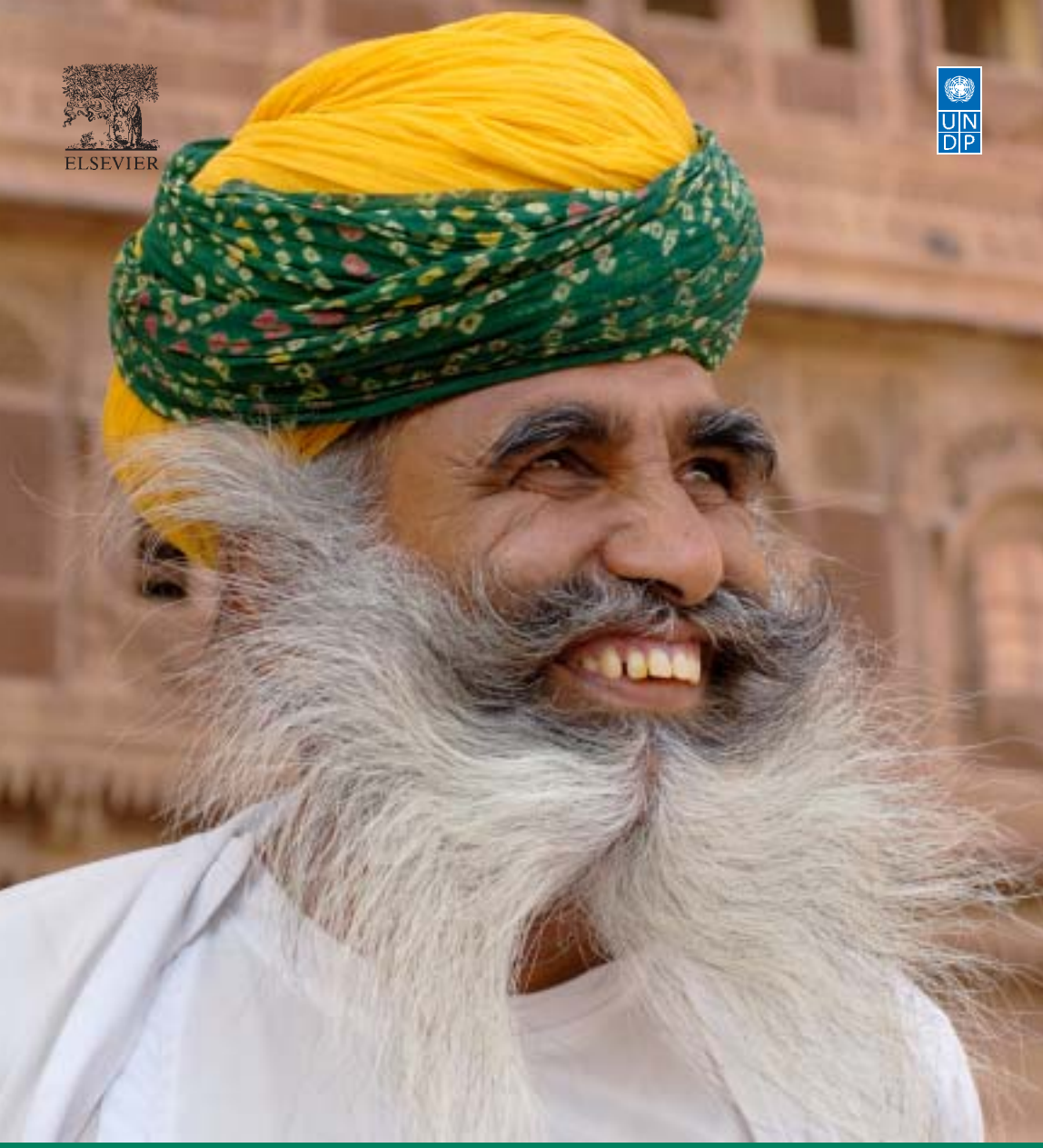

Empowering the Poor

Information and Communications Technology for Governance and Poverty Reduction

A Study of Rural Development Projects in India

Roger Harris and Rajesh Rajora
Foreword by M.S. Swaminathan

UNDP-APDIP ICT4D Series

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UNDP APDIP

Government of India
Department of Personnel and Training

APDIP

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For more information please contact:
UNDP ASIA-PACIFIC DEVELOPMENT INFORMATION PROGRAMME
Regional Centre in Bangkok
3rd Floor, United Nations Service Building
Rajdamnern Nok Avenue
Bangkok 10200, Thailand
Tel: +66 2 288 1234
Fax: +66 2 280 0556
Email: info@apdip.net
Website: http://www.apdip.net

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List of Abbreviations

ABL	Aksh Broadband Limited
ADB	Asian Development Bank
AMCS	Automatic Milk Collection System
AMUL	Anand Milk Union Limited
ANL	Aksh Networks Limited
AOL	Aksh Optifibre Limited
APDIP	Asia-Pacific Development Information Programme
APMC	Agricultural Produce Marketing Committee
ASA	Activists for Social Alternatives
ATM	Automatic Teller Machine
BPL	Below Poverty Line
BSNL	Bharat Sanchar Nigam Limited
BUIC	Backup Intercept Control
C2G	Citizen to Government
CARD	Computer-Aided Administration of Registration Department
CCEG	Concept Centre for Electronic Governance
CD	Compact Disc
CDIT	Centre for Development of Imaging Technology
CEO	Chief Executive Officer
CIC	Community Information Centre
CLC	Community Learning Centre
CMS	Cane Management System
CSO	Counter Service Officer
CTC	Community Technology Centre
CTS	Commodity Trading System
DCS	Dairy Cooperative Society
DGM	Deputy General Manager
DISK	Dairy Information System Kiosk
DIT	Department of Information Technology
DIU	Dock Interface Unit
DMCS	District Milk Cooperative Society
DoPT	Department of Personnel and Training
DPB	District Planning Board
DRDA	District Rural Development Agency
DRO	District Registrar's Office
DTP	Desktop Publishing
EID	East India Distillers
ETSI	European Telecommunications Standards Institute
FDMS	Fibre Distribution Management System
FMCGs	Fast Moving Consumer Goods
FRIENDS	Fast, Reliable, Instant, Efficient, Network and Disbursement of Services
G2C	Government to Citizen
GGIS	Gujarat Geographic Information System
GIL	Gujarat Informatics Limited

GIS	Geographical Information System
GNP	Gross National Product
GOG	Government of Gujarat
GOI	Government of India
GOM	Government of Maharashtra
GSFC	Gujarat State Fertilizer Corporation
GSWAN	Gujarat State Wide Area Network
GTC	Grameen Technology Centre
HDD	Hard Disk Drive
HRD	Human Resources Development
HTML	Hypertext Markup Language
ICT	Information and Communications Technology
ICT4D	Information and Communications Technology for Development
IGRAS	Inspector General of Registration and Stamps
IIM	Indian Institute of Management
IIM-A	Institute of Management - Ahmedabad
IIT	Indian Institute of Technology
IMF	International Monetary Fund
IRMA	Institute of Rural Management at Anand
ISDN	Integrated Services Digital Network
ISP	Internet Service Provider
IT	Information Technology
Kbps	Kilo bits per second
KSEB	Kerala State Electricity Board
LAN	Local Area Network
LSP	Local Service Provider
Mbps	Mega bits per second
MCA	Master of Computer Application
MCIT	Ministry of Communications and Information Technology
MDG	Millennium Development Goal
MIS	Management Information System
MIT	Massachusetts Institute of Technology
MoU	Memorandum of Understanding
MSKs	Mahiti Shakti Kendras
NASSCOM	National Association of Software and Services Companies (In India)
NDDB	National Dairy Development Board
NE	North East
NGO	Non-Governmental Organization
NIC	National Informatics Centre
NIC	National Information Centre
NOAPS	National Old Age Pension Scheme
NOC	Network Operation Centre
OFC	Optical Fibre Cable
PCO	Public Call Office
PM	Project Manager
PPP	Point to Point Protocol
PPP	Public Private Partnership

PRSP	Poverty Reduction Strategy Paper
QEH	Queen Elizabeth House
RAID	Redundant Array of Inexpensive (or Independent) Disks
RAS	Random Access Server
RESECO	Remote Sensing and Communication
RI	Revenue Inspector
RSEB	Rajasthan State Electricity Board
RTC	Right Tenancy and Cultivation
SARI	Sustainable Access in Rural India
SEWA	Self Employed Women's Association
SLIP	Serial Line Internet Protocol
SRO	Sub Registrar's Office
STD	Subscribers Trunk Dialing
STPI	Software Technology Parks of India
TASP	Tribal Area Sub Plan
TV	Television
TWINS	Twin Cities Integrated Network Systems
UAE	United Arab Emirates
UNDP	United Nations Development Programme
UPS	Uninterrupted Power Supply
VA	Village Accountant
VISP	Vidyal Info Service Provider
VoIP	Voice over Internet Protocol
VSAT	Very Small Aperture Terminal
WAN	Wide Area Network
WEF	World Economic Forum
WiLL	Wireless in Local Loop
WSDUPL	Warana Sahakari Dugdh Utpadan Prakriya Limited

Indian Language Terms

Akshaya: Indestructible
Bazaar: Market Place
Bhoomi: Land
Chawk: Courtyard
Choupal: Village meeting place
Daak: Post (as in Post Office)
Dhaba: Restaurant
Doot: Agent / Messenger
Grameen: Rural
Ganga: Name of a river
Ghee: Purified butter
Gram Sabhas: Village Councils
Gram Vikas: Village Development
Gram: Village
Gramsewak: Government representative in village
Gyan: Knowledge
Haat: Market place
Jamabandhi: Land Records
Janmitra: Friend of the people
Janampatri: Horoscope
Kendram: Centre
Mahila: Women
Mahisagar: Magazine
Mahiti: Information
Mandi: Commodity exchange/auction centre
Panchayat: Councils at the village level
Patwari: Village revenue official
Pehchan: Identification
Pradhan Mantri: Prime Minister
Rojgar: Employment
Sanchalak: Operator
Sangh: Group
Sanyojak: Coordinator
Seva: Service
Shakthi: Power
Shirastedar: A revenue official at Tahsil level
Soochak: Information Provider
Soochanalaya: Information Centre
Suvidha: Facility
Tahsil: An administrative unit (smaller than a district)
Tahsildar: Officer in charge of a Tahsil
Taluka: Same as Tahsil
Tara: Star
Vaivahiki: Matrimonial
Yojana: Plan

Note: One US dollar has been taken as the equivalent of 45 Indian Rupees (the value at the time the study was completed).

Foreword

I am glad that UNDP India has completed a study of Information and Communications Technology for Development (ICT4D) initiatives which can address the concerns articulated in the UN Millennium Development Goals (MDGs). UN MDGs represent a global common minimum programme for sustainable human security and well-being. It is now clear that ICTs can help to empower rural women and men in areas of importance in their day-to-day life such as health, education, agriculture, weather and, above all, markets. The work done by a wide range of institutions during the last 10 years in different parts of India has shown that ICTs can help us to leapfrog in the areas of knowledge and skill empowerment of the rural poor.

The poor are poor only because they have no assets like land, livestock or productive employment. They are often illiterate. There is need for a paradigm shift from unskilled to skilled work if the poor are to come out of the poverty trap. This is where ICTs can help to impart speedy functional and adult literacy and market driven skills. It can also help the rural poor with knowledge about their entitlements.

Yet, as promising as these examples are, they risk being overwhelmed by the massive scale of India's poverty, so that, on the other hand, no matter how well our individual efforts perform, either in the cyber cities or the rural telecentres, their results are almost undetectable from a wider perspective that encompasses all of our more than one billion citizens. This is the challenge we face in Mission 2007. The Mission for achieving a knowledge revolution in India derives strength and confidence from the numerous outstanding initiatives underway in the country under the sponsorship of central and state governments, civil society organizations, academia and the corporate sector. The visionary Bharat Nirman or New for Rural India programme includes knowledge connectivity.

In Mission 2007, we have stated that what is now needed is the launching of a self-propelling, self-replicating and self-sustaining model of ICT for rural regeneration and prosperity. This can be achieved in a short time and at a low transaction cost by the functional fusion of the large number of programmes in progress at the micro-level. Such a fusion of objectives, strategies and programmes can be achieved only by creating a platform for partnership. This is what the National Alliance for Mission 2007 provides.

Against this background, this study of the ICT4D efforts in India makes a valuable contribution. To be successful in our goal, we must all understand the sometimes problematic issue of how ICTs can be used to change the lives of the poorest of the poor. What must be done to ensure that ICTs fulfil their promise to change the lives of the large number of Indians caught in the poverty trap? How can ICTs be used to increase literacy rates, education, employment and healthcare on a nationwide scale, thereby empowering the poor with the basic necessities of life for achieving the fullness of their human capacity in the new millennium? These are some of the questions this study tries to answer by analysing 18 ICT4D case studies from India and considering the circumstances necessary for them to scale-up to even wider audiences.

The study it is not limited to an illustration of the projects. As a research enquiry, it sought direct evidence through surveys of the poor users of the projects as well as from the project staff. It goes

beyond descriptives to examine the success factors and contextual circumstances of each project. In our field, there is a paucity of such robust research from which the necessary new knowledge can be generated and the results of this study provide the beginnings of an evidence-based approach to poverty reduction with ICTs. To some extent, the results confirm what many of us working in this area intuitively believed – that real change is a product of changes in human behaviour. But as we proceed with Mission 2007, there is a pressing need to make this clear to the non-experts; the government, civil society and corporate sector organizations participating in Mission 2007; and the one-million members of the Jamsetji Tata National Virtual Academy for Rural Prosperity who will serve as the torchbearers of the knowledge revolution in rural India.

The book is part of the ICT4D series produced by the United Nations Development Programme (UNDP) through its Asia-Pacific Development Information Programme (APDIP). It is not restricted to an Indian readership as its message offers a guide to a wide variety of individuals and organizations concerned with bridging of the rural-urban and North-South digital divide, as well as the alleviation of poverty. Policy makers from government, development practitioners, civil society activists and donor agencies will find its insights valuable, especially those intending to replicate similar projects elsewhere. I congratulate the authors and all who assisted them in this valuable contribution and I commend this book to all with an interest in our mission.

PROF M S SWAMINATHAN
Chairman, National Commission on Farmers, Government of India
President, Pugwash Conferences on Science and World Affairs
Chairman, M S Swaminathan Research Foundation

Preface

This report sets out to examine the application of large-scale approaches to the use of Information and Communications Technology (ICT) for electronic governance and poverty reduction. The study that is reported began with the premise that ICTs are effective tools in the fight against poverty, when used appropriately, so we do not further argue that proposition. We pose the question, if ICTs can be used to reduce poverty, why in India are they not being used more extensively to do so? The study examined 18 development projects in India that make use of ICTs in the form of community telecentres for the benefit of the poor. The objective was to evaluate them along key constructs relating to their potential for scaling up; these were Project Design, Community Participation, Project Outcomes, and their contextual Political Economy. Questionnaires were completed by 2,156 users of the telecentres and interviews were conducted with project stakeholders and personnel.

A typical survey respondent was a 30-something, male farm worker, with some schooling, representing a socially-marginalized community and earning close to US$ 2 per day. The study sought to understand the factors that influence how and why the projects might or might not scale up into widespread implementations once they had established themselves as being capable of delivering beneficial outcomes in a sustainable manner.

It was recognized that even when individual implementations generate useful and unambiguous benefits, external factors such as political will, social awareness, business imperatives and the availability of resources will affect the rate at which ICTs are made available to wider audiences of poor rural populations, Nevertheless, it has emerged from the study that projects with promise have the ability to influence these external factors but at the same time they are not dependent on these factors being in their favour. However, the pre-condition for scaling up is to have a successful project, and the key component of that success in terms of scaling it up appears, from the study, to be the extent to which the recipient community accepts the project within its day-to-day life. Furthermore, it has emerged that the most effective way of achieving community acceptance lies in the quality of the staff at the centres with whom the community interacts. Several projects have failed to understand the importance of cultivating close relationships with their beneficiary community, either by employing inappropriate staff within telecentres or by failing to supply incentives for those staff to ensure that they are sensitive to the needs of the community. As a result, the quality of the services of these projects has suffered.

Moreover, although the political and social environments within which the projects operated were mostly less than ideal, projects depicted higher levels of community acceptance where they were better. Other project characteristics generated more desirable outcomes:

- projects that were formed within public-private partnerships, where the telecentre operator had a financial incentive to succeed, possibly under a franchise arrangement;
- centres that delivered a wider range of integrated useful services, including e-government, agricultural support, education, trade facilitation, health and entertainment;
- projects that participated closely with their beneficiary communities, in a bottom-up mode of design;

- projects that targeted low cost technology; and
- projects that engaged in capacity building at all levels of stakeholder engagement, from institutional to local.

