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ANALYSING ICT PROJECTS FROM A DESIGN PERSPECTIVE: A CASE OF RURAL INDIA

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1. Introduction

Reducing information poverty in rural India, with the aim of improving quality of life presents a major challenge for design and development of information and communication technology (ICT) interventions. Information poverty can be seen as a lack of information for the rural users to make choices to improve their well being, thus limiting their economic and social development [Barja and Gigler 2004]. In addressing information poverty in rural India, over the last decade, several ICT intervention offering information related to healthcare [Jiva 2005], agriculture [Ramamritham, K., et al. 2006], and e-governance [CEE 2001] services have been executed. Despite recent efforts in the use of ICT to bridge the information poverty gap, there is still a lack of information available for people in rural areas. Limited user acceptance of ICT interventions may be attributed to (a) mismatch between the information required by the rural users and the information offered by the ICT interventions and (b) dominance of technology centred design and deployment process over user-centred design approaches. To further compound the problem, the lack of information available via ICT intervention in rural India, means that new projects have to overcome the hurdle of familiarity with information and information device and thus indirectly acceptability.

Available literature on ICT intervention display sufficient studies on review of design approaches applied in design of information system [Boonstra 1996], [Blattman et al. 2002] pointed out relevance of community participation for information dissemination, and [Toyoma et al. 2005] on different ways to make ICT intervention sustainable. However, in literature mentioned above or otherwise, there is rare evidence about studies related to user acceptance of ICT intervention and its relevance in achieving higher technology adoption. In the current paper, the design processes of ICT interventions already deployed in rural India are reviewed, including the degree to which and how users were involved in the design process. The review of past ICT intervention led to an integral design approach. The design approach supports (a) user participation in the design and development process, (b) integrates empirical findings into the design process, and (c) offers evaluation parameters to measure adoption of ICT intervention. This approach have been reported in [Parmar 2009]. In this paper, we will only discuss our learnings from the ICT case studies. For the purpose of this paper, ICT intervention is defined as technologies that help the creation, transfer, and exchange of information across geographical distances through radio, internet, and web browsing.

2. Related ICT studies in rural India

Several ICT interventions have been deployed in rural India with a view to reducing information poverty in order to enhance social, economic, and political development [Best and Kumar 2008; Rao 2008]. Approximately 174 projects initiated by international agencies, the private sector, NGOs,

central and state governments are using new media ICT for the benefit of the urban and rural populations in India. These ICT interventions provide e-services in the domains of agriculture [Ramamritham et al. 2006], healthcare [Jiva 2005], and education [Mitra and Rana 2001]. Over the past decade several internet-based information delivery products and services have been proposed by governmental agencies, non-governmental organizations and corporate bodies [CEE 2001;Jiva 2005; Bailur 2006].

In order to understand the successes and failures of the existing ICT interventions, several case studies have been reviewed from multiple perspectives, including media and communication [Reilly and Gomez 2001], social sciences, technology development, and business development [Best and Kumar 2008]. These studies specified certain issues that impede the success of ICT interventions. The issues can be understood as: design for community, multidisciplinary design and development models, ICT adoption, sustainable economic models, and overall sustainability towards improving ICT development. Although, the literature is helpful in understanding the factors that affect the success and failure of existing ICT development, there is one issue from the user-centered development viewpoint that should be considered: Even though ICT interventions are aimed at rural development, none of the above studies were framed from the perspective of the rural user. As a consequence, the role of the user as a prime stakeholder was neglected, and the tendency was for issues mainly relating to finance and technology to be considered important in relation to ICT development. Although "information dissemination" is a critical aspect of ICT intervention, none of the above studies analyzed the mechanisms applied for the generation and dissemination of content to the users.

In short, the above gap in the literature pertaining to the analysis of ICT interventions, leads to an insufficient understanding of the role of users, other stakeholders and their needs in the design process of ICT intervention. In terms of developing ICT interventions from the user perspective, the following issues should be considered:

- What is the role of user participation in the development process?
- What is the information exchange model used between the user and the ICT intervention?
- What is the involvement of stakeholders?
- What efforts are made to ensure ICT adoption?

In order to understand the above issues, four case studies of ICT interventions for rural users in India were analyzed. The following section summarizes the research method applied, the criteria for selecting the case studies, and the evaluation aspects for conducting case study analysis.

