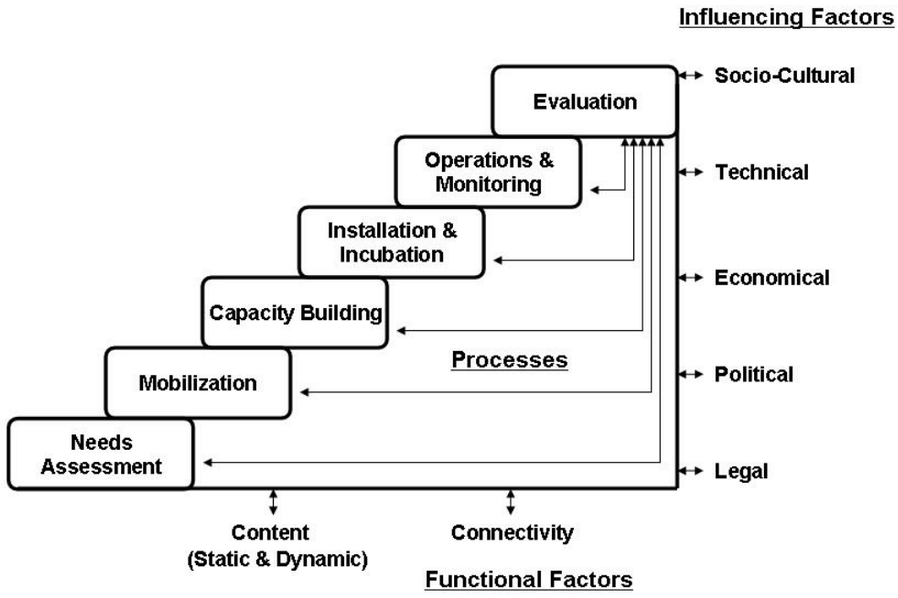

Figure 1. Functional framework for RKCs.

Mobilization. Community mobilization and resource mobilization are essential for ensuring the long-term sustainability of the RKC project. Involving the communities in each and every evolution process of RKC, includes needs assessment, identification of the user preferred technology and resource mobilization; and also gives sense of ownership. Once the communities realize that the RKC project is being operated by them and for their benefit, then the operation will go long-way with the faith and motivation of involved communities. During the resource mobilization, make the communities to share the project costs in terms of community buildings, electricity and human work hours. Motivate them to identify and establish linkages with local knowledge producing agencies and their role in RKC operations; and make them to realize the information need and knowledge management process and pattern; make them to understand structural differences in the community, i.e., caste, class, religion, region, gender and age; and realize them need of allowing users to use facilities of RKCs irrespective of structural differences for achieving the development.

Capacity Building. Capacity building is often defined in the literature as a process to develop certain skill or competence to enable individuals (or) organizations to perform effectively. In this context, capacity building is essential to both the communities (individual level) and RKC (organizational level) for long-term execution of activities effectively. Capacity building is continuous long-term process as reported by UNDP (United Nations Development Program). It was therefore, since inception of the project, continuous capacity building to the communities and RKCs is essential on various areas, including (1) Organization—Capacitate the communities on identification of organization types, build organizations, planning programs through their organizations, linking the organization with the macro, meso and local organizations for horizontal and vertical transfer of knowledge, facilitating the organizations to define the self-sustainable interventions, developing contractual arrangement among various stakeholders, organization management and conflict resolution; (2) Literacy—The focus of first phase should be on digital literacy including literacy training on new software and basic trouble shooting, and the focus of second phase is on subject matter literacy training including use of

technical skills for gaining subject matter literacy; and ICT enabled knowledge management includes content creation, consolidation and delivery.

Installation and Incubation. After ensuring the communities are mobilized and capacitated, start install services, and introduce them by creating awareness. The period in between installation and implementation is known as incubation period.

Operations and Monitoring. In the project, initial stages monitor each and every service, the way it is being delivered and the way communities are being received.

Evaluation. After certain period of time, there is a need to conduct an evaluation study to understand various insights and dynamics of a project. Each learning experience should be fed back into the system to make a project sustainable.

Functional and Influencing Factors

The functional factors such as content and capacity building play a vital role in ensuring the long-term sustainability of RKCs. The economical, political, socio-cultural, technical and legal factors need to be considered carefully while planning and designing of RKCs.

For instance, ICT choupal project experiences show the need of socially accepted technologies for their various choupal models, whereas Rajiv Internet Village project shows how the political factors influence to rename the Rural E-seva project to Rajiv Internet Villages.

Recommendations

The study recommends the necessity of partnerships with the external agencies, locally reliable organizations and local communities for successful implementation of RKC projects.

This kind of initiatives cannot be successful unless the community has a sense of ownership and participation right from the beginning. The bottom-up exercise involved local volunteers in participating the project activities i.e., collecting information from various sources, organizing and implementing various activities of the Village Information Centers/info kiosks gives the sense of ownership in the local communities, and would be useful for establishing sustainable RKC projects.

It is strongly recommended that the developing nations should formulate policies for developing strategies to harness the potential of ICTs and RKCs.

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