The implications for practice are that whilst useful information services are a prerequisite for successfully operating ICT implementations in the form of community telecentres, in themselves they are insufficient. The additional key ingredient seems to be the skills and characteristics of the staff in the centres in their dealings with the community. This may have been overlooked by project designers and operators. There is very little literature on how to manage the face-to-face relationship between community telecentres and their clients. In many projects it is left to chance; a low priority task sometimes assumed to be within the capabilities of local volunteers, even schoolchildren. Yet our evidence suggests a far higher priority for the selection, training, support and development of such personnel if it is intended that the project would eventually be scaled into a wider implementation. Technologies and the information they deliver are key ingredients, but telecentres act as conduits for community development and their social role in terms of fostering productive relationships with poor people appears to be at least as important as their substantive role of delivering information services. Scaling rural ICT projects for poverty reduction, then, depends on the project providing useful services, but it also depends on doing it with effective staff that can achieve high levels of community acceptance.

OVERVIEW AND INTRODUCTION

Overview: People before Technology

It is evident that, in rural India, Information and Communications Technology for Development (ICT4D) projects are well received by their users, who value the benefits the projects bring. They accept these projects as part of their lives. Yet not all the supposed benefits of ICT4D, or the conditions that foster them, matched with either expectations or with what is often claimed to be the purpose for making ICTs available to poor people.

According to the study, the users of the centres seem to express that while they are satisfied with the benefits the projects bring, they do not feel fully empowered by receiving them. At the same time, they do not seem to feel that they have much influence on the operations of the centres. The findings from the data correspond with the observations of many of the individual projects by emphasizing the importance of understanding the needs of recipient communities. A further consideration is the extent to which the benefits of the projects are evenly distributed among the members of communities. Three-fourths of our survey respondents were male. As a group, the respondents seemed not to believe that benefits were evenly spread.

Generally, there was low impact on the factors that are supposed to lead to some form of social appropriation of the technology; a highly desirable condition whereby users of technology take over its control from the original implementers and design new and unforeseen uses for it. While conducting the study, we did not see this taking place. The expectations of the project users were not well managed. They did not feel that their use of the centres encouraged them to adopt any form of leadership in using the technology. Their technology awareness remained rather low and they did not feel as though the projects were empowering them beyond the immediate benefits. Paradoxically, the overall rating by the users of the quality of service from the centres was also rather low, even though they appreciated the benefits of using them. We speculate that the rural poor appreciate all attempts to improve their lives whilst simultaneously recognizing that more could be done.

The capability of project staff varies considerably across the projects. Yet this seems to be an important determinant of the degree to which users accept the project as part of their community. Designing projects around communities is clearly a winning strategy, and deploying staff which is capable of fostering productive relationships with clients also strengthens project operations. Whilst not in themselves leading to high probabilities that projects will scale up, it seems that these factors have a strong chance of positively influencing the factors that do lead to scaling projects up.

The social and political environments within which the projects operated were not always seen to be conducive to their operation. Many verbal accounts recount the frustrations over red tape and entrenched interests, and it is a tribute to the tenacity of many of the project protagonists that useful results actually emerged.

Some projects exhibit positive indicators for their financial sustainability, especially those that involve the private sector. Public-Private Partnerships (PPPs) show the most promise for delivering reliable and desirable public services in a financially sustainable manner. Whilst the design of the projects has enabled them in some cases to achieve high levels of staff capability and associated

community acceptance, the quality of service delivery still shows room for improvement. Generally, community participation seems rather low yet community acceptance is high where benefits are evident. The projects do not appear to have engaged with their user communities as closely as they could have, suggesting the possibility of improvements even where results are already desirable.

The projects included in the study are as follows:

Projects and Brief Descriptions

1. Akshaya – Mallappuram, Kerala

In 2001, a joint project between local bodies (gram panchayats) in rural areas, municipalities in urban areas and private entrepreneurs in Mallappuram district of Kerala was started to bridge the digital divide by providing community access to computers and the Internet. Five hundred and sixty-five Community Technology Centres (CTCs) have been implemented in the district. Akshaya operates PPPs in establishing the CTC in remote villages.

2. Anand Milk Collection Centres – Anand, Gujarat

The Anand Milk Union Limited (AMUL) with more than 578,000 members was the first cooperative dairy to be established in Gujarat. It was established in 1956, and now AMUL collects 0.8 million litres of milk from 1,003 milk societies every day. AMUL introduced an electronic automatic milk collection system in 691 milk collection centres, which reduced the time required for collecting the milk. The system weighs the milk and measures its fat content at the time of delivery to the centre, and this has enabled immediate payments to the farmer, thereby eliminating the previously opaque procedures that often left the farmer short-changed and with little recourse for query. The project has been selected for the study because the technology tool has affected a huge population of women dairy farmers socially as well as economically.

3. Bhoomi – Bangalore, Karnataka

The Department of Revenue, Government of Karnataka, has computerized 20 million land ownership records of 6.7 million farmers in the state. Each record is available online from 177 taluka kiosks at a cost of Rs 15 per record. The project has been widely acclaimed as possibly the most successful ICT project for land records in the country.

4. Computer-Aided Administration of Registration Department (CARD) – Hyderabad, Andhra Pradesh

In this project, 214 registration offices have been computerized since 1998. This project provides services such as encumbrance certificates, valuation certificates, market value search, etc., on user-charge bases. The time taken for registration of documents has been reduced from one day to 15 minutes. More than 4 million documents have been registered, and 2.16 million encumbrance certificates and 3.73 million registration check slips have been issued since 1999.

5. Community Information Centres – Gantok, Sikkim

This project was started by the Department of Information Technology, Government of India with the technical support of the National Informatics Centre (NIC). This pilot started in 30 blocks of seven North Eastern states in 2001. Presently, all 487 blocks in 79 districts of the states, including Sikkim, are provided with one telecentre each. The kiosks provide e-governance, e-health, e-education and e-business opportunities.

6. e-Choupal – Ujjain, Madhya Pradesh

This web-based initiative of Indian Tobacco Company's international Business Division in Central India caters to soya growers for information, products and services required in soya farming. The kiosks facilitate the supply of high quality farm inputs and purchases of soya at the doorsteps of the villagers. This project was started in 42 villages of Ujjain district and around 1,800 kiosks in Madhya Pradesh and has around 3,300 kiosks in Central India. The kiosks also handle dealerships of various commodities like Hero cycles and Eicher tractors. This feature has provided extra benefits to the villagers in terms of minimizing their cost on travel expense.

7. e-Seva – Hyderabad, Andhra Pradesh

The project was started as a pilot in the twin cities of Hyderabad and Secunderabad, and was thus called TWINS (Twin Cities Integrated Network Systems). It was started at the cost of Rs 10 million, fully funded by the Government of Andhra Pradesh. The project provides registration of birth and death certificates, and vehicles and learners' driving licenses.

8. Fast, Reliable, Instant and Efficient Network for Disbursement of Services (FRIENDS) – Thiruvananthpuram, Kerala

This one-stop service centre uses computers to provide public services such as payments of electricity bills, examination fees, motor vehicle tax, building tax, property tax, water bills and telephone bills. This project is operational in all 15 district headquarters of the state. The services are provided on a user-charge basis and government officials operate the counters at the FRIENDS centres.

9. Gramdoot – Jaipur, Rajasthan

Aksh Optifibre Ltd is India's second largest manufacturer of optic fibre cables. The company has provided an integrated hardware and software solution for connectivity in the Gramdoot project. Gramdoot provides e-governance through broadband services to 200 gram panchayats in Jaipur district. The project also provides cable connections to rural households on which 32 television channels are telecast. High-speed non-dial-up Internet access at 70 Kbps is available to 200 villages. Land records, prevailing market rates of agricultural commodities, Hindi e-mail facilities, application for certificates and online grievance opportunities are also provided.

10. Gyandoot – Dhar, Madhya Pradesh

This project started as a comprehensive community network in Dhar district with 40 ICT-equipped information kiosks. More than 24 public services are installed, including land records, agriculture commodity rates, grievance opportunity, and applications to government departments. These are charged to users. All the kiosks are either community financed or privately owned. Wireless in Local Loop (WiLL) technology is used. This project has been operational since January 2000. It has been replicated in more than 45 districts in India.

11. India Agriland – Nellikuppam, Tamil Nadu

In this project, EID Parry, a 212-year-old private company, working in the field of sugar production, caters to 100,000 sugarcane growers. The company has partnered with N-Logue Communications Pvt Ltd in 48 kiosks and has been in operation since 2003. The project disseminates market and commercial information to farmers and provides them with direct access to their markets. Information includes crushing details of sugarcane, payments due to farmers, local news, weather forecast, information on cultivation and farming techniques, e-mail, etc. These services are provided at user charges ranging from Rs 5 to Rs 10 per service. Information kiosks also collect soil samples for testing and sale seeds, sugar, tea and candies.

12. Janmitra – Jhalawar, Rajasthan

This project is a joint initiative of UNDP and the Government of India, operational since 2002. It has been implemented with the help of district administration Jhalawar, Department of Information Technology (Government of Rajasthan) and RajComp, a state agency. A rural intranet provides e-governance, e-education, e-health and e-commerce services to the villagers through 30 Community Information Centres (CICs); 21 departments are connected to the server through dial-up connectivity and 13 departmental offices are on a Local Area Network (LAN) with the server. The kiosks also function as stamp vendors, petition writers, computer education providers and desktop publishing (DTP) providers.

13. Mahitishakti – Panchmahal, Gujarat

In this project, about 80 telecentres have been set up in Panchmahal district to cater to the information needs of villagers. The network provides more than 200 online forms of different government schemes. It also provides updated sanctions of development works from the District Rural Development Agency and the District Planning Board, along with some Geographical Information System (GIS) functions. The information is available in the local language (Gujarati), and the project has been operational since 2001.

14. N-Logue Telecentres – Madurai, Tamil Nadu

N-Logue Communication Pvt Ltd, a commercial offshoot of Indian Institute of Technology (IIT), Madras, has pioneered its own version of WiLL technology. In Madurai district of Tamil Nadu, 30 telecentres have been set up, which provide a link between the doctors at Madurai Medical College and the villagers. Besides telemedicine, several other web-based services are also provided to the villagers.

15. Self Employed Women's Association (SEWA) – Ahmedabad, Gujarat

SEWA is a large primary trade union working since 1972 for women workers in the informal sector. SEWA's two main goals are full-employment and self-reliance. SEWA started using the SatCom (Satellite Communication) Programme in 1998 with its receiving terminals in nine districts and transmitting terminal in Gandhinagar. SEWA has started computer training for semi-literate women workers. Many of its milk cooperatives are using computerized milk collection software.

16. TARAhaat – Jhansi, Uttar Pradesh

The project was started by Development Alternatives (with the help of 12 project partners) in four districts of North India as a business model to cater to the unserved rural markets. The project provides services like TARAbazaar (e-bazaar), TARAvan (mobile kiosks), TARAguru (e-education), TARAdhaba (cybercafé), TARAreporter (news), TARAdak (e-mail), TARAvendor (e-commerce) and TARAcard (e-greetings). This project provides connectivity to franchisee kiosks through C-band satellite, VSAT or dial-up modem, according to the infrastructure available.

17. Vidyal Information Service Provider (VISP) – Tiruchirapalli, Tamil Nadu

Activists for Social Alternatives (ASA) has been working in five districts of Tamil Nadu in rural microfinancing since 1993. It has 2,000 women's credit and thrift groups and has 60,000 women members. In May 2003, ASA launched VISP in six villages. The project provides services such as prices of agriculture commodities, horoscopes, rural market place, matrimonial services, educational services, grievance opportunity, government forms, etc., by using the software developed by Drishtee Foundation. The kiosks also provide services like web-browsing, DTP, data entry job work, net-to-phone and basic computer education.

18. Warana Wired Village – Kolhapur, Maharashtra

Seventy villages in Kolhapur and Sangli districts of Maharashtra have been linked through a Wide Area Network (WAN) using dial-up connectivity and VSAT technology. This project aims to provide benefits to members of the sugar cooperative and the villagers. More than 12 public services, such as measuring the content of carbohydrate in sugarcane, payments due to farmers, land records, etc., have been introduced. This project was started in 1999 by the Government of India, the Government of Maharashtra and Kolhapur Sugar Cooperative on a cost-sharing basis.

Benchmarking

The following graphs benchmark the 18 projects for each of the variables examined, grouped within the constructs they represent.