3. Method for selecting ICT case studies

A case study was conducted to analyze four ICT interventions that had been deployed in rural India in the last decade. The purpose of conducting the case study analysis was to understand the successes and failures of existing ICT interventions in rural India. The case study method was selected as it provides an opportunity to directly observe unfolding events over time within its natural setting. The case study method is useful in the pilot stage of an investigation since it provides hypotheses that may be tested systematically in follow-up research [Flyvbjerg 2004].

3.1 Selection of case studies

The following four ICT interventions deployed in rural India were selected for the case study analysis: Gyandoot, n-Logue, Simputer, and Hole-in-the-Wall. The criteria for selecting these cases were: (a) The case should provide a diverse range of ICT-based services in the area of e-governess, education and agriculture; (b) ICT interventions should have been deployed for at least five years so that the social impact of ICT can be investigated by interviewing and observing the stakeholders involved; (c) Secondary data about these cases should be published in journal articles and conference proceedings.

3.2 Evaluation aspects

The following four evaluation aspects were selected to evaluate the case studies: user participation in design, information exchange model, user adoption and stakeholder involvement. These aspects were selected based on their relevance in the user-centered development and make it possible to evaluate ICT interventions from multiple dimensions that directly or indirectly influence the user's attitude

towards ICT interventions [Best and Kumar 2008; Jain et al. 2008]. The four evaluation aspects can be understood as:

- User participation: the role of user involvement in the development process.
- Information exchange model: the model of information exchange between the user and ICT intervention.
- User adoption: the approaches applied to ensure ICT adoption.
- Stakeholder involvement: the approaches applied to establish communication between rural users, local stakeholders and technology providers.

3.3 Data collection

In order to evaluate the interventions, information was collected by the following methods:
Interviews: Interviews (n=30) were conducted with rural users, field experts, and non-government organizations in the states of Maharashtra, Gujarat, and Karnataka in India. The interviews were conducted in local languages with the stakeholders involved: kiosk operators, users, content developers, and service providers. Telephone interviews were conducted in those situations where physical accessibility was not possible. The questionnaire is partly based on the questionnaire developed by Microsoft, India, for investigating kiosk usage in rural India [Toyama et al. 2005]. The interview sessions started with informal discussions with the rural users in order to gain their trust and confidence when answering the questions.
Literature review: This included a review of research articles and evaluation reports.
The data collected from the interviews and the literature studies were combined to make a descriptive case. The evaluation aspects were used as main categories to consolidate the data from the interviews and literature studies.

4. Results of case studies

The interviews were transcribed and key statements were extracted. The key statements were coded by using the following four aspects: (a) User participation; (b) Information exchange model; (c) ICT adoption, and (d) Stakeholder involvement. An affinity diagram of all the key statements was made. An affinity diagram is a semantic grouping of data and organizes key statements into a smaller set of common issues and themes [Beyer and Holtzblatt,1998]. The findings from each case study are explained below.

4.1 Description of the project: Gyandoot

Gyandoot is a large-scale project introduced in January 2000 in the Dhar district of Madhya Pradesh, in central India, whose purpose is to provide government-to-citizen (G2C) and citizen–to-government (C2G) services to 1.7 million rural users. Technically, Gyandoot offers 22 applications. The applications are mainly related to e-governance, agriculture, small business establishments, village level government and private services [CEE 2001; Cecchini and Raina 2004]. Figure 1 depicts the training session attended by teachers at one of the Gynadoot soochanalayas.

Figure 1. Gyandoot kiosk set-up (Photo courtesy of: www.dhar.nic.in/gd-pg5.htm)

*Method of information delivery:*Information was delivered via a dial-up internet connection and through n-Logue corDECT technology used in Gyandoot centers called “soochanalayas” or information houses.