FIGURE 1. BENCHMARKING: PROJECT DESIGN

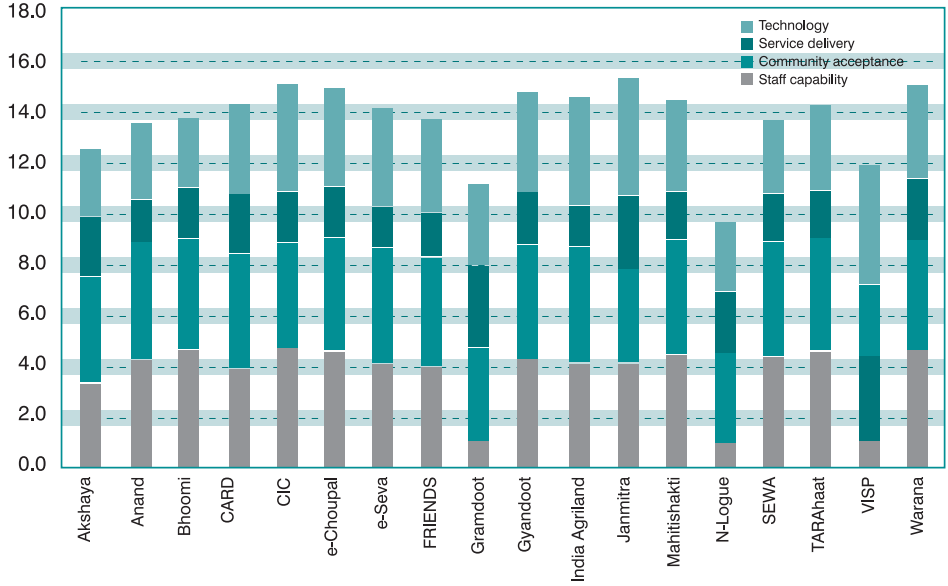


FIGURE 2. BENCHMARKING: COMMUNITY PARTICIPATION

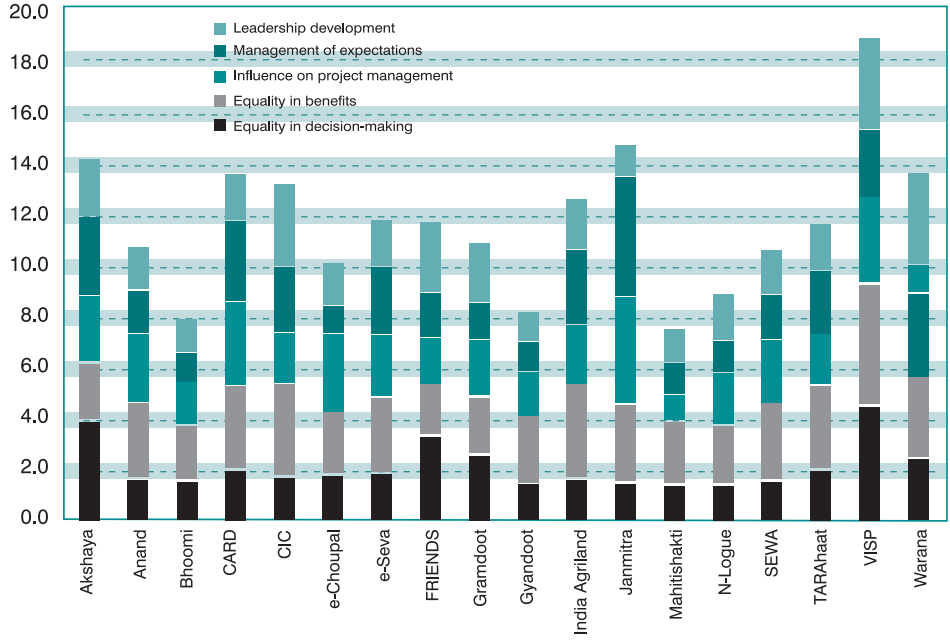


FIGURE 3. BENCHMARKING: PROJECT OUTCOMES

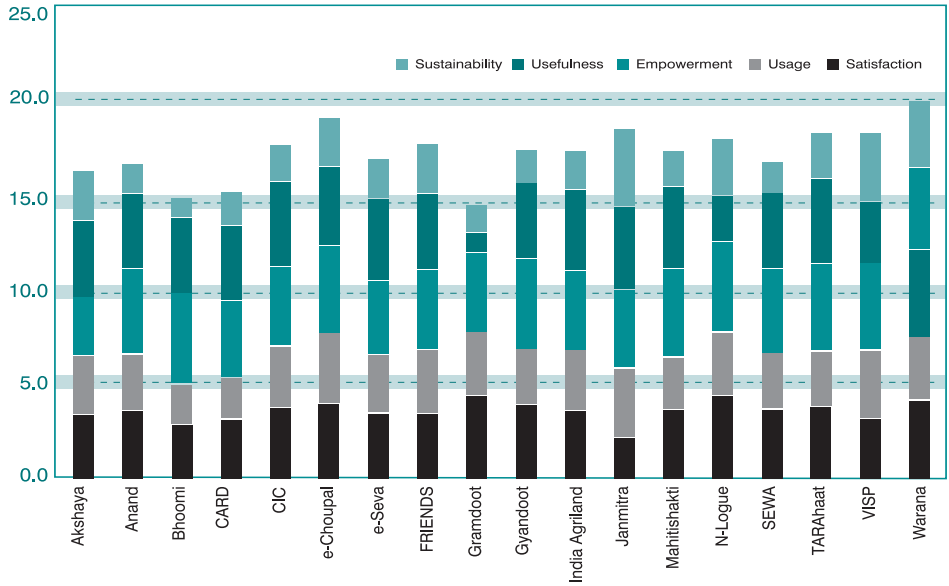


FIGURE 4. BENCHMARKING: POLITICAL ECONOMY

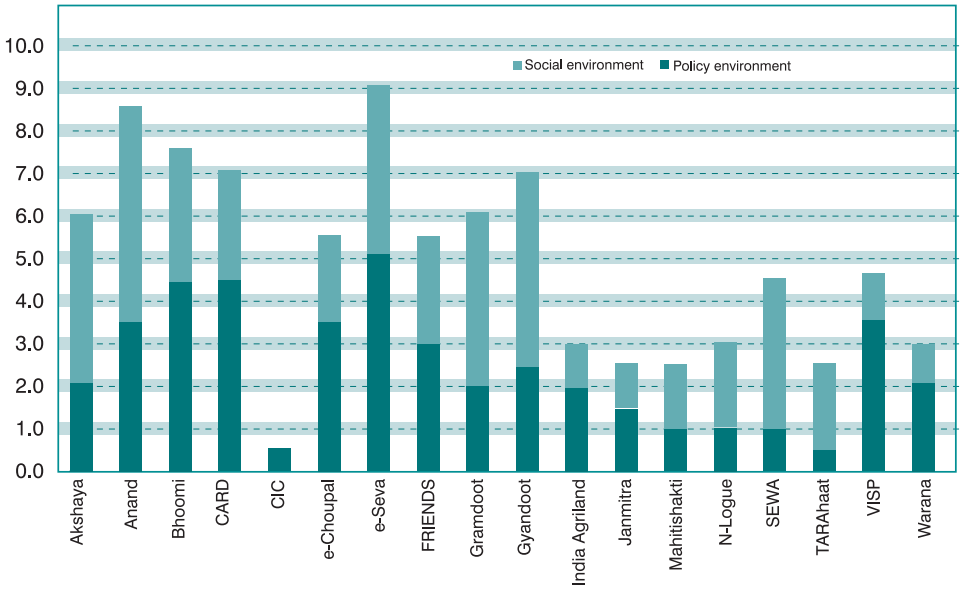


FIGURE 5. BENCHMARKING: TOTAL

The graphs are self explanatory. Figure 5 shows that the overall results of the projects vary only within a limited range. Of a total of 80 standardized marks, all projects have been able to score nearly 50 percent or more. This means that users have evaluated all projects to be moderately successful though their rates vary slightly. Even regional projects, confined to certain areas, are rated comparably to national level projects.

In Figure 6 the projects are depicted with their scores in the survey for each variable. In Table 1 they are shown with their rankings for each variable. Those ranking the highest for each variable are highlighted. Janmitra and VISP emerge as projects that rank the highest most often in the scoring for our variables, but 10 of the 18 projects rank the highest on at least one score. Of the eight that do not rank highest on any score, six rank second on at least one score and the other two rank third on at least one score. Some projects do not attain the highest ranking for any variable.

It is necessary to look at these rankings and scores in various ways in order to understand the overall picture. It appears that the projects we have studied display a wide range of characteristics that are required for desirable outcomes, yet none display them all and most display only one or two. The importance of the role of the project staff, those who interface with users, has been highlighted and our observations are that staff-user relationships are better in projects whose centres are operated by profit–motivated individuals. In most cases in the study, this has been achieved through some sort of franchise arrangement between government and local entrepreneurs, possibly with the support of a microcredit scheme, or some other from of early assistance, perhaps subsidized equipment. Accordingly, the PPP mode of institutional arrangements is indicated as desirable.

FIGURE 6. PROJECT SCORES BY VARIABLE

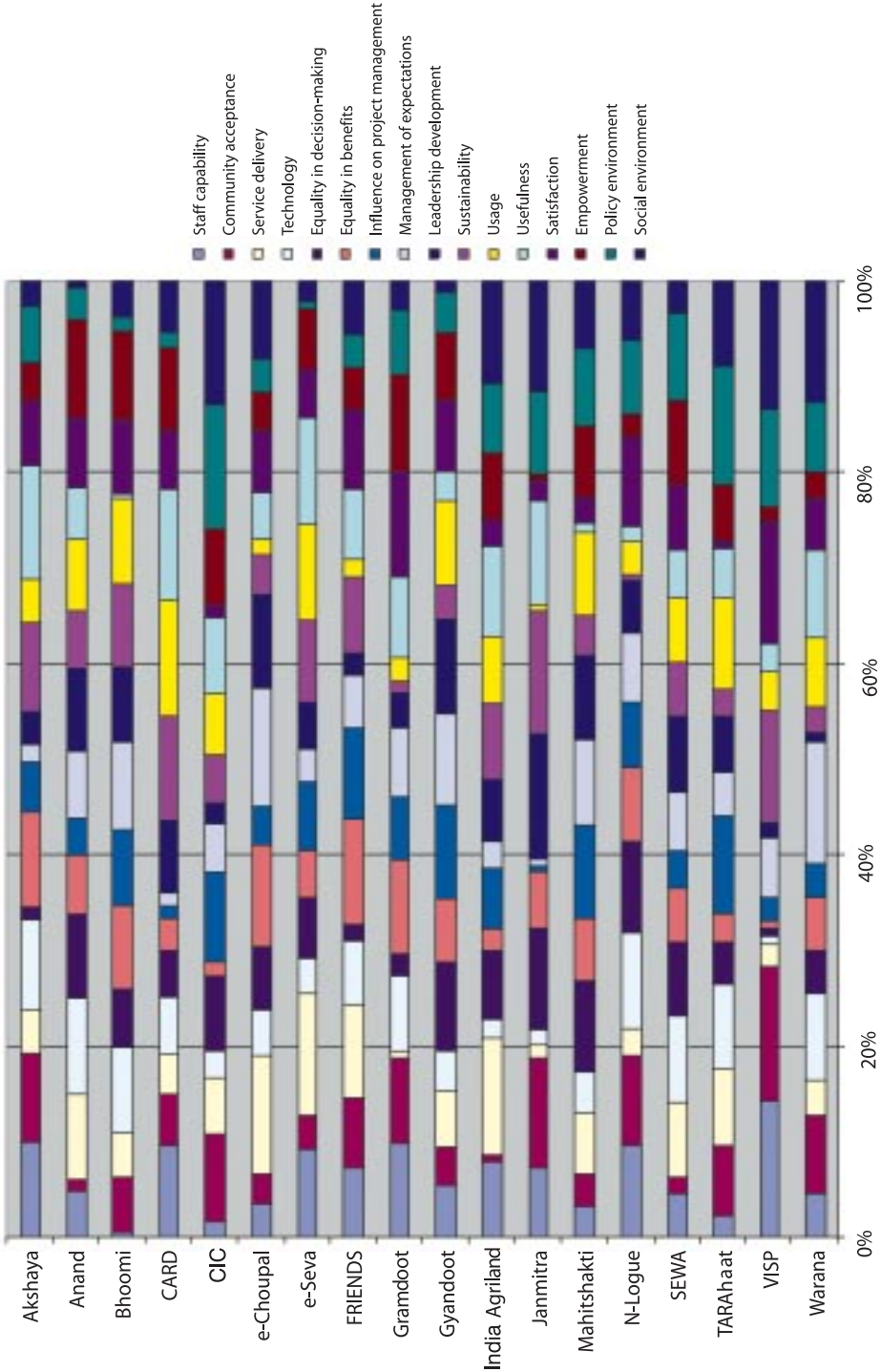


Table 1. *Projects ranked by variable*

	Staff capability	Community acceptance	Service delivery	Technology	Equality in decision-making	Equality in benefits	Influence on project management	Management of expectations	Leadership development	Sustainability	Usage	Usefulness	Satisfaction	Empowerment	Policy environment	Social environment
Akshaya	15	14	7	14	2	15	8	3	5	14	7	18	10	6	9	4
Anand	7	2	13	15	13	9	6	10	13	9	11	8	11	15	5	1
Bhoomi	1	11	9	17	12	17	15	18	15	17	17	1	15	18	3	7
CARD	14	8	6	9	7	5	2	2	11	16	18	17	9	13	2	8
CIC	2	13	8	4	11	2	13	7	3	7	9	11	2	11	18	18
e-Choupal	4	4	15	6	8	13	5	15	12	5	2	6	8	5	4	10
e-Seva	13	5	18	5	9	7	10	5	7	12	14	16	7	9	1	3
FRIENDS	12	12	16	11	3	18	16	9	4	13	3	12	14	7	6	9
Gramdoot	16	15	1	13	4	16	11	12	6	2	4	14	18	17	11	5
Gyandoot	9	7	10	7	16	11	17	16	17	6	15	5	13	12	7	2
Indi Agriland	11	1	17	3	10	3	9	4	9	11	10	13	4	10	10	15
Janmitra	10	16	2	2	15	8	1	1	18	18	1	15	3	1	12	16
Mahitishakti	6	6	12	8	18	12	18	17	16	8	16	2	5	14	15	13
N-Logue	17	17	5	18	17	14	12	13	10	1	6	3	17	4	14	11
SEWA	8	3	14	16	14	10	7	11	14	10	12	9	12	16	16	6
TARAhaat	3	10	11	12	6	4	14	6	8	4	13	7	1	8	17	12
VISP	18	18	3	1	1	1	3	8	2	15	5	4	16	2	13	17
Warana	5	9	4	10	5	6	4	14	1	3	8	10	6	3	8	14

In all cases, project outcomes appear to be preferable when they are based on a close understanding of the communities' needs, probably based on some sort of participatory appraisal of what the community would welcome from the project. The range of information services that all our projects deliver is also revealing, in that it provides a number of alternatives and opportunities on which to base rural ICT programmes. The projects in our study that did best provided an integrated but varied range of information services, including e-government, education, agricultural information, trade, health, and entertainment. In conjunction with general communications, these seem to have emerged as the primary areas of interest for rural populations where ICTs have something to offer. Projects that begin life by focusing on a sub-set of these services have the potential, therefore, for building their sustainability by expanding into other areas. From a practical standpoint, it is probably more feasible to establish services slowly, especially as projects begin, than to attempt to do everything at once, which risks spreading resources too thinly and delivering sub-optimal outcomes as a result. Nevertheless, a wide range of useful services should remain the long-term objective for rural ICT projects that aspire to longevity.

Another desirable characteristic that does not appear in many projects is the determination to restrict technology to low-cost devices that are the minimum requirement to do a good job. With the right information services, and the correct approach to delivering them to communities, a single simple device with basic connectivity can achieve a great deal, and it is not helpful to over-specify technology, even though resources may be available at the time of inception.

Finally, all projects benefit from capacity building, at local operator and community levels as well as at the institutional level, where services are designed and programmed. There is much evidence of background champions backing many projects, and whilst their drive and enthusiasm is a key ingredient to getting started, scaling up to wider implementations cannot depend on it. Awareness raising and capacity building are essential to harness human resources towards replications and the achievement of suitable standards of service delivery, community interaction, equipment maintenance and outcome evaluation.

Table 2 summarizes individual conclusions for each project. General comments are as follows:

- Most projects have achieved moderate to high levels of usage, community acceptance and user satisfaction through targeting specific application and information provision areas, such as milk trading, e-government, agricultural market prices, etc.

- Users of the centre value the e-government applications most, followed closely by information on:
  - prices
  - farming practices
  - business contacts

- The level of usefulness of the centres and the extent to which they have been able to achieve community acceptance both affect their sustainability.

- User satisfaction with the centres' services is closely associated with the capability of the staff at the centres and this in turn affects the degree of community acceptance that the centres enjoy.

Table 2 *Key factors related to scaling*

Project	Key conclusions derived from the study
1. Akshaya	· The 'people's action plan' appears to be more vibrant than the technology action plan. · Public-private partnerships are favourable for scaling up.
2. Anand	· Efficient and effective services, appropriate technology, local languages, multi-actor partnerships, committed volunteers are some of the key success factors of this project.
3. Bhoomi	· Citizens are ready to pay user charges if that results in more convenient service delivery.
4. CARD	· e-Government can be implemented by training the existing staff, instead of recruiting new staff. · Financial sustainability can be achieved in an e-government project.
5. CIC	· Without community involvement and participation, it is difficult for only the government to alleviate poverty and provide efficient governance through the use of ICT.
6. e-Choupal	· e-Commerce solutions can be effectively utilized for poverty alleviation. · ICT tools can reduce the number of middlemen. · This is a good example of a financially sustainable project.
7. e-Seva	· This project has a sustainable business model. . It has been able to provide one-stop, integrated, multi-departmental government services.
8. FRIENDS	· Inter-departmental coordination can be established with government will. · This can be termed as a first step in providing a one-stop shop for the citizens for all government-related services.
9. Gramdoot	· The provision of only volume bandwidth without a business model could be a losing preposition. · Instead of employees with fixed salaries, it is worth working on a franchise model.
10. Gyandoot	· Rapid and participatory rural appraisal provides necessary inputs for effective implementation of a community networking project. · Profit sharing between a community institution like the village council and a private entrepreneur has proven to be an effective relationship in a project of this nature.
11. India Agriland	· Partnerships between the business community and technology providers can result in sustainable and viable projects. · Industries and businesses having a rural base would benefit from creating communication channels through community networks.
12. Janmitra	· Community networks in rural areas need not necessarily be on the Internet or the World Wide Web. · Success for a rural ICT project area depends on a needs assessment at the initiation and proper selection of villages and entrepreneurs.
13. Mahitishakti	· This project underlines the importance of assessment of community needs before planning a community network.

14. N-Logue	· The poor rural health infrastructure in India has created a vibrant scope for the usage of telemedicine to bridge the divide in the health infrastructure in urban and rural India. · Using self-help groups in managing ICT kiosks is effective, in spite of the fact that kiosks are unable to provide enough remuneration to all the members of the group.
15. SEWA	· This project supports needs-based projects like water campaigns, policy-related changes, microcredit, and micro insurance. It also presents an integrated approach with ICT to facilitate the achievement of livelihood security for members.
16. TARAhaat	· Had there been better back up arrangements and back up support, the service would have been more useful. · Backward integration is of paramount importance.
17. VISP	· Reductions in the cost of a kiosk increase the chances of financial feasibility of the project. · Centres should be established initially in only those villages where there is demand.
18. Warana	· Content and software applications should be developed with the continuous involvement and feedback from the community. · This is a good example of efforts to improve women's and poor people's access to information.

Project Ranking

Another depiction that can further illustrate the relative scaling up potential of each project is their rank order in terms of the standardized scores that were used to generate the scaling wheels. These are shown in Table 3. The score is out of a possible theoretical maximum of 16 indicators with 5 points each = 80. (Indicators were ranked in the survey on a scale 0-5.)

Community acceptance of rural ICT centres is their strongest influence on the social and policy environment, i.e., on the degree to which such centres win the support of local community groups, politicians and government authorities. However, the precondition for scaling up is to have a successful project, and the key

Table 3. *Rank order of scaling potential of each project*

Rank Order	Project	Score
1	e-Seva	51.62
2	Warana	51.40
3	Janmitra	50.63
4	VISP	50.20
5	CARD	49.85
6	e-Choupal	49.36
7	Anand	49.35
8	Akshaya	48.77
9	FRIENDS	48.13
10	Gyandoot	47.28
11	India Agriland	47.04
12	TARAhaat	46.71
13	CIC	45.98
14	SEWA	45.35
15	Bhoomi	43.92
16	Gramdoot	42.15
17	Mahitishakti	41.58
18	N-Logue	39.40

component of that success in terms of scaling it up appears, from the study, to be the extent to which the recipient community accepts the project. Furthermore, it has emerged that the most effective way of achieving community acceptance lies in the quality of the staff at the centres with whom the community interacts.

Scaling up rural ICT projects for poverty reduction, then, depends on the project providing useful services that are driven by the real needs of the community, but it also depends on achieving this with effective staff that can maintain high levels of community acceptance within centres that are financially sound, probably as a result of being operated within effective PPPs.

Introduction

Poverty in India

By many measures, the problem of poverty is no more severe anywhere else than it is in India, which still has the world's largest number of poor people in a single country. Thirty five percent of its billion plus population lives on less than US$ 1 per day and around 86 percent of Indians, more than 900 million people, manage to survive on incomes of less than US$ 2 a day.[1] Although the much-heralded economic reforms of recent years have led to impressive levels of economic prosperity and the creation of a middle class, the distribution of wealth in India continues to be highly uneven. Furthermore, despite reductions in India's poverty level during the 1970s and 1980s, when farmers prospered, poverty reduction efforts stagnated during the 1990s, along with declines in agricultural growth, a slowing of growth in agricultural incomes and price rises of basic food staples.

The causes of these setbacks, according to the World Bank, lie in the nation's fiscal crisis, which reduced the ability of the government to underwrite technological change for agriculture and development of the non-farm economy, and in over-regulation of agriculture, forestry products, agro-industry, and the non-farm economy, which benefits neither farmers nor the poor.[2] Others point to high rates of illiteracy, enduring social exclusion, population growth rates that exceed economic growth, and protectionist policies that inhibited foreign investment.

Poverty reduction in India will clearly remain a very long-term goal. Yet India's poverty statistics reveal a paradox: its huge population, estimated at 1.05 billion in 2003, along with that of China, at 1.29 billion, means that when these two countries achieve reductions in poverty, which they have done since 1990, it seems that the global goal of halving poverty by 2015 from its 1990 levels, expressed in the internationally agreed and ambitious Millennium Development Goals (MDGs), may soon be reached.[3] A relatively modest reduction in the proportion of poor people in these countries registers as a huge reduction globally. Consequently, the scale of poverty in India (and in China) makes it possible to use the numbers simultaneously to commend as well as criticize the progress that has been made.[4] This also means that, although poverty levels have fallen, with growing income disparities that exist, many rural Indians feel they have become worse off. In fact, India's urban residents were twice as rich as their rural counterparts in the 1970s, but they are now eight times as rich, prompting one observer to note that poverty is now a case of relative deprivation.[5]

Additionally, pervasive as poverty is in India, it is becoming more concentrated in the country's lagging states, its rural areas and among its disadvantaged people. As of the time of the study, more than half of India's poor lived in four states of Bihar, Madhya Pradesh, Orissa and Uttar Pradesh, with more than two-thirds in rural areas, where the poverty incidence is highest amongst agricultural workers, many of them small-scale farmers or casual labourers. People of scheduled castes and scheduled tribes, who together make up around 24 percent of the total population of India, or 252 million people, are far more likely to be poor than those of other social groups, because low status and gender barriers still operate as social obstacles that exclude them from opportunity.[6]

Poverty is a multi-dimensional phenomenon. Income poverty is central but it is just one aspect. There are also other aspects such as powerlessness, lack of voice, vulnerability and fear (especially for women) as well as the deprivation of basic capabilities and the lack of access to education, health, natural resources, employment, land and credit, political participation, services and infrastructure.[7] Solutions to these conditions imply a level of social restructuring that goes far beyond economic opportunities and increases in incomes.

Governments and international agencies seem to agree that poverty reduction and sustainable development require a wide range of mechanisms including: sound macroeconomic policies; open trade relations; increases in human and physical capital; good governance; sound legal, incentives and regulatory frameworks; an adequately regulated and supervised financial sector; health, education and social services that reach the poor, women and girls effectively; quality infrastructure and public services to promote rural development and liveable cities; and policies to promote environmental and human sustainability. India's progress in applying these processes to poverty problems during the last decade of the 20th century has been mixed, with sluggish rates of reduction and patchy improvements across the nation.[8] Relieving India's poverty requires substantial and sustained efforts in all these areas, as well as new approaches and novel techniques if gains are to be substantial and irreversible.

The ICT Political Landscape

A spate of reforms since 1991 has given impetus to the Indian economy, particularly to the ICT sector. As part of the reform agenda, the Indian Government has taken significant steps to promote ICTs, including the creation in 1988 of a World Market Policy, with a focus on software development for export; telecommunications policy reform; privatization of the national long-distance and mobile phone markets; and development of a more comprehensive approach to ICTs. Although India's success is commanding increasing attention and investment, it has yet to result in the distribution of social and economic benefits across a broader base of the population. Challenges remain, including the perception of an unfavourable regulatory climate, an overloaded judicial system, poor infrastructure, costly access, and resulting limited use of ICTs. However, the emerging shift in government strategy, toward knowledge-intensive services, has created a climate more conducive to addressing enterprise, domestic infrastructure, education and the use of ICTs to meet development needs.

According to a Gartner estimate, India spent US$ 1.008 billion on Information Technology (IT) in 2002, making it the fourth largest vertical spender on IT after telecom, manufacturing and banking, and finance industries[i]. This compares favourably with other countries in the Asia-Pacific region, where the total spending on IT was around US$ 15.2 billion. The government accounted for 9 percent of the total IT expenditure in India for 2002. This figure is expected to increase to 15 percent by 2007. That establishes India as a serious force within the Asia-Pacific region. According to Gartner, it is the only recession-proof vertical sector that could keep up the momentum in IT spending despite a downturn in the country's economy.

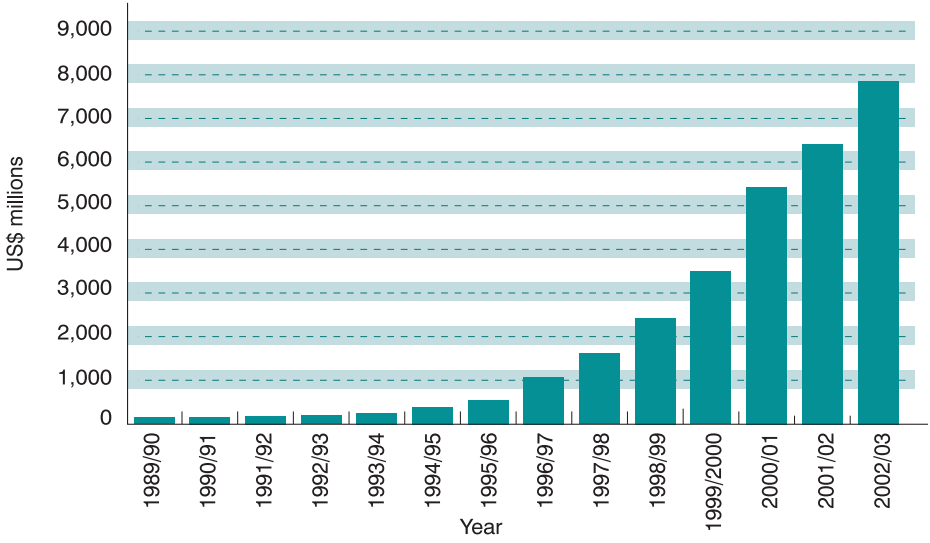
[i] "Gartner estimate rates India as the fourth largest IT spender". *The Economic Times*, 13 July 2003.
See http://www.infochangeindia.org/archives1.jsp?secno=9&monthname=September&year=2003&detail=T

Although e-governance is only five years old in India, a dozen states already have an IT policy in place. The 10th Five-Year Plan, which highlights the role of IT as an interface between the government and the public, has given IT a fillip, say experts. Areas in which it is increasingly being used include the maintenance of land and treasury records, various departments of the police, the irrigation department and the courts. The states that are taking ICTs seriously include Maharashtra, Kerala, Karnataka, Tamil Nadu, Andhra Pradesh, Gujarat, West Bengal, Haryana and Goa. Where less expensive solutions, based on the Linux operating system, are available these have been adopted in states such as Maharashtra, Goa and Madhya Pradesh. Additionally, Indian Railways, at the central level, is taking greater interest.

India's ICT Industry

Against the background of appalling poverty in India, we can juxtapose the country's more recent phenomenal success in the global ICT industry, with its software exports contributing upwards of 7 percent of GNP growth in 2000. Between 1991 and 2003, India's ICT industry grew at an annual rate of nearly 37 percent, doubling every 2.2 years.[9] The country's National Association of Software and Services Companies (NASSCOM) estimated the value of India's 2003-04 software and services market at a staggering US$ 20.3 billion, with exports making up close to 60 percent.[10] Figure 7 demonstrates how India's software exports have grown during the 1990s and early 2000s.[11]

FIGURE 7. INDIA'S SOFTWARE EXPORTS



The Prime Minister's National Task Force on Information Technology and Software Development advocated in 1999 that the software and hardware industries were two sides of the gold coin representing India's emergence as a global IT super power.[12] Indeed, the impact of India's prowess with ICTs on Indian society has been considerable. The demands of the software industry have spurred investment in the Internet and communications infrastructure, which benefits wider sectors of business and society. There have been other spill-overs in ancillary and supply services as well as in education. ICT-enabled services such as call centres that rely on advanced infrastructure have blossomed. In employment, wages

of software professionals rose by 20 percent per year for many years. In spite of these positive factors, and while the educated individuals employed in the ICT industry and its spin-offs enjoyed the benefits of India's booming ICT industry, the masses of the poor however seem to have missed out badly. Although the National Task Force envisaged a variety of services to be delivered to citizens in rural areas through a network of privately operated service delivery points, its priorities were clearly focused on the further development of India's ICT industry as an export earner. But the improvements that emerged as a result have been accompanied by a marked growth in income disparity.[13] This has not passed unnoticed by the country's electorate.

The World Bank has claimed that "India is a leader in the Information Technology revolution, and states such as Andhra Pradesh and Karnataka are making impressive gains in applying Information Technology solutions to a variety of public sector problems."[14] These two states are ranked as leaders on the Government of India's e-readiness scale along with Tamil Nadu and Maharashtra.[15] The spate of suicides by destitute and debt-ridden farmers in Andhra Pradesh, numbering around 3,000 in some reports, is a stark testimony to the desperation of the poor

India's New Challenge on Technology Policy

It is significant that two south Indian states threw out ruling parties of differing political complexions in the 2004 elections. Andhra Pradesh, with its capital Hyderabad, and Karnataka, with Bangalore, are vying to become global IT powers. In doing so, however, both have become excessively focused on IT development, ignoring the conventional rural development that should have gone along in parallel.

The outcome has important lessons for other developing countries. For it is a reminder that although technological innovation is a necessary condition for social and economic progress, it is not a sufficient condition. Equally important are accompanying policies to ensure that the benefits of successful innovation are widely shared and experienced.

There is growing resentment among those being asked to help share the costs of participation in such an economy, yet at the same time are excluded from its benefits. In issues that range from the application of intellectual property rights to the integration of biodiversity concerns with development strategies, there is growing evidence that solutions designed by the North are not always applicable in the South – and that alternative approaches are needed.

If India can now explore and develop some of these alternatives, ensuring firstly that they are based on a thorough comprehension of the underlying science, and secondly that they are capable of meeting the basic needs of the country's rural poor, it will have made a substantial contribution to the whole development community. Conversely, there is a strong case for reviewing the future direction of IT policies in India, ensuring that these effectively complement and support rural development and poverty-reduction strategies, and not substitute for them.

SciDevNet, 18 May 2004
http://www.scidev.net/Editorials/index.cfm?fuseaction=readEditorials&itemid=115&language=1

and the urgency of effective measures to relieve their suffering.[16] Clearly, in India as well as elsewhere, governments neglect the rural poor at their peril, representing as they do, in most cases, the majority of the population. Rural neglect and its consequences in terms of enduring and debilitating levels of poverty can be identified everywhere as the root cause of social disaffection, electoral upsets and ultimately of armed conflict and rebellion.

ICTs and Poverty

While India's poverty is deepening and its ICT industry booming, there are many experiments underway with the direct application of ICTs for poverty reduction. IT For Change, a non-profit network located in India, lists more than 50 such projects, some with hundreds of rural technology centres providing services to the public, including poor rural communities.[17] Some of these projects involve significant resources and have demonstrated their ability to deliver desirable social, economic and government services to rural populations. At a workshop held at the Indian Institute of Management-Ahmedabad (IIM-A), on 26-27 February 2004, representatives of the more significant of these projects agreed that there were major challenges in scaling up the use of ICTs in rural areas. They concluded that since most of the projects had not been subject to any serious evaluation, it was difficult to assess why they could not be scaled up. There was no clear mechanism for scaling them up and there needs to be a formalized method for learning from them.[18]

Other Asian governments, encouraged by international aid agencies and mindful of what is becoming possible through their understanding of the activities of the pioneering projects in India, are implementing their own pilots in order to learn how they might emulate the Indian experiences and apply ICTs to their own poverty alleviation efforts.

Yet the projects for poverty reduction with ICTs in India are not without their problems. There has been little independent analysis of them and many show signs of faltering, following the initial enthusiasm of a novel initiative and the intensive attention of pioneering experimentation. Modern technology often carries a halo effect in the settings in which these projects are conducted. In other cases, observers have drawn conclusions prematurely, either positively or negatively, usually by applying their own criteria rather than those of the project and its beneficiaries. In cases where failure has been declared, it is sometimes more the result of rigid forms of project conduct and management, or of unreasonable and externally imposed expectations, rather than through any inherent faults in the initiative itself.

According to one observer, an analysis of the Indian experiments with ICTs for poverty reduction is a prerequisite for any effort aimed at replicating and scaling up these pioneer, pilot projects, with a view to ensuring the technology makes a difference from a human development point of view.[19] Given the current political climate in India, it is timely to now examine more closely how ICTs can be applied to the massive, widespread and seemingly intractable problems of poverty, especially that they now seem to be demanding urgent attention. Whilst many of the pilot programmes have demonstrated value, they are set in contrast to the paucity of government efforts at central or state levels to replicate such endeavours on a wider scale that might be capable of making measurable inroads into the poverty problem. Even though the Government constituted a Working Group on Information Technology for Masses in May 2000, and despite the vast experience with ICTs for poverty reduction in India, the nation's 10th Five-Year Plan (2002-2007) makes scant reference to the topic. In the chapter on ICTs, there is no mention of poverty reduction,

and in the chapter on poverty reduction there is barely any mention of ICTs.[20] Although, as the World Bank points out, several states are already implementing innovative reforms in the delivery of public services, often with the aid of IT, the challenge, it says, is to broaden these initiatives and to apply them across the country, including the poorer states, where the governance environment is weak.[21]

The Government's Working Group on Information Technology for Masses identified four categories of IT relevant applications that could be expected to have the effect of reducing poverty: electronic governance; enabling literacy and education for masses; fulfilling local information needs of the people; and enabling a better economic condition of people.[22] Its report notes "while there has been considerable progress in the use of IT in government services, most of the applications have been confined to back-office computerization. As a result, the improvement in quality of service to the public has not made sufficient impact."[23] By mid-2003, the Government had announced its National IT Mission, or "IT Application in Rural Development, Agriculture, Water and Panchayats (e-Rural Group)", with the slogan "Taking IT benefits to ALL People" and with the stated aim to "ensure that the benefits of an IT based economy reach the masses."[24]

In November 2003, the e-Governance National Action Plan was approved. It was the culmination of a series of high-level announcements by the Government starting with the Prime Minister's announcement, on 15 August, 2002, that the Government was determined to use ICT to provide better services to citizens. According to Mr R. Chandrashekhar, Joint Secretary e-Governance, in the Department of Information Technology, the goal of the National e-Governance Plan is to focus on speed and accessibility, accountability, reliability and transparency in the provision of services to citizens. The National Plan actually looks at a centralized initiative; however, considering the kind of innovations, local variations and customizations that are required, implementation is totally decentralized. Twenty-two mission mode projects have been identified to be undertaken as national missions: eight areas in the central sector, nine areas in the state sector, and five projects in integrated services.[25]

Scaling up ICTs for Widespread Poverty Reduction

This report sets out to examine the application of large-scale approaches to the use of ICTs for electronic governance and poverty reduction. This study began with the premise that ICTs are effective tools in the fight against poverty, when used appropriately, so we do not further argue that proposition. We pose the question, if ICTs can be used to reduce poverty, why in India are they not being used more extensively to do so, especially given the existence of several seemingly powerful forces that might lead anyone to suppose that they would be. For example, the distressing and enduring nature of poverty in India, the national commitment to internationally agreed targets in the MDGs, the strength of the Nation's ICT industries, and the obvious disconnect of the poor themselves, now expressed politically, that their plight is not being addressed, would tend to suggest a more vigorous approach to the widespread deployment of ICTs for the purpose of poverty reduction than is actually occurring. What holds back the wider rollout of ICTs for poverty reduction at the state and national levels? If India, with all its technical and human resources and with all its problems of poverty, struggles to make ICT an effective ally in the war on poverty, what chances do other developing countries, with fewer resources, have? How can the extensive learning that is available from the Indian experiences guide the nation's own future directions, as

well as those of the other countries that look to it for guidance? We will attempt to furnish answers to these questions, based on the evidence gathered during the study. Whilst the answers are unlikely to be conclusive, it is our expectation that they will contribute in some small way to the immense challenge of eliminating, once and for all, the horrendous state of India's and the world's poverty and its consequences that have blighted so many for so long.

It would be untrue to claim that scaling up of existing promising initiatives that utilize ICTs for rural poverty reduction is not yet happening. e-Choupal, one of our case studies, is operated by ITC and provides farmers with ICT-based services relating to the production and selling of their produce; e.g., soya, coffee and prawns. Farmers using the services receive better prices than they did previously through traditional markets. ITC has set up 3,500 e-Choupals serving 20,000 villages

ICT for Poverty Alleviation in India: Scaling up Opportunities

The performance of India's ICT sector is widely held up as an example of the significant and positive effects that the ICT revolution can have for development. India's software sector is second only to the US, and global corporate organizations continue to increase the outsourcing of their software requirements to Indian companies, despite a slowdown in overall IT spending. The impressive growth of the ICT sector is considered an indicator of the possibility of a much more widespread and deeper diffusion of ICT, particularly to improve India's progress in achieving the goals set by the Millennium Declaration in areas such as literacy, education, gender equity and employment by allowing larger sections of the population to exploit or benefit from new technology.