User participation: No formal mechanisms were adopted for generating user requirements; hence much of the functionality offered was not required by rural users and was found irrelevant by the users. Efforts were mainly focused towards digitizing existing official (government) paper-based transactions. This led to over-specification of the requirements by the Gyandoot service provider. Further, it complicated access to the information required by placing higher demands on the learning capabilities of the rural users. In one of the conversations (US9) the respondent stated: "*I don't even know about certain functions, things that are important to me are not there…none of my friends or myself were asked about what we need in our daily life…"*
Model of information exchange: The usage of e-governance applications was low because the system was operated by the "soochalak" or kiosk operator and not by the users themselves. One respondent stated (US6): "*I have made several visits to obtain certain information. However, two times soochalak was busy dealing with people from the upper class. I had to wait a long time and I finally left because I had some other work to get on with. Other times he was not there. This means I can't access information, I wish I could access these services on my own."*
User adoption: The project was accepted among upper middle class villagers as they could take advantage of the "mandi" or agro-market prices and were therefore in a position to take risks associated with quick decision-making. Despite targeting rural users, the impact of the project was mainly restricted to reasonably well-off and rich farmers.
Stakeholder involvement: The communication gap between soochanalayas and the government organizations often caused delays in the information delivery process. This gap may have had a negative impact on building trust between users and Gyandoot. Furthermore, irregularity in content update by government officials was a problem for soochalak as users required the latest information for their business decisions. One of the soochalak (US2) said: "*I have some customers who always look for updated and new information. Unfortunately, due to poor telephone connectivity and poor communication between content developers and government officials, I often disappointed these customers".*

4.2 Description of the project: n-Logue

N-Logue is a large-scale project spanning seven Indian states. The project was introduced in April 2000 with a view to setting up a profitable network of wirelessly connected internet kiosks in villages throughout India. It offered information services via corDECT, a fixed wireless local loop technology for providing an IP network. Technically, the low-cost deployment and minimal maintenance requirement makes corDECT ideally suited to rural areas. Figure 2 depicts a woman kiosk operator and her kiosk set-up.

Figure 2. n-Logue kiosk in the village (Photo courtesy of: www.nature.com)

*Method of information delivery:*Information is only delivered via internet-based applications. There are no dedicated applications for agriculture or healthcare. The information delivery in the n-Logue kiosk is dependent on infrastructural factors such as: internet connectivity, power supply, and the availability of the kiosk operator [Dhawan 2004].
User participation: The findings indicate that no formal methods were applied to generate user requirements or design solutions. The developers mainly generated the requirements and content on the basis of a general understanding of the issue as presented to them by the development manager. Users were not involved in generating the requirements. One of the kiosk operators (US11) in Maharashtra state said: "*n-Logue came with their technical kit, we were only trained to use their equipment and none of us from the village was ever asked what our actual requirements are".*

Model of information exchange: The main function of n-Logue was to offer net connectivity for browsing the internet and to access information from different information resources. The existing user interface was found not to be compatible with the skill set of rural users, thus restricting kiosk usage to expert users who are able to operate Windows and browse the internet [Parmar et al. 2007]. One of the n-Logue kiosk users (US14) said: *"All I need is a few buttons that I can remember, and for the rest I am not concerned about how a computer works, how it updates information etc. I don't have time to learn about computers now."*
User adoption: The lack of well-defined applications in the n-Logue kiosk restricted its use to that of a general purpose internet booth. Furthermore, the n-Logue kiosk did not target a specific user segment, and as a result it was not clear to the rural users what they should use it for. The lack of well-defined applications was one of the factors inhibiting project acceptance among rural users. One kiosk user (US17) said: "We have information needs related to health or agricultural problems, but it is extremely difficult for us to use internet and find information. A dedicated application would be very useful…"
Stakeholder involvement: The project involved local service providers, kiosk operators, and the n-Logue team as the main stakeholders. However, communication between content developers, kiosk operators, and service providers could not work coherently due to a lack of commitment about the deliverables from each stakeholder. For example, where issues about internet connectivity were concerned, providers did not supply the necessary services on time, and the result was that kiosk operators incurred financial losses. A few kiosk operators said: *"We were told we would earn money, but it seems n-Logue had no real plans at all to sustain our kiosk…"*