India has undertaken a large number of pilot projects –144 projects according to IT for Change, Bangalore, and many more await launching. These projects, among the others, provide the blueprints for possible replication and/or scaling up, allowing for the potential that ICT holds for human development to be realized. The Government's IT Task Force has recommended that the best of these should be replicated across India, but financing issues remain to be addressed. While there are a few over-arching lessons that are being derived from these experiments, the focus of this workshop will be how to scale and replicate such projects through public-private partnerships and through the international donor community.

Workshop on ICT for Poverty Alleviation in India: Financing Models and Scaling up Opportunities
Indian Institute of Management, Ahmedabad, 26-27 February 2004
http://www.nasscom.org/artdisplay.asp?art_id=2346

and 1.8 million farmers in five states of India. It is adding seven new e-Choupals a day and plans to scale up to 20,000 by 2010 covering 100,000 villages in 15 states, servicing 25 million farmers.[26] The Bhoomi project initiated by the Government of Karnataka (also one of our cases) operates 177 online rural centres that provide copies of land titles on demand. Private individuals are being encouraged to set up duplicate centres that can also produce the land titles.[27] The Drishtee project is a revenue-generating platform for rural networking and marketing services that enable e-governance, education, and health services. From its beginnings in Sirsa in the state of Haryana, it now provides a string of rural services, including land records, mailing software, virtual marketplaces, matrimonial services, and online

grievance postings from 300 kiosks across six Indian states, with plans to expand with a further 200 kiosks.[28]

Despite these examples, noteworthy as they are, it will require further scaling up in many orders of magnitude before they will have a visible effect on overall poverty levels. Additionally, it is possible that successful projects expand into areas that will be more likely to breed further success; those that are more economically active, or where the technology and power infrastructure is relatively stable, thereby leaving behind poorer sections of the population that are more in need. The projects that have already demonstrated their capability for reducing poverty as well as the ability to expand their services to wider audiences have done so for varying reasons that may be more or less applicable from place to place. The ITC e-Choupals, for instance, focus on areas where they have an interest in agricultural production. The land registration facilities of Bhoomi would not apply to urban communities.

For the extent of scaling that will be required for ICTs to have a measurable impact on poverty, some form of generic or meta-service needs to be provided, one that will be widely applicable for communities with highly varying socio-economic characteristics. Whilst a transaction-based view of poverty reduction makes for a more focused set of information services within any particular community, and it is now well-understood that in this regard local relevance is key to success, a more generalized approach to defining information and service delivery is more likely to foster widespread diffusion. Accordingly, scaling up successes from the local to the general will require more than the mere replication of services, although that would be useful in many cases, but it would also need the institutionalization of the process that is used to define the services that any particular community finds useful. Relating as it does to the nature of the relationship between the project and the communities within which it operates, this aspect of ICTs for poverty reduction is less well understood and it probably represents a considerable obstacle to scaling up.

The Study

In this nationwide study, data were collected from 18 different projects with one common factor, that they use ICTs to reduce poverty, often through the application of e-governance, but sometimes through the delivery of services that increase incomes. The intention of the study was to understand what influences will determine the extent to which projects like these can be scaled up from what often appears to be a perpetual pilot syndrome; either to greater use within existing recipient beneficiaries (infusion) or among wider beneficiary populations (diffusion), or both. The enquiry was driven by informed opinion derived from direct experience with the use of ICTs for reducing poverty, as well as from observations and studies of such initiatives. Such assumptions suggested that projects should be well designed and managed; that community participation is important; that benefits have to be tangible to those for whom they are intended; that the political and social climate should be conducive to the initiative; and that financial sustainability, or at least its prospect, has to be demonstrable.

The Projects Surveyed

Initially, researchers identified 50 ICT initiatives in India in the field of poverty alleviation and governance as candidate projects for inclusion in the study. These were assessed against a set of criteria before the final list of projects was arrived at. The criteria for projects to be included in the study were as follows.

Selection Criteria

Projects should have had an ICT component for poverty alleviation and/or governance. The identified projects focused mainly on education, training, capacity building, health, microfinance, microenterprises, etc. Whilst contributing to poverty reduction in a broader sense, such initiatives were not limited to serve only rural poor.

Overall, the projects selected were to be spread over different parts of India, so as to take account of regional diversity. India has considerable geographical, linguistic and cultural diversity and projects in one part of the country may not be relevant or replicable in another part. The aim was to include projects that would give the study adequate diversity of literacy levels, language, availability of resources and economic conditions.

Projects should be making use of a gamut of ICTs, such as the Internet, community radio, satellite phones, wireless technology and so on. We took the view that ICTs are not limited to the use of computers and the Internet.

Projects should have different models of financing: private, public and public-private. Many ICT-related projects have been initiated by governments of different states, but using different models of funding. Some projects have also been initiated by private companies as well as Non-Governmental Organizations (NGOs). Some projects are community driven and some are funded by international organizations. The study tried to reflect these varieties in its selection of projects to be examined.

Based on these criteria, 18 ICT-related projects were eventually selected for the study.

Two other projects that had been identified initially were not studied. Samaikya Agri Tech Pvt Ltd is no longer in operation and the project has been abandoned, and Swayam Krishi Sangham had discontinued using smart cards in the cooperative sector. Therefore, during field visits, these two projects were substituted by Akshaya (Kerala), and Vidyal Information Service Provider (VISP), Tamil Nadu. Furthermore, the team faced difficulties carrying out the study at Infovillage/MS Swaminathan Research Foundation project in Pondicherry. The projects were surveyed between June and October 2003, whereby a two-man team of enumerators applied a questionnaire to around 100 randomly selected project users at each of the project locations. This was followed up by detailed interviews with the project staff: promoters, management and operators.

The study was supported by the Asia-Pacific Development Information Programme (APDIP) of the United Nations Development Programme (UNDP), UNDP India and the Department of

Personnel and Trainin, Government of India. It was guided by an advisory group of eminent researchers and practitioners.[29]

The Variables of Interest

The variables that were examined in the study are as follows. Each variable is described in the subsequent sections.

Project design

The initial design of the project will have an impact on its outcomes, its viability and hence the likelihood that it will have the potential for scaling up. A well-conceived project will be more likely to deliver useful benefits to its target audience in a sustainable manner. Several aspects of project design are considered relevant in this regard.

Staff capability

Information services that are provided via ICTs to poor rural populations require more than merely setting up and maintaining the technology. In most of the settings of our study, the clients of the services had hardly had any previous exposure to computers and the Internet. Although computer training is commonly conducted, most users are only able to avail of the services that are on offer through the staff of the centres, who act as intermediaries.

The role played by such people intercedes between the clients and the information services and will affect their effectiveness. Sometimes known as information intermediaries, or infomediaries, they fulfil a vital role and they require certain characteristics to be effective. Their actions and behaviour should lead to the information service achieving its full potential, through active promotion, sensitive and respectful dealings with the clients, and by building empathy with the host community. Volunteers drawn from the community and trained in ICT skills have been shown to be effective in playing this role, and in India it is essential to use women in this role in order to provide services to female clients. The project has to be able to attract, train and retain such people. Staff capability, as we see it, is indicated by its numbers and levels of education and by the opinions of clients with regard to the quality of the service they provide.

Community acceptance

For a development project to have a positive impact, especially where it implies changes in the way that people live their lives, it must be accepted by the community as something that they can trust and respond to. Community acceptance is a key ingredient of desirable outcomes, and projects have to work at achieving it. There has to be a demonstrable concern with the problems of the community and a willingness to provide services that are of value. Outreach activities that manifest a willingness to share control and to respond to community concerns are important components of a programme aimed at winning community trust and embedding the services of the centre into its daily life. Effective providers of information services grow their services with the changing demands of the client community, and to do this they need to win the confidence of the community and to form close relationships with community

representatives that are based on trust and mutual goals. Indicators of community acceptance would be the benefit that is derived by the community from the services of the project as well as its willingness to continue using the services of the project.

Service delivery

This factor relates to the ability of the project to maintain the delivery of the services that it is meant to provide over a long-term period, for as long as the host community might wish to receive those services. In many cases, a project will depend on delivering information that is sourced from partner organizations, over which the project has little or no control. These may be government institutions or private businesses. There will be factors outside the control of the project that are critical to the continued delivery of the service. Accordingly, how well the project is able to retain the cooperation of the partner institution will impact the effectiveness of the service. Community development projects that use ICTs will grow in effectiveness as the number and quality of information services that they provide grow. Single service centres, such as those dedicated to land registration transactions or to agricultural support services, may provide value to poor people, but the delivery infrastructure could well be capable of delivering a wider variety of services as well, say for health care or education, and that may be a necessary requirement for approaching financial self-sustainability of the centres or a wider diffusion of the service. In such circumstances, there will be an added demand on the project managers for coordinating services from a variety of sources and of making the most out each of them for the host communities. Key indicators here would be the nature of the relationship between the project and the content providers, the form of partnership, and the level of their joint commitment to the maintenance of the service.

Technology

Project design incorporates the selection of the most appropriate technology. Technology is most effectively deployed in pursuit of some predefined developmental outcome, rather than as an outcome itself. Accordingly, development problems and the strategies to overcome them should be clearly articulated before technological solutions are determined. In many cases, the reverse actually happens; technology is decided upon and then a development opportunity is sought to which it can be applied. Often this leads to the deployment of inappropriate technologies, say computers and the Internet, when simpler alternatives such as radio and television would have been more appropriate. In addition, computers and the Internet tend to deliver maximum output when they are appropriated by the organization and the community to provide assistance with problems that they themselves have identified and sought solutions for, and project promoters should adopt measures, including education and awareness raising, to encourage this form of technology adoption to take place. It indicates the achievement of higher order benefits through community empowerment and requires suitable awareness of the technology within the using community. In the study, we looked for awareness of technology among the users of the centres as an indicator of this variable.

Community participation

Available knowledge makes a strong case that information-based development services are effective when the communities in which they are provided have a share in their design and operation. For one observer, "participation should not be considered simply the contribution of content, but also the determination of direction, and the ability to determine and even develop future applications and intended uses". Community participation in project design should, of course, be based on equality of gender, caste, age and so on, so that equal participation in project design fosters equal participation in the enjoyment of the benefits of the project. ICTs have an important characteristic that distinguishes them from other development tools in that they are multi-purpose, and can be shaped to address problems that were not necessarily those for which they were originally intended. Once communities have become accustomed to the use of ICTs for one purpose they will begin to consider other uses, for the technology, but only if they have been able to participate in the decision-making processes that determine how the technology is used. Creative solutions can emerge from the cross learning that occurs between communities and promoters of technology. The dictum about listening to the poor, and acting on what they say, has particular applicability with ICTs because there are almost always significant information components within the solutions that they themselves foresee for their problems, and which provide openings for the introduction of ICTs. Based on what we already know, ICT has proven that it can help reduce poverty when used appropriately and with the full participation of stakeholders, particularly the poor themselves.[30] In the study we evaluated participation in project design with four indicators: equality in decision-making; equality in benefits; influence on project management; and leadership development.

Equality in decision-making

Here we look to see if the community has been able to play a truly equal role in the processes of decision-making in the conduct of the project. Is the role of the community characterized by one of equal and active collaboration or more by one of passive cooperation? Unless the sharing of responsibility is genuine, the project is likely to breed dependence and the community will fail to appropriate the technology for its own purposes, a factor that can lead to higher order benefits in due course. As indicators of equality in decision-making we look for participation in meetings and committees, not just attendance and also acceptance of roles of responsibility. There need to be representatives of all sections of the community within decision-making processes, especially women and disadvantaged groups.

Equality in benefits

The benefits of the project must be distributed widely throughout all sections of the host community. Even communities in the poorest districts will be stratified into groups that are better-off and those that are less well-off. We have seen that facilities that are provided for the poor can also be used by the rich, but that the reverse is not always the case. Everyone in the community should be able to make use of the services of the project in an equal and unimpeded manner. The available experience indicates that rural women, whether literate or semi-literate, are able to take to new technologies like fish to water, provided they are genuinely involved in the implementation process. It is therefore important that women

managers and operators are trained in large numbers. There is also a gender dimension to the information needed. For example, women require specific health information. Therefore, the participation of women both as managers and users of ICTs should receive specific attention. Also, a gender audit procedure should be built into the final ICT programmes.[31] In the study we have examined the gender, caste, age, education and income levels of the users of all projects.

Influence on project management

Whilst equality in decision-making may only materialize on occasion, when decisions have to be made, we were also interested to know if the community has been able to influence the way in which the project has been managed on a day-to-day basis. This would reflect both real influence as well as project managers responsive to their client's needs. Such influence would require effective mechanisms that allow the community to make their opinions felt with regard to project management and are then able to see that they are acted upon. Such mechanisms might include steering committees that meet regularly, and explicit lines of responsibility and representation in management processes.

Leadership development

If the technology is to be appropriated by the community, so that it can decide for itself the type of service that is provided, equality and participation have to lead to the independent decision-

The Meaning of Participation

Participation has been used to mean different things in different contexts. One important distinction is whether it is interpreted to involve 'empowerment', implying significant control over decision-making, or whether it simply means rudimentary levels of consultation, where little delegation of decision-making powers occurs. Another distinction is between whether it is viewed as a means or an end. An instrumental approach views participation as a means to improving implementation, efficiency and equity, while an empowerment approach values the process of increasing participation as an important end in itself. At a minimum, participation clearly requires that individuals and groups are, in some way, involved in the decision-making process. This engagement can assume any of a number of points along a spectrum, which has been defined as ranging from: (1) information-sharing (2) consultation (3) joint decision-making to (4) initiation and control by stakeholders. At one end 'information sharing' involves very limited decision-making powers but potentially important knowledge transfer. At the other end lies 'initiation and control', which implies a high degree of citizen control over decision-making. In between, 'consultation' exists when participants are able to express opinions but their perspectives are not necessarily incorporated into the final product; 'joint decision-making', on the other hand, gives participants the shared right to negotiate the content of strategy. The boundaries of this classification are of course not clear-cut.

Frances Stewart and Michael Wang, Do PRSPs empower poor countries and disempower the World Bank, or is it the other way round? Queen Elizabeth House Centre for Development Studies, University of Oxford, QEH Working Paper Number 108. http://www2.qeh.ox.ac.uk/pdf/qehwp/qehwps108.pdf

making that can come from effective leadership within the community. This is also crucial for sustainability; that the community can effectively take over the reigns of the project through some form of local ownership that is responsive and accountable, and evolves it in line with the community's changing circumstances and developing aspirations. We would look for how well the project has fostered local leadership within the community towards the goal of encouraging it to exploit the information assets that the project is capable of making available and thus achieving the project's full potential. Useful indicators include the extent to which the community has been mobilized towards using information within its own development plans and planning for its use of information as a means towards achieving a better life.

Project outcomes

In examining project outcomes, the study sought to depict factors that are broad enough to capture the intent of a varied range of project objectives, give the diversity of those that were studied but at the same time to focus on concrete measures that would be capable of indicating genuine benefits to those for whom they were intended. The factors chosen were intended to clarify the subtleties implied by the unfortunate labels of project 'success' and 'failure', and whatever lies in between these simplistically bilateral characterizations of project outcomes, as well as drawing on the substantial body of knowledge in the information systems field relating to system success.

Sustainability

ICT projects for poverty reduction and e-governance require a regular flow of adequate resources in order to remain viable including, but not limited to, financial resources. However, in the sustainability discourse that surrounds the use of ICTs for poverty reduction, most of the attention is directed towards financial sustainability, and even then it is narrowly interpreted as self-financing. Curiously, this serves to set apart ICT projects from other infrastructure developments, e.g., roads (unless tolls are charged) and telephones, where rural subsidies are widely applied and self-financing sustainability is hardly mentioned. Even libraries, which serve a sub-set of the purpose of most rural ICT projects; that of disseminating information and knowledge as a public good, mostly escape the demands of requiring to be self-financing, not to mention public schools and universities. Nevertheless, it seems clear at this stage of the diffusion of rural ICTs, i.e., before they are accepted as being at least as important and useful as public libraries, that governments and private organizations will not take on substantial commitments to scale up ICT projects without assurances that they are not exposing themselves to unendurable and indefinite financial demands in order to keep the initiative alive. Accordingly, we expect that financial sustainability is a key criterion for scaling up, and that the closer that it comes to self-financing sustainability, the better.

Usage

The degree of actual and intended usage by its beneficiaries indicates the extent that the project can be deemed successful. In most situations in the study, usage is optional, and future intensions of usage would be indicative of project outcomes.

Usefulness

A long history of research in the field of information systems, mostly applied to the organizational use of ICTs, confirms that the usefulness of an information system is a reliable indicator of its value.[32] Intuitively, it would be expected that beneficiaries, or users, of the ICT project would place some value on an information system that they found useful, would use it again and that this would indicate some measure of success of the project.

Satisfaction

User satisfaction is another accepted indicator of information system success, known as the recipient response to the use of the output of an information system. The use of user satisfaction in measuring information system success is frequent among researchers and practitioners.[33] Users that are satisfied with their use of an information system within the projects of the study imply desirable and successful outcomes for the project.

Empowerment

A number of ICT projects for poverty reduction touch upon the need to empower the poor, particularly women. Empowerment in this sense seems to involve the taking up of new skills but it also points towards an increase in the freedom of individuals to make certain key decisions regarding their own future, as opposed to having no such opportunities or having such decisions made for them by others. Enhanced status and the ability to freely advocate for one's rights and interests are also implied by increased empowerment.[34] There seems to be a close association between empowerment and the availability of information, and ICTs therefore are closely implicated in empowering processes.

Political economy

All the projects in the study are being conducted, of course, within their own specific contexts, which can be expected to have a bearing on the conduct of the project and on its potential for scaling up. All information systems exist within such contexts, and their influence needs to be accounted for when assessing the impact of the system. In our case, this was brought into sharp focus by the national elections in India, which resulted in surprise losses for ICT champions amid claims of government neglect of the welfare of the poor rural population. The study sought information relating to two aspects of the political economy surrounding each project, using observation and interviews with project staff as well as secondary sources.

Policy environment

With many Indian states having populations that are larger than most Asian countries, state policies with regard to ICTs are as relevant as national policies. The telecommunications infrastructure is sensitive to national policy, regulating the activities of private operators whose presence is said to accelerate the diffusion of telephones. National telephone density reached five per 100 inhabitants by 31 March 2003, compared with only 1.39 at the end of March 1994, when the shift to a new, more liberal telecom policy began. However, differences between urban and rural areas and between individual states distort the overall picture. Rural teledensity

stood at a mere 1.49 in 2003, when urban teledensity was placed at 15.49. In March 2003, while teledensity in the state of Delhi was 26.85, that in Bihar was still as low as 1.32.[35] Other differences exist between states, as revealed by a study of national e-readiness, in which a composite index encompassing network policy and e-governance was used to rank states. Karnataka, Maharashtra, Tamil Nadu and Andhra Pradesh were ranked as 'Leaders'; Haryana, Rajasthan, Himachal Pradesh and Orissa, among others, were ranked as 'Below Average Achievers'; and Assam, Bihar, Jammu and Kashmir, and Arunachal Pradesh, among others, were ranked as 'Least Achievers'.[36] This study was interested to discover what policies, if any, drove the implementation of the project and to what extent it seemed possible that the outcomes of the project might feed back into policy formulation processes.

Social environment

The social environment of each of the projects in the study is made up of the local factors that comprise the intended beneficiaries, their social make up and condition, both before and after the project was implemented, as well as any influence there has been on the relationships within the community. For example, one often-quoted impact of rural ICTs is on the relationship between farmers and traders, whereby the negotiating power of middlemen, which is based on their monopoly over trade information, becomes balanced more in favour of the farmers who can use ICTs to obtain the same information that the traders previously withheld.[37] ICTs impacts in rural projects are often sought in gender relations, advancing women's equality, and in increased incomes, directly reducing income poverty.

Scaling

The dependent variable in the study is the potential for project scaling; the extent to which the benefits that are experienced from experimentation can be enjoyed more widely. Given the scale of India's poverty, and the ambition of the MDGs, scaling up of ICT projects for poverty reduction will be essential if the technology is to have significant impact and is to achieve its full potential.[38] Scaling up rural ICTs can be related to the diffusion of other types of innovation, which is what rural ICTs are. Whilst acknowledging that project success (in some form) is a prerequisite to scaling it up to wider audiences, it is also clear that in practice, scaling goes beyond mere replication; it involves processes of bureaucracy and institutionalization that would be markedly different from the typically intensive, adaptable and flexible operations of small-scale experiments run by visionaries.

Scaling up from experimental modes of technology operation to mainstream practice does require certain enabling conditions. For example, the diffusion of technology beyond experimental usage seems to demand the removal of uncertainty and a high degree of predictability with regard to the outcomes of its use. Technology adoption takes off among majority groups (the equivalent of scaling) when it is easy to understand the innovation and when it can be acquired and put to good use as a single complete 'package' without any additional mechanisms or uncertainties.[39] Currently, many institutions (governments, corporations and NGOs) are uncertain of the conditions that are necessary to ensure that rural ICTs will deliver real benefits to poor people in a predictable, reliable and affordable way. They are uncertain of the technology in a fast changing environment and they are wary of the adaptations that experience tells us are necessary in order to ensure the services that are provided are relevant within highly localised contexts. They are also wary of the costs involved, especially when competing demands that carry less uncertainty with regard to their benefits are crying out to

be served. Being effective with ICTs requires agility and adaptability; characteristics that are uncommon among the large government institutions and other organizations whose resources and managerial and technical skills are required for scaling up. In such cases, it is necessary to implement institutional reforms that are rooted in a high level commitment to deliver radical improvements in services and a widespread willingness to adopt innovative methods, and from this, the adoption of ICTs will emerge naturally. In the corporate world, this process is sometimes known as Business Process Re-engineering in which extensive improvements in service quality are achieved by stripping away traditional methods and organizational norms and by aggressively innovating with technology.[40] Whilst the study does not address aspects of institutional reform in the scaling of the rural ICT projects that are examined, it is expected to remove some of the uncertainties surrounding the diffusion process by coming closer to an understanding of what a complete and scaleable 'package' of a rural ICT innovation might look like. Essentially, while the success of a pilot project is a precondition to scaling it up to wider audiences, this is treated separately from the issue of institutional reform that would often be required to make scaling up possible. Finally, we treat scaling as being represented by two dimensions, diffusion and infusion.

Diffusion

Diffusing a project relates to replicating its methods and its benefits among a wider population; i.e., beyond the beneficiaries of the pilot. This would be carried out either by the original implementing institution or by other institutions with similar roles and responsibilities, such as government or private organizations. In some cases, pilots evolve, moving into new areas of experimentation, and scaling institutions spin off the successful initiatives successively as they emerge. Such projects are sometimes criticized for appearing to be in a perpetual pilot mode, but this often ignores the way that experiments evolve, through adaptive planning into new areas of enquiry, learning as they proceed and exposing novel challenges that may not have been evident at the outset, or which only arose in response to the new conditions created by the project's earlier work. Accordingly, scaling up from a successful pilot can occur more than once over time and in more than one direction.

Infusion

Intensification of the project within the existing populations that it serves, either by the same implementing agency or by others, for example by providing new services across the same network, represents another dimension of scaling. Such amalgamations of different services that provide benefit to the same population might generate synergies from their complementary strengths, thereby increasing usage and economic viability and approaching the network effects that are so important in achieving the full potential of ICTs. One such suggestion that has been put forward is to combine the e-Choupal and Bhoomi models.[41] It seems that the use of ICTs for e-government and poverty reduction will be easier to justify financially when multiple applications are delivered in this way, making maximum use of the costly physical infrastructure. Scaling in both directions, diffusion and infusion, can therefore occur simultaneously.

Measuring the Variables

Measurement was by questionnaire and interview. Interviewing included the gathering of stories related to any of the variables. A standardized questionnaire was applied to the projects, involving around 100 respondents in each. Respondents were asked to give answers on a scale of 1-5 against

questions that represented one of the indicators of the variables of interest. In some cases, indicators were represented by more than one question. The questionnaire is shown in Annex 3.

The following case studies provide a description of each of the projects. In each study, the results of the survey are depicted in a 'radar' graph. A score was computed for each variable on a standardized scale, which is depicted on the graph. By shading the area under each score, it can be seen that the closer the shaded area approaches the outside edge of the graph, the more favourable the results of the study for that project.

CASE STUDIES

Akshaya
Malappuram, Kerala

Background

Kerala, as a state, has performed exceptionally well in the past in its National Literacy Mission. It has achieved 94.6 percent literacy (the highest in any Indian state), the highest density of science and technology personnel, 100 percent digital telephone exchanges and the highest telephone density. The people of Kerala are known for their fast learning skills. The aim of this project was to familiarize one person from every family (6.4 million families) in the state with the basic use of computers, empower them to access relevant e-content in the regional language and to provide services such as e-learning, e-transaction, capacity building programmes, e-government services. It was started as a joint venture between local bodies (gram panchayats in rural areas and municipalities in urban areas) and private entrepreneurs to bridge the digital divide by providing community access to computers and the Internet.

In November 2002, Dr A. P. J. Abdul Kalam, the President of India, launched the project in Thiruvananthpuram whereas the Chief Minister of Kerala started Akshaya centres in Thiruvananthpuram and Malappuram in May 2003.

Goals and Objectives

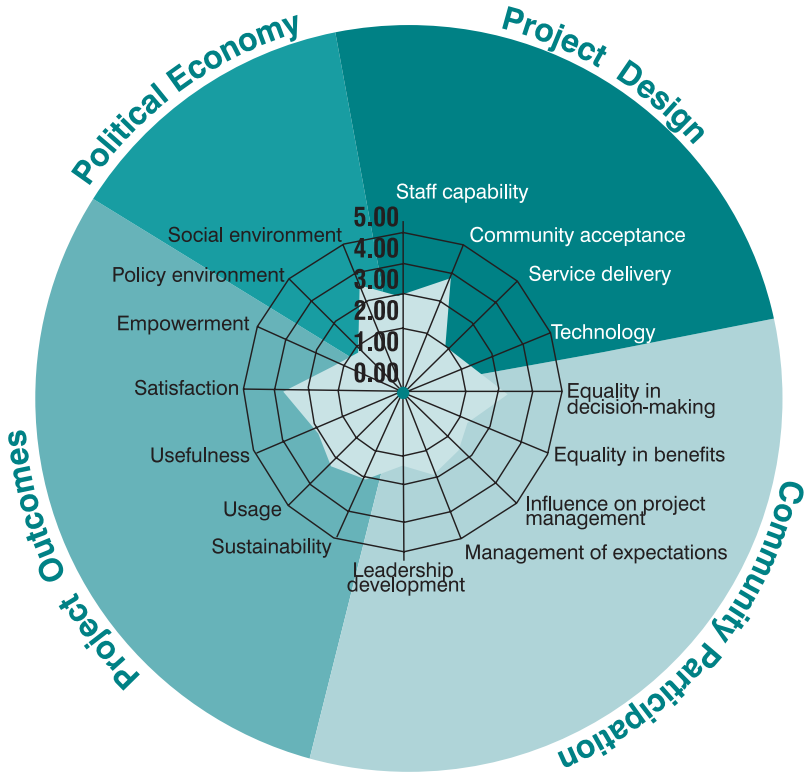
- To provide basic functional skills (e-literacy) to every family in the state.
- To ensure universal access to various information and communication tools as well as technologies.
- To provide relevant content to the local population in the native language.
- To provide community access centres, which can eventually be developed as centres to provide integrated e-governance services.

Planning

The district panchayat, Malappuram, presented a proposal in February 2002 to train interested rural youths in ICTs, at a budgeted cost ofRs 6 million. A survey conducted in the district resulted in a list of 26,000 trained IT personnel and 451 private IT training institutes (mostly concentrated in urban areas).

The project was launched as a pilot in Malappuram district. The district has an area of 3,372 sq km and a population of 3.7 million (of which more than 70 percent are Muslims), 600,000 families in the district live in 102 panchayats and five municipalities. The district is administratively divided into 137 villages, 14 blocks and six talukas. It has a satisfactory penetration of landline and mobile phones (250,000 phones). It also has 3,500 voluntary organizations.

The Town and Country Planning Department was entrusted with the task of identifying geographical locations. It identified 801 locations for Community Technology Centres (CTCs), which were located on main/link roads, with telephone connections and available electricity power. The district panchayat finally selected 634 sites after the approval of gram panchayats. Of these, 565 CTCs have already been set up. The project proposes to establish 9,000 CTCs throughout the state, so that there is one CTC within a distance of 2 km of every household. Three critical factors in the project are: the number of centres, the number of users and the mass of content. The three major



How effective is Akshaya in providing basic functional skills (e-literacy) to every family in the state

components are: access, skill sets and content. The project had initially planned for one CTC among every 1,000 families. However, currently the plan is to have one CTC among every 1,500 families.

Services Provided

Various services are provided from networked and stand-alone computers. An e-literacy campaign that imparts IT-related training at the CTCs has been started. These centres also provide services such as DTP (digital albums, identity cards, report cards, etc.) and conduct advanced courses on ICT-related subjects. Of the 565, only 83 CTCs have Internet connectivity. They provide services such as web browsing, e-mail, Internet telephony, web-based consultancy, etc. Each CTC has 10 computers (smaller and remote centres have six or eight computers), two printers, one web camera, one scanner and one CD writer. These centres are planning to provide e-government, e-education and e-health services in the future.

Target Group and Intended Beneficiaries

The target group is the 600,000 families residing in the Mallapuram district. One member from each family (selected by the family), preferably in the age group 15-65 years, is the intended beneficiary of the project. In the extended phase, it is envisaged that 6.4 million houses will be covered in the state.

Institutional Arrangements

All CTCs have been established using the PPP model. Private entrepreneurs have set up CTCs in their own (or rented) buildings and have invested on computers, equipments and furniture. Each centre has 10 computers. The total cost of the computers is Rs 383,000. Of this, Rs 200,000 is made available by commercial or cooperative or rural banks without secured collateral. The government provides Rs 120 per person as its contribution towards e-literacy, training material and content in the local language. The learner pays Rs 20 to the CTC owner towards completing the course.

The ward implementation committees of panchayats and municipalities monitor the functioning of the CTCs. The President of the district panchayat heads the district-level implementation committee. At the state level, the Secretary, Information Technology, heads the IT mission and coordinates work of six crucial departments. The state-level executive committee is headed by the Chief Minister and is represented by ministers and secretaries of relevant departments. The District Coordinator of Akshaya has a District Programme Officer (for the campaign) and an Assistant Mission Coordinator (for implementation). About 4,500 women from Kudumbashree, a movement of 60,200 women in the state, have been engaged in mobilizing for the e-literacy campaign, particularly in Mallapuram district. There are 13 block-level coordinators who are appointed on contract and 100 panchayat-level coordinators, who execute and monitor the project.

Technologies

Each CTC is equipped with personal computers, each having a LAN card, application software, a modem, a web camera, a printer, a scanner, a CD writer, a UPS, a cable networking component and a telephone connection. Connectivity will be provided through leased lines or through cables in the near future. Around 15 percent of the CTCs have some form of Internet connectivity. Five companies were short-listed (Escotel, Satyam, Asianet, Tulip and Aksh) for providing uninterrupted connectivity at 64 Kbps/2 Mbps to all CTCs in the district on a monthly user-charge agreement. This work was awarded to Tulip, and the entire network has now become wireless.

Primary Access Points

CTCs provide primary access points. One CTC has been started for about 1,000 families and situated, in most cases, within 2 km from every household. On average, each centre provides e-literacy training to 1,000 members in the community in the span of 100 days. For each person trained in the basic course, the owner of the CTC gets Rs 80 from the gram panchayat, Rs 20 from the janpad panchayat, Rs 20 from the district panchayat and Rs 20 from the member itself. The state government also pays Rs 10 per person as incentive for those trainees who complete their e-literacy targets in the specified timeframe.

Capacity Building

The project has taken up an unparalleled challenge for providing e-literacy at an unprecendented scale. Each entrepreneur/ owner of the 565 CTCs established so far has undergone two-day training at Thiruvananthpuram. Each member of the family is given 15 hours of computer training at the closest CTC from the household, which consists of 10 lessons prepared in the local language.

Constraints and Implementation Challenges

The project has faced numerous constraints and implementation challenges. One of the first questions asked was why not invest more in health and education instead of investing in ICTs. The conservative Muslim community also feared the possible misuse of computers for

Human Interest Stories

From the United Arab Emirates to Olavattur

Twenty-seven-year-old Majeed Baba worked for six years in the United Arab Emirates (UAE) as a supervisor in an office. He was earning Rs 60,000 per month. However, homesickness and the desire to do something for his village brought him back to Olvattur in the year 2000, along with his wife and his one-year-old daughter. He rented a dilapidated building in the village at Rs 450 per month and started an Akshaya centre in May 2003. He bought eight computers, two printers, one scanner, one UPS, one web camera and the minimum required furniture, investing Rs 300,000 from his own savings. He says, "I had to make 2,000 families e-literate in the first three months. From this, I earned Rs 270,000. Then onwards, all the machines became mine after recovering my investment in three months' time." He also helps in the nearby orphanage (housing 200 orphans) and organizes health and sanitation campaigns in the village. He provides free computer courses to needy children of the village. He is earning less than he did in the UAE, but he realizes that his work is more fulfilling and satisfying. His ultimate dream is that some day the President of India, his idol, would come to his village to visit his Akshaya centre.