4.3 Description of the project: Hole-in-the-Wall

NIIT of New Delhi started this project in 1999. The basic strategy was to engender a collaborative learning approach by encouraging children to explore, learn and enjoy computers. This large-scale project was mainly deployed at Leh, Ladakh, Maharashtra, Rajasthan, and New Delhi. The aim of the project was to reach children from rural and urban slums, who do not have access to computers in their schools [Mitra and Rana 2001]. The prototype learning stations were deployed in playgrounds where children assemble to draw knowledge and in the process to engage in meaningful interaction leading to better awareness about computers (see Figure 3).
*Method of information delivery:*The information is delivered via a wall-mounted desktop with a customized keyboard. The application mainly involves computer learning software, educational software and internet browsing. It provides information on subjects such as math, English, and science adapted from the structured textbook and curricula formats.
User participation: The project offered functions relevant from the perspective of student development through rapport-formation avenues such as educational games, freeware from the internet and information related to improving English vocabulary, and science and math skills. Schoolchildren were involved in generating the user requirement. A group of children stated: *"We have been regularly interviewed by the project manager to help him understand our needs and requirements".*
Model of information exchange: Concurrent evaluations via hands-on experience from the field were put to use to periodically update the content and user interface of the system. One of the school teachers (US23) said: *"The content is student driven making it interesting for the student to interact with the Hole-in-the-Wall system".*
User adoption: The novel idea of creating a collaborative education environment was well received by the students and educational institutions. The hands-on experience on the prototype gave students the opportunity to expand their skills and knowledge base. The on-site 'hands-on experience' also worked positively towards generating awareness among the student community.
Stakeholder involvement: The NIIT research laboratory involved a team of stakeholders from several disciplines such as content specialists, designers, technologists, and social scientists. Together these stakeholders handled most of the work related to the technical and the design development. This exchange was found to be necessary in order to arrive at a shared understanding of the development context.

Figure 3. Schoolchildren interacting with the Hole-in- the-Wall (Photo courtesy of: www.itl.moneycontrol.com/archive2.php)

Figure 4. The Simputer (Photo courtesy of: www.geocities.com/indigate/Simputer.jpg)

4.4 Description of the project: Simputer

The Indian Institute of Science, Bangalore, introduced the Simputer as a multilingual computer in 2001. The Simputer targeted semi-literate user as a ”stand-alone” computing device (see Figure 4). The purpose of the project was to provide on-line information about market prices and build communication networks between village farmers . The planned usage model was initially mediator driven, whereby users of the Simputer could share data while traveling [Fonseca and Pal 2006].

Method of information delivery: The Simputer model of information delivery was based on a shared model. The idea was to enable a large group of users to share one device that could be bought at community level. Information delivery was dependent on a dial-up connection and internet connectivity.

User participation: The field observations revealed that end users were not involved in the initial development phase. Due to a lack of insight into user requirements, the Simputer team were not able to develop any well-defined application or identify their target-user group. One user (US25) said: *“They came with their device and expected us to understand and use it. I don’t know how to operate this device. I have never used such a thing…”*

Model of information exchange: The Simputer displays small characters on a handheld screen, and uses a stylus to input data. Rural users found the interface daunting and complicated because of their limited knowledge of and experience with using handheld devices.

User adoption: The lack of well-defined applications resulted in the Simputer not being accepted by the rural population. There were no domain-specific applications developed to address the information needs of a cross-section of communities such as, employment opportunities for young people and agricultural information for farmers. As a result, Simputer use has been limited to pilot sites. One user (US28) said: *“I am ready to learn operating skills. But the Simputer should offer information related to agriculture, which is directly relevant to me”.*

Stakeholder involvement: There was minimal interaction between the users and the development team. Because of this lack of communication, a number of applications which the technical team had originally envisioned for rural users turned out, in practice, to be urban oriented and therefore irrelevant for rural users.

5. Results of case studies

The case study analysis of ICT interventions indicated that the services offered were only partially successful in disseminating relevant information related to areas such as agriculture and education. Failure to deliver products and services that were found acceptable and relevant to the rural users could be mainly attributed to: (a) a lack of domain specific applications; (b) weak information dissemination mechanisms; (c) a lack of user participation in development, and (d) no formal mechanism to involve stakeholders from several disciplines in the design process. The following section explains the results consolidated under the four evaluation aspects.

5.1 User participation

A study by Whyte [1991] reported the relevance of participatory action research to support the design process in complex social environments. The case study analyses revealed that due to a lack of

understanding of the user's needs, n-Logue, Gyandoot, and Simputer struggled with low user adoption. The Gynadoot project in particular provided 22 applications offering e-governance as the major content with a limited focus on agriculture. Of the total number of applications, only six were considered by the users to be relevant. On the contrary, the Hole-in-the-Wall project followed user participatory techniques in the initial development phase to develop a user-centered solution. The user participation techniques, involving children in the design, encouraged the children to explore computers themselves. The idea of offering hands-on experience on the deployment site was well received by the child participants.

Design implications: of the four case studies selected, only the Hole-in-the-Wall applied user participation techniques, such as involving teachers and children to generate content and ascertain user requirements in the early design cycle. When drawing lessons from the case studies, one can conclude that ICT interventions will have a higher chance of user acceptance if user participation is considered to be an important criterion. User participation in the development has been considered critical to define the product requirements. Furthermore, to minimize the time required for iterations in the design process, the rapid integration of user feedback on site should be supported. The key stages where user-participation can be incorporated in the design cycle are:

- *Generate user and design requirements:* involve users in the early stage in the design cycle to gain an insight into the user needs and user context.
- *Design evaluation and iteration stage:* involve users to obtain consistent feedback to iterate the design of the ICT intervention.

5.2 Model of information exchange

The model of information exchange should provide a means for communicating complex information to rural users. Our studies reveal two important aspects of information exchange via ICT interventions: 1) the creation of content that needs to be disseminated via the ICT interventions, and 2) the role of the user interface in accessing the information provided. From the content generation point of view, there were limited opportunities for the rural users to communicate their opinions and requirements. For instance, the role of the users in the case of Gyandoot was mainly as information consumers and the content was generated by the developers. Therefore, in terms of sustainability, a one-way information flow model appears to have led to limited business opportunities and to have had a negative impact on the sustainability of the projects. The interaction model in the Hole-in-the-Wall project included direct user participation for accessing information and collecting product feedback. This model provided two-way interaction in which users interacted directly with the product. This may have been a key factor that contributed towards the Hole-in–the-Wall project being more readily accepted.

The second aspect of information exchange is the user interface required for accessing information. The information-exchange models applied in n-Logue, Gyandoot and the Simputer were based on a mediator as being the interface between the ICT intervention and the user. The rural users were dependent on an operator to access information because knowledge of how to operate computers was limited to users who had been trained by the respective ICT development organization. Having to be dependent on operators limited the sense of ownership among users toward ICT intervention. Furthermore, current projects typically use a PC-based set-up installed in small rooms, which allowed only one or two users to access information. These set-ups were found to be more easily accessible to close relatives and friends of telecenter operators than to general users. Findings revealed that placing the intervention in a closed room set-up limited the opportunities for conducting group discussions or for taking community-based decisions.

Design implications: To develop a sense of ownership about the information offered, an information exchange model is needed which involves users in the content creation process and in the development of the user interface. This may eliminate dependency on a local operator. This result could partly be achieved by having alternative solutions such as auditory or graphical based interaction in which users with limited literacy levels could access information on their own, and partly by involving rural users in an early design stage to understand their information requirements and operating skill sets. Early involvement of rural users in the content creation process may increase their sense of ownership. The key implications for improving information exchange models are:

- *Include the users' past experience with using ICT-based devices to design the interaction model.* Rural users have limited exposure to using ICT-based products. Understanding the users' experience with ICT products can lead to designs that are easy to use and accept.
- *Design information exchange models in which users can access information on their own.* Design simplified user interfaces that do not require computer-training skills to operate.
- *Develop community-centric ICT intervention.* The ICT intervention should offer flexibility to engage multiuser and single user interaction in the information dissemination session. This may lead to an increase in the community acceptance of the ICT products.

5.3 ICT adoption

Despite significant investments by ICT development organizations, the user adoption of ICT interventions in rural India has been limited. User adoption may be defined as the demonstrable willingness within a user group to employ information technology for the tasks it is designed to support. In reviewing the cases, only the Hole-in-the-Wall project considered technology adoption issues. Because user participation was constant, the development team obtained feedback related to the children's attitude to learning about computers, and they were in a position to offer content that intrigued the schoolchildren. This led to high acceptance of this project among schoolchildren. Examples in which technology adoption determinants were not considered can be seen in applications deployed in Gyandoot, n-Logue and the Simputer. For instance, the Simputer did not have any well-defined applications for specific target groups. Content update was mainly dependent on network connectivity. As a result of the aforementioned dependencies, the Simputer appears never to have gained enough popularity to be circulated successfully in rural India.