"Learning to drive an auto is more difficult than learning to use a computer"

Phiroz Babu, the youngest in his family, dropped out of school in the ninth class. His father died when he was 12 years old. The entire family's responsibility fell on the shoulders of his elder brother who left for the Gulf soon after and now sends Rs 3,000 every month to the family. Apart from Phiroz, his wife and child, the mother and the brother's wife constitute the family.

Phiroz used to collect sand from the riverbed to sell. He also drove an auto-rickshaw to support the family. He had always thought that the computer was a very complex machine. After joining e-literacy classes at Kolmanna Akshaya centre, to his surprise, he found that computers were very simple to handle – in fact, less complex than driving an auto-rickshaw. On completing the initial course, he joined the six-week (three hours daily) advanced course to learn Windows 98, MS Office, multimedia (Photoshop and Photoimaging) and the Internet, for which he paid Rs 500 from his own pocket. Now, after learning to use the computer, he dreams of owning one and working as a data entry operator in Dubai.

Ashraf and his band of cyber kids

Abdul Ashraf, a 28-year-old who lost his left hand some years ago in an accident, got his Diploma in Computer Applications while he was teaching Hindi in the local high school. With an investment of Rs 200,000 (of which Rs 150,000 was taken as a term loan from a bank), he started an Akshaya centre in his village, Kizsheri. He also runs a Kids Club, which has a membership of around 100 children in the age group of eight-16 years. He charges Rs 10 per hour from the children for playing computer games. He has dozens of innovative and skills-based computer games. He has also launched a Cyber Kids scheme in which 30 children (between 10-16 years) have joined. In this scheme, he provides advanced courses on MS DOS, Windows, WordPad and MS Paint over a period of four months at a fee of Rs 180.

watching pornography on the Internet. These doubts were addressed by the project administration by reasoning with and educating the users. There was a strong resistance from commercial, cooperative and rural banks to provide term-loans of Rs 200,000 without collateral. Local bodies like gram/block/district panchayats and municipalities initially did not want to provide Rs 120 per person per family as a contribution towards e-literacy efforts from their own resources. Eventually, the state government had to provide budgetary allocations for these bodies.

The district has poor Internet connectivity though the telephone density is higher than the national average. This too was a constraint to the successful implementation of the project. Another major constraint was the unavailability of Malayalam content. The absence of Malayalam sites on the web prevents the local population from deriving maximum benefits from the Internet.

Project Outcomes

The project has shown that the PPP model can be effectively mobilized to launch this type of project, helping to bridge the digital divide. Of the total cost of Rs 260 million, Rs 180 million has been invested by private entrepreneurs in establishing the CTCs. Local bodies contributed Rs 60 million towards the e-literacy programme. The state government has to spend only Rs 20 million for promotion and content development. Around 40 percent of the 0.6 million families were made e-literate in the Malappuram district. The community has largely accepted CTCs as centres for communication and e-literacy.

Key Lessons Learnt

Apart from the fact that Akshaya has introduced a successful and effective PPP model for establishing CTCs, it was found that there is adequate skilled manpower available for operating computers in rural areas. The project also emphasized the fact that e-literacy is a precursor in a developing e-community. The project also shows that the People's Action Plan is more important than the Technology Action Plan.

Sustainability

It is too early to comment on the sustainability of the project, as it is in the nascent stage of implementation. The promise of one CTC per 1,000 families (5,000 people) may not be realistic. The long-term sustainability of the project would only be ensured once the CTCs are effectively networked with the provision of sufficient bandwidth.

Replication and Scaling Up

This project has been replicated in seven other districts in India. The PPP model is worth emulating and replicating to bridge the digital divide. In a resource-poor country, this model provides ample opportunities for community access to computers and ICT. The state of Kerala had set a target to scale up the project in all its 14 districts to provide e-literacy to 6.4 million families by 2004.

Recommendations

It is recommended the initial strategy of having one CTC for every 1,000 families be changed. In the long run, many ventures might not be financially viable. Instead of adopting such a rule of thumb, it would be better to decide the number and location of CTCs based on a needs assessment and potential analysis. The project should focus more on implementation on the basis of field realities rather then rhetoric. There is an urgent need to standardize advanced learning courses, as repetitions already exist. It is also recommended that adequate, relevant content in the local language be provided to fulfil the community's demand for information.

Connectivity and networking of all the existing CTCs is a critical issue to be addressed before increasing their numbers. Numerous technology options like cable, VSAT, fibre, line-of-sight wireless as well as non-line-of-sight wireless exist for providing connectivity to the CTCs. It is also recommended that a technology be chosen only after a detailed analysis of cost/capital requirement, recurring costs, usefulness in the geography, potential use of the bandwidth by the community and long-term sturdiness of the technology. Connectivity should support Internet browsing, Voice over Internet Protocol (VoIP), multimedia, video-conferencing and e-learning/e-health services. The government should also encourage all organizations, institutions, universities and business establishments in the state to host informative websites in the local language on the Internet. A significant effort is still required to enable these CTCs to provide e-governance, e-health, e-education and e-business. Similarly, a vision of using these Akshaya centres as outlets of the FRIENDS project (see page 72) is yet to be implemented. For the sustainability of these centres, the integration of Akshaya CTCs and FRIENDS need to be achieved at the earliest.

Contact Information

Sivsankaran
Director, Kerala IT Mission,
ICT Campus, Vellayamballam Jun
Thiruvananthpuram, Kerala
Tel/Fax: +91 471 272 6991
+91 471 231 4307
E-mail: director@keralaitmission.org

Website

http://www.akshaya.net

Anand Milk Collection Centres

Anand, Gujarat

Background

The Anand Milk Union Limited (AMUL) was born in 1956, before the promulgation of the Gujarat State Cooperative Act, 1961. The first cooperative dairy in the state of Gujarat was established in Anand district and the offices of the National Dairy Development Board (NDDB) are also located here. The Anand District Milk Cooperative Society has a staff strength of 1,200 and collects 700,000-800,000 litres of milk every day from 1,003 milk societies (with more than 578,000 members, of whom 405,000 belong to the poor category) in Anand and Kheda districts. The Anand District Milk Cooperative Society (DMCS) produces milk, flavoured milk, cheese, chocolates, butter, ghee, etc. It provides backup integration to these societies through selling 600 tonnes/day cattle feed and has one breeding centre, 36 veterinary centres (with 76 qualified doctors) and four chilling plants. The old system of milk collection at the primary societies; with manual testing, manual account keeping on paper and manual receipt of the payments from the district dairy, resulted in a five to10 days' delay in payment to the milk collectors. An Automatic Milk Collection System (AMCS) was introduced in 1996. At the time of the study, 691 primary milk collection societies used AMCS.

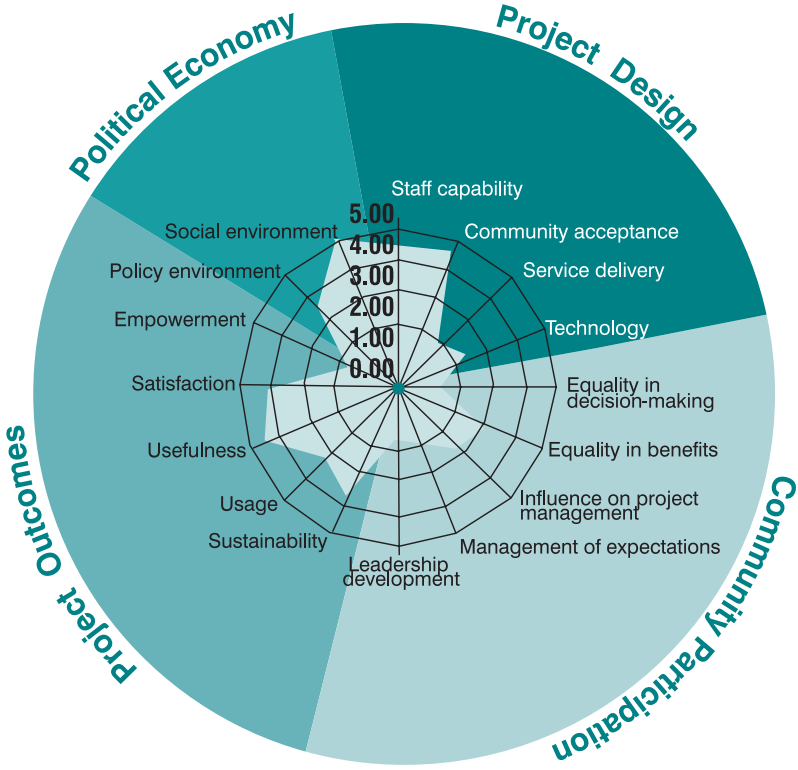
Goals and Objectives

- To automate milk collection procedures at the collection centres to reduce the time required in collecting milk from members.
- To use electronic technology to weigh the milk and to measure its fat content.
- To automatically calculate the amount payable to each and every milk collector.
- To maintain regular records at the Dairy Cooperative Societies (DCS).
- To integrate data at each primary milk society with the District Milk Cooperative through the use of ICT.

Planning

Each AMCS consists of a computer for billing, a milk-testing machine and an automatic milk tester. There are seven to eight manufacturing companies (such as Akashganga, Surabhi, RAL, Kaamdhenu, Prompt, etc.), which manufacture these instruments. Each AMCS costs Rs 70,000 to 90,000. At the time of the study, 691 out of 1,003 primary milk societies used AMCS, while the remaining societies used automatic weighing machines. The e-Governance Centre of the Indian Institute of Management-Ahmedabad (IIM-A) has worked to extend the benefits of this application by developing the Dairy Information System Kiosk (DISK) software, which will replace the existing application at the milk collection centres. It has two major components – an application with enhanced database and reporting running at the society level and connectivity to a dairy portal serving transactional and information needs of all members and staff at various levels in the district cooperative structure. The DISK database includes a complete history of all milch[ii] cattle owned by the farmers. The basic details of breed and a history of diseases, inoculations, artificial insemination and pregnancy are maintained in the system. Longitudinal data on milk production by

[ii] Giving milk; bred or suitable primarily for milk production



How effective are the Anand Milk Collection Centres in establishing transparency and financial integrity in milk collection at dairy cooperatives

individual farmers is also available in the collection, which can provide feedback to the farmers.

Services Provided

AMCS provides automatic weighing of procured milk, measurement of fat content of the milk and automatically calculates the amount to be paid. It maintains a database on the computer for member details like membership number, date and time of the milk collection, weight of the milk, fat content of the milk and amount payable. The payment is made to the member on the spot at the rate of Rs 190 per kilo fat. Each primary milk collection society provides cattle feed on a no profit-no loss basis, veterinary services at Rs 35 per visit and artificial insemination at nominal charges.

Target Group and Intended Beneficiaries

The target population is 578,000 members of 1,003 primary milk collection societies and 400,000 members.

Institutional Arrangements

The DMCS has 13 elected members. There is a Managing Director, along with two general managers (plant technology and dairy development), two assistant general managers (cattle feed and other products), 10 managers (milk procurement, cooperative

development, finance, accounts, production, engineering, chocolate complex, cattle feed, cheese centre and animal husbandry). There is a fully-equipped research facility as well. Each 1,003 primary milk cooperative society has 11 elected members, of which there is one chairman. Each primary society has a secretary, a milk collector, a cashier, a tester, an artificial insemination worker, a cattle-feed salesman and a clerk. At the primary milk cooperative society, AMCS is either manned by a milk collector or by a tester.

Technologies

A basic milk collection transaction done by Akashganga comprises:

- Measuring weight of milk with electronic weighing scale.
- Fat testing using 'milk-o-tester'.
- Capture of unique member ID by the PC software.
- Printing of pay slip, with all this data and the amount to be paid.

The MS DOS-based system offers scalability for an information-kiosk like service. Thus, DISK has been added as an enhancement, which offers a multitude of animal husbandry-related services, besides maintaining databases and offering Internet connectivity at the DCS.

Primary Access Points

The Milk Collection Centres of the primary DCS are the primary access points. The number of farmers selling to their local cooperative milk collection centre varies from 100 to 1,000 and the daily milk collection varies from 1,000 to 10,000 litres.

Capacity Building

AMUL uses the facilities of the Institute of Rural Management at Anand (IRMA) for the purpose of capacity building. At least two members from each DCS have been given three-day training on the use of AMCS and computers. All the secretaries of DCSs have been given one-day training in AMCS. Managerial training courses like Member Business Development Programme, Society Staff Orientation Programme, etc, also include an orientation on the use of AMCS.

Constraints and Implementation Challenges

The major barrier is the attitude of the people. It seems like a surmountable challenge but building the initial momentum takes time due to this attitude. Although AMCS is priced competitively, the cost is a major impediment for the DCS, for whom every rupee has to be accounted for. They are answerable to every member of the society. In addition, villages in India are dusty and have poor infrastructure. For ICT-based systems to operate, the machines have to be rugged and be able to withstand the climatic conditions. The power situation in the villages is poor. When the power goes down at the time of milk collection, all activities come to a halt. At times, manual entry has to be done, leading to a disruption of the normal routine.

Project Outcomes

AMUL has been one of India's great success stories. It has been instrumental in bringing the "White Revolution" into India. The use of AMCS in the DCSs has brought about phenomenal results. AMCS has brought down the waiting time for the members of the Milk Collection Centres from 20 minutes to 50 seconds. AMCS has a comprehensive database of 290,000 members in Anand-Kheda districts in 691 DCSs. Also, it has reduced payment delays from 13-14 days to sameday payments. AMCS has served tens of thousands of members in Anand-Kheda districts and in other districts of Gujarat.

Key Lessons Learnt

A large part of the success of this venture can be attributed to the use of appropriate technology. The adapted milk-testing machine costs Rs 22, 500 as compared to Rs 180,000 for one from the original manufacturer. It works better in the heat and dust. It needs manpower to operate the machine, but this is not a disadvantage in rural India. Simple and rugged plastic cards with holes are used as personal identifiers, rather than smart cards. The idea was to keep the cost to affordable levels, without sacrificing any essential requirements. Building useful content in local languages is absolutely necessary. In the dairy sector, the district unions are willing to spend because they stand to gain as the system increases the efficiency and effectiveness of the services delivered by them to rural farmers. For rural kiosks to become a reality, it is necessary to build partnerships among development organizations, telecom companies, small IT service companies and government agencies. The role of the

Human Interest Stories

The Dairy Cooperative Society of the new age

The DCS at Utarsanda in Anand district provides quality services to 2,300 members. The population of Utarsanda village is 15,000 and it has 4,500 milch cattle. The DCS has a staff of 10 and is looked after by the secretary, Deepakbhai Patel. AMCS was introduced in the Milk Collection Centre in 1997. Everyone in the DCS knows the operation of AMCS. Every morning and evening, they generate data on milk collection which they post on the office notice board. The centre opens between 6 am to 8.30 am and between 5.30 pm to 8 pm. Earlier there used to be long queue of around 700 members every day and the centre used to close one hour later in the morning and the evening. The centre has a telephone and a television for the use of members.

The AMCS is always functional because of the UPS and generator backup. Four hundred and sixty-five milk buyers have also joined a special deposit scheme in which on a deposit of Rs 500 or Rs 1,000, they receive milk and the amount is debited from their accounts. The services available at DCS are very popular with the villagers. In 2002-2003, the DCS has made a net profit of Rs 2 million. And in 2001 it received the ISO-9002 certification.

Empowerment of a woman member

Forty-year-old Santokhben is a migrant from drought-prone Saurashtra region. She has been looking after her five sons and one daughter since the death of her husband. She has no agriculture land and milch cattle are her sole source of income. She owns 25 cows and the income thus earned is the family's livelihood. Her sons take the cattle for grazing and she takes the milk to the DCS in Bhumel, which is 1.5 km away from her house. She deposits 20-30 litres of milk every day at the Milk Collection Centre. She is very satisfied with the AMCS as now her work gets done in less than 60 seconds, while earlier it used to take up 20-30 minutes. She is fully satisfied with the fat content measurement of her milk now. Before the AMCS was introduced in October 1998, she used to argue with the milk collector/tester or the secretary every day over the quality of her milk. She is now happy as she gets her payment on the spot. She plans to change over from local breed cows (Gir) to newer breeds.

committed volunteer who acts as the intermediary between the computer screen and the rural farmer is also important.

Sustainability

The AMCS is sustainable. The cost of the whole system is Rs 70, 000-90,000. The time reduction in catering to customers, providing an instant milk quality measurement facility and the automatic generation of database recovers the cost within a period of two years. In most DCSs, one or two staff has been removed after the introduction of AMCS, further reducing operational costs. The District Milk Union has entered into an annual maintenance contract for the hardware. The operation of AMCS is so simple that in less than one day anyone can master its operation. The widespread replication of AMCS in numerous DCSs in various Indian states has been primarily due to its sustainable business model.

Replication and Scaling Up

Of 10,000 DCSs in Gujarat around 4,000 are in the AMCS network. The concept of AMCS required considerable effort from the manufacturing companies. Their aggressive marketing and rural coverage assisted them in winning the confidence of the DCSs. The replication of the use of AMCS has spread beyond the state of Gujarat. Of 96,000 DCSs all over India, around 6,500 are already using AMCS. The replication has been fastest in Gujarat and Maharashtra. But other states like Andhra Pradesh, Punjab and Karnataka are also quick in adapting AMCS at Milk Collection Centres of DCSs. The biggest stumbling block in fast replication is the poor financial position of most DCSs in India.

Recommendations

It is recommended that the pilot DISK should be replicated in all the DCSs where AMCS are being used. There is a felt need for a database of milch cattle (consisting of past history of diseases, inoculations, artificial inseminations, etc.), decision support systems (like milk collection forecasts), information on veterinary-related issues and innovations. DISK would eventually fill the gap for the benefit of poorer members. There is a need to scale up the pilot of connecting five AMCS in DCSs through a network. All 50,000 AMUL product distributors are already connected to 50 marketing offices of AMUL across the country through dial-up connectivity. Since 1997, 50 marketing offices are linked to the Gujarat State Cooperative Milk Marketing Federation through dial-up connectivity and, in turn, this is connected through VSAT with 12 District Milk Unions in the state of Gujarat. The organizational structure is already in place; the networking of DCSs with the DMU should follow. In most DCSs which are using AMCS, other databases of members are kept manually. The PC attached with the AMCS is only used for four hours in a day. It will be useful for the DCSs if all their remaining work is computerized too. The cost of AMCS is still out of reach of small DCSs. If it could be reduced by 20-30 percent, it would become affordable to even small DCSs.

Website
http://www.amul.com

Bhoomi
Bangalore, Karnataka

Background

Sixty-six percent of the population of Karnataka resides in rural areas where the main occupation is agriculture. About 6.7 million farmers own 20 million land holdings. The crucial document which records various parameters and information pertaining to land holding is the Record of Right Tenancy and Cultivation (RTC). Earlier, in the manual system, these records were maintained by 9,000 Village Accountants (VAs or village revenue officials) who served farmers in about 27,000 villages. The RTC is required for land transactions, to obtain crop loans, other loans and concessions linked to the size of the land holding. The manual system of maintaining RTCs was exploitative as the VAs were not easily available and bribes were often extracted. Since the records were not open for public scrutiny, there was considerable scope for manipulation. The land records are the most important testimony of rights for land owners in the huge agro-economy of India. VAs held a monopoly on all revenue records and were frequently involved in harassing citizens, tampering with the records and other corrupt practices. The Ministry of Rural Development has been providing funds to state governments for computerization of land records since 1988-89. In Karnataka, data entry work started in 1995, but up to 1999 there were few concrete benefits. In 1999-2000, modifications were made in the software and all the databases were updated when the Bhoomi project was launched.

Goals and Objectives

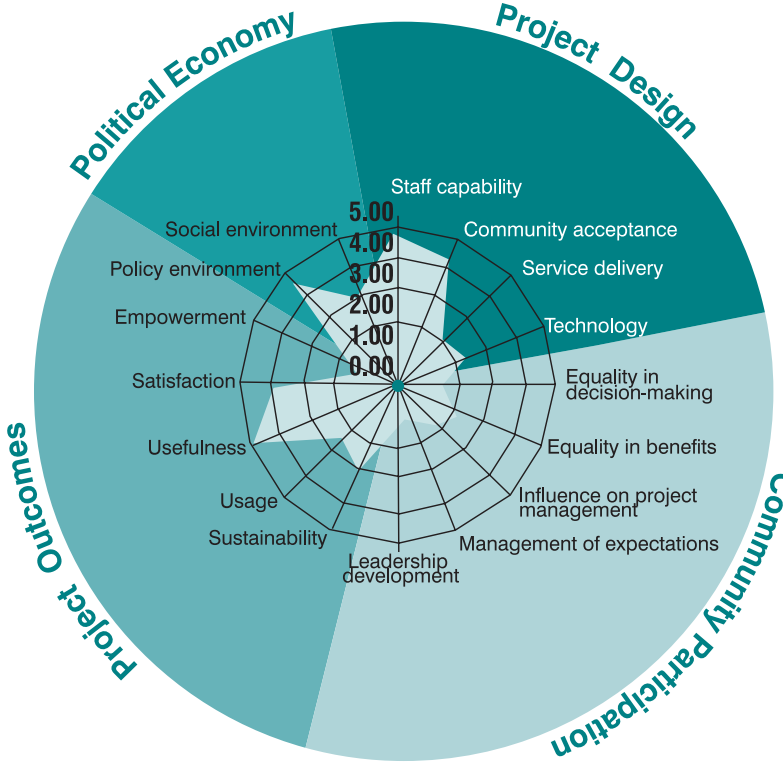
- To facilitate easy maintenance and prompt updatation of land records.
- To make land records tamper proof.
- To provide farmers easy access to their land records.
- To create and to construct databases of land revenue, cropping pattern, land use, etc.
- To utilize the data for planning and formulating development programmes.
- To enable usage of this database by courts, banks, private organizations and Internet Service Providers (ISPs).

Planning

A pilot project for the computerization of land records in Karnataka started in 1989, initiated by the Government of India. By 1996, the project for computerization of land records for all districts in the state was sanctioned. The aim was to create computer records from the manual data. However, since no provision was made to install computers at the sub-district level, online updating of these records was not possible. Thus these projects failed to achieve all of the above objectives. The Bhoomi project was launched in Karnataka in 2000 with the aim of computerizing the system for maintaining land records, thereby permiting online updating. In the first phase, the project was implemented as a pilot in five talukas in the district; and later rolled out to all 177 talukas. The required software was designed and developed in-house by the National Information Centre (NIC, a Government of India organization).

Services Provided

At each kiosk, there are two computer screens, one of which performs the operation and the other which shows the transaction being performed to the clients. Just by providing the name of the owner or the plot number, one can collect copies of the land parcel. Farmers can file online requests at these kiosks for a change



How effective is Bhoomi in facilitating easy maintenance and prompt updating of land records

of ownership, sale or inheritance. These are important transactions for initiating the mandatory process known as mutation for effecting necessary changes in the RTC. Each request is assigned a number, and notices are then generated from Bhoomi, which are served by the VA, on interested parties. After waiting for a statutory period of 30 days from the day of serving the notice, the Revenue Inspector (RI) passes the mutation order in a register maintained for this purpose. The mutation order passed by the RI is processed in Bhoomi and a new RTC is generated, duly incorporating the details of the new owner. As a part of this process, the mutation order is scanned to take care of non-repudiation. While the mutation records are pending for orders of the RI, a farmer can trace the status of the application, using the number provided to him.

Target Group and Intended Beneficiaries

All citizens of the state (residing in rural and urban areas) are the target groups and intended beneficiaries.

Institutional Arrangements

An additional secretary in the Revenue Department (Land Reforms) acts as the project manager, assisted by the Senior Technical Director, NIC (Technical Manager). At the district level, the leadership role is given to the Deputy Commissioner. The administrative responsibilities were given to the Assistant Commissioners, technical responsibilities to District Information Officers of the NIC, and implementation and monitoring tasks assigned to the consultants appointed by the Bhoomi

project. Revenue Shrestedars (Deputy Tahsildars) were made project leaders at the taluka level, working under the direction of the Tahsildar. At the grass-roots level, there are revenue inspectors, village accountants and data entry operators. Except for the 28 consultants (one for each district and one for the state headquarters) appointed on an annual contract by the Bhoomi project, all tasks have clearly defined roles and responsibilities assigned to existing government staff. At the taluka level, one of the three existing Deputy Tahsildars are made responsible for Bhoomi. Five VAs were trained and assigned to man the Bhoomi counter and update records.

Technologies

Each of the177 talukas is provided with one computer with 64 MB RAM (with two monitors), one printer, one scanner, one UPS, one battery for back-up and a generator. The computer at the counter is connected to a a LAN and the server room has biometric equipment for fingerprints, two client machines for data updation and one printer. The front-end is written in Visual Basic v6 and the database in SQL server v7.0. The Operating System is Windows NT.

Primary Access Points

Bhoomi centres are operational in all 177 taluka headquarters of the state, providing a primary access point for all citizens. Each Bhoomi counter has two computer screens, one for the counter operator and another for the user. Some centres have touch screen kiosks as well.

Capacity Building

Rs 12.8 million were spent on capacity development of government officials. Intensive training was conducted for bringing about changes in attitude amongst departmental staff. This included seven-day training of 1,200 VAs , consisting of 10 hours a day on the basics of computers and the Bhoomi software; and two-month intensive training of 108 VAs on hardware and networking. In addition, 500 Tahsildars and 900 Shirastedars were given seven-day training on computer operations and the Bhoomi system and 600 VAs were given two-day training on data entry operations. Twelve state-level seminars were organized for 1,200 senior and middle-level officers; and four divisional-level workshops were organized to train 800 officials. To clarify technical and administrative issues, over150 circulars were issued and compiled into seven compendia. Also a Bhoomi Help Manual was distributed at the sub-district level. A computer-training lab was also set up.

Constraints and Implementation Challenges

Many constraints and challenges were faced at the time of implementation. There were 20 million land records of a dynamic nature, which had to be updated at least once a year. The manual copies of land records had a number of inaccuracies and inconsistencies. The question of data integrity became a major issue, as the inconsistencies became more visible once they came into the public domain rather than under the monopoly of VAs. The data structures in the state were not uniform. Data were kept in multiple languages across the state. Data entry operations by multiple agencies had to be closely monitored, as there was an urgent need to create a robust process to facilitate data validation by the owners. There was huge resistance to change from an exploitative system of land records which had operated for more than 300 years. It was necessary to change the mindset of 10,000 revenue officials, VAs and RIs, and 1,500 officials from other departments. The revenue officials involved in the project had no exposure to technology. There was an issue of lack of public acceptance of the deliverables of the project (such as trust in the legal validity of the computer printouts) amongst 6.7 million farmers. The project, in the initial phase, was supposed to be operated from the taluka level

instead of village level, which required change in the processes and procedures. Online updating of the system had to be built in to obliterate manual updating of records. The issue of manual records had to be discarded, which was a major procedural shift. The mutation system had to be robust and quick once it was decided that it would go online. The geographic expanse of the project – 27 districts, 177 talukas and 27,000 villagers – provided a challenge in the form of coordination of implementation and monitoring. Major power cuts (six to10 hours a day) also hindered the project. This compelled project managers to buy UPSs, batteries and generator sets in each taluka.

Project Outcomes

The generation time of the RTC has been reduced from 1 to 30 days to 5 to15 minutes. Similarly, the mutation process cycle time has decreased from 90-180 days to 30-45 days. Crop record updating has increased to 80-100 percent from 50-70 percent. Around 12 million users have used Bhoomi since its inception, resulting in the collection of Rs 180 million as user charges. Presently, 0.7 million people are using Bhoomi centres every month and monthly user charges collected amount to around Rs 10 million.

Key Lessons Learnt

Land registration is a major requirement of Indian villagers. The successful implementation of the project has proved that citizens are ready to pay increased user charges to get certified copies of their records. It has also emphasized the point that even huge and confusing databases can be integrated in a simple and user-friendly program. Another key lesson is that the payment of user charges is necessary for the financial viability of the project. Actually, land records can become a core e-government service for any CIC or a telecentre, supporting other developmental activities.

Sustainability

The project operates a financially sustainable model. It has recovered Rs 180 million in three years against the investment of Rs 244 million. In-house capacity building has provided skilled manpower from within the organization. The constant modification of software ensured long-term functionality of the system.

Replication and Scaling Up

Computerization of land records is an ongoing Government of India programme, which has been continuing over the last decade. Besides Karnataka, other Indian states like Tamil Nadu, Madhya Pradesh, Andhra Pradesh and Maharashtra have also shown similar success in land record computerization projects.

It is planned to scale this project up to at least three villages in every taluka (around 500 kiosks). On a pilot basis, seven talukas have been linked to the State Data Centre. There is a plan to create a network of all 500 kiosks in villages and 177 existing taluka centres. Presently, a few centres have been provided with touch screen computers, but it is planned to provide this facility to all centres. On a pilot basis, two villages – Arudhi and Sassalu in Doddaballapura taluka – have been linked to taluka centres through mobile wireless sets (using Dak Net[iii]). Also, 200 Simputers[iv] have

[iii] DakNet uses wireless technology in conjunction with the existing infrastructure, such as a post office, a cybercafé or kiosk, to extend connectivity to neighbouring areas. It uses point-to-point links between kiosks and mobile access points which are storage and transmission devices mounted on and powered by vehicles such as a bus or a bicycle.

[iv] The Simputer is a small handheld computer, intended to bring computing power to the masses of India and other developing countries. The word "Simputer" is an acronym for "simple, inexpensive and multilingual people's computer", and is a trademark of the Simputer Trust. Similar in appearance to the Palm Pilot class of handheld computers, the touch sensitive screen is operated with a stylus.

Human Interest Stories

At last, relief after eight months

Forty-year-old Gangu Muthaiyya, a landless labourer and member of a marginalized community, lives 25 km from Bangalore in a small village called Ganapatti Hadli. Eight years ago he was allotted 1.27 acres of land by the Government of Karnataka for which he paid a bribe of Rs 650 to the VA. But even after that his name was not entered into the land record system. He came to a Bhoomi centre three months ago and applied for a mutation over the counter. To his surprise, within a month he got the mutation order. When he came to consult a doctor in the city he dropped by at the Bhoomi counter where, in only five minutes at a cost of Rs15, he received the corrected copy of the RTC. He was very happy when he saw his name registered as the legal owner on the RTC.

The times are changing

Khamitkar is a Village Accountant in Gangen Hallie. He joined in 1972, and has worked as a VA for almost 28 years. Then the computerized RTC started to be issued from the taluka office in which he worked. Though he did not have any knowledge of computers, he felt that the new system was good. But, he claims that his workload has increased. He also says that villagers do not pay land revenues to him as they now pay it directly to the centre to get the RTC. Earlier he used to settle the land revenues before issuing the RTC. He is also upset because earlier, whenever he visited the villagers, they would carry his bag on their heads and invite him to eat in their houses. Now, since the introduction of Bhoomi, they do not even notice his presence in their village. "The times are changing. Things will change," he says.

been provided to VAs in five districts of North Karnataka to be used for updating the crops in land records. It is envisaged to scale up the Simputer (or some more cost-effective hand held device) to all 10,000 VAs of the state to integrate the back-end processing.

Recommendations

It is important to convert the land records into measurements of hectares and boundaries rather than plots provided in a matrix (in metres). The Bhoomi project still depicts areas in *guntas* and acres, and boundaries in feet. There is no provision of maps through the Bhoomi kiosks as they are still in the experimental stage of scanning or digitizing village maps. The farmers have to depend on VAs for maps of their land records. There is still a problem in Unicode standardization of Kannada fonts. At present, Bhoomi is providing only land records with entries after 1999 because the records before 1999 have not been updated and validated. For the growth of the project, it is recommended that all land records prior to this year be updated and validated as well. Villagers have to walk 10-35 km to the taluka headquarters to get computerized copies of land records. It is further recommended the project be extended to remote villages, so that the villagers are provided with closer access.

The project is over-dependent on proprietary software (Oracle and Microsoft) and it is necessary to shift to open source software like Linux to cut costs. Non-agricultural land data are still not entered into the databases. Citizens in need of records pertaining to non-agricultural land have to depend on the manual system. This should be rectified. Bar coding of land records can also be used to improve their validity. Due

to the manual system adopted by VAs to update crops in the land records (twice in the year), there are huge delays in updating the records. It is recommended that these records be updated using cost-effective hand-held devices which can be synchronized with server databases to save time.

Contact Information

Rajeev Chawla
Secretary e-Governance
Room 630, 6th floor, MS Building
Bangalore
Tel: +91 80 235 3953
E-mail: as-lrf@revdept.kar.nic.in

Website

http://www.bhoomi.com

Computer-Aided Administration of Registration Department (CARD)

Hyderabad, Andhra Pradesh

Background

The Registration Department of the Government of Andhra Pradesh performs the functions of registration of deeds, valuation of immovable property, collection of revenue (stamp duty and registration fee), preservation of copies of documents, issuance of certified copies of documents, issue of encumbrance certificates and registration of societies, firms, marriages, etc. The department has 387 Sub Registrar's Offices (SRO) in 23 districts of Andhra Pradesh. The gross revenue earned by the department is Rs 12 billion. The manual systems in all the activities caused long delays, red-tape and corrupt practices. The Computer-Aided Administration of Registration Department (CARD) project was conceptualized to computerize all activities and procedures of the Registration Department. A pilot was conducted at two SROs in August-September, 1997. The project was started on 4 November 1998. Presently, the project covers the whole state of Andhra Pradesh.

Goals and Objectives

- To simplify the registration procedure.
- To enhance the speed, reliability and consistency of the system.
- To provide transparency in valuation.
- To replace copying/filing systems with imaging.
- To preserve documents on CDs.
- To automate all back-office functions.
- To enable a system that enables setting time and quality standards.
- To smoothen the government-citizen interface.

Planning

After the success of the two pilots, the project was scaled up