The Gynadoot team adopted only a few awareness generation measures such as posters and pictorial depictions of the services, which were displayed outside the telekiosk. As a result, only close relatives of operators and rich villagers who frequently visited the telekiosk were better informed. The awareness generation was found to be effective in the Hole-in-the-Wall project. In particular this project did manage to tap the "human curiosity" factor as an interesting awareness generation strategy by allowing hands-on experience to use the product. This strategy was well received by rural children and children from the slums, and was successful in generating project awareness from the initial deployment phase. The adoption curve of the Hole-in-the-Wall was partially measured over time by running longitudinal studies. Longitudinal studies included measuring the acquisition of computer skills among slum children and by running English, math and content assimilation tests to measure the influence on academic achievement. Our findings are similar to those in a study on e-governance projects presented by [Cecchini and Raina 2004]. Their study pointed out that ICT intervention usage could only increase if users are well informed and were made comfortable about ICT interventions in their villages

Design implications: Low adoption of projects has led to financial instability and a scaled-back impact in rural areas. Improving ICT adoption requires understanding the prevalent structure of the values and beliefs of rural users. This will mean probing deeper into users social values, working patterns and general habits. To increase the adoption of ICT intervention in rural areas, considerable efforts need to focus on awareness generation. An awareness strategy needs to be implemented to inform rural users about the added value that ICT interventions could bring to their everyday life and to the village at large. In brief, the key strategies to be incorporated in the design process to stimulate ICT adoption can be summarized as:

- *Offer information that is relevant to the target group and their needs.* To ensure user adoption it is important that the ICT interventions offer products and services that correspond with the requirements of the target user group.
- *Incorporate existing traditional social and cultural values.* To ensure the acceptance of the information offered by the ICT intervention it is critical that the design of ICT interventions builds on the existing socio-cultural values of the users.
- *Awareness generation processes should be initiated in the early design development phase.* To ensure proper means to inform users of the ICT products and services at the early stage of the development.

5.4 Communication between multi-disciplinary stakeholders

A company or individual entrepreneurs who invest in the development of ICT interventions can be known as stakeholders who hold a direct stake in the project results. The service provider and users are also part of the stakeholder team as being the direct or indirect beneficiaries of an ICT intervention. Examples in which communication between different stakeholders appears to have been poor are the Gyandoot, n-Logue, and Simputer projects. In particular, our study pointed out that the Gyandoot designers relied on government backend support to offer updated information to users. Because communication between government and the Gyandoot team was poor, it was difficult to provide rural users with the latest information. As an illustration of this, two n-Logue kiosk owners in Maharashtra state reported that "*…because communication between their village local service providers and the city-based project technical team was poor, the average time needed to address their technical problems was six months…"*. Poor communication between these stakeholders hampered the content update process and therefore forced these kiosk operators to seek new avenues for earning a living.

Design implications: In reviewing stakeholder involvement, the case study analysis reveals the need to have an appropriate communication channel to exchange content and responsibilities between multidisciplinary stakeholders at two levels: Firstly, between the multidisciplinary development team such as: social scientists to understand the societal issues at community and individual level in rural areas; computer scientists for the development of the software and hardware of an interactive device; industrial designers for designing the user interface and for usability testing; management experts for addressing issues of economic sustainability. And secondly, between local service providers such as non-government organizations (NGOs), local village administration councils and local operators. Assigning responsibilities among stakeholders would generate a sense of accountability in the development process. Additionally, organized communication between stakeholders leads to transparency in the development and deployment process. The key implications in terms of improving communication between stakeholders are:

- Involve multidisciplinary stakeholders and assign responsibilities to the stakeholders in the early development process.
- Establish a communication channel to exchange content and responsibility between the development team and local service providers.

6. Conclusions

Information poverty in rural India poses a wealth of challenges towards seeking ICT intervention as ways to improve the well being of the rural users. Despite various applications offered by currently deployed ICT intervention, many interventions have neither been successfully accepted by the rural users nor have made a substantial contribution towards disseminating the required information. Instead of following a structured design process, existing ICT interventions have adopted an incomplete and sometime inconsistent development approach. Empirical methods to understand and incorporate user information needs have been scarcely applied. Moreover, limited attention has been paid to the pilot user testing of the user interfaces before onsite deployment. This led to limited acceptance of the ICT interventions by the rural users. The Design framework formulated on the basis of above findings have been followed to develop persuasive health information system for rural women in India [Parmar 2009]. The result from the field have shown positive results about the acceptance of health information system among women in rural India.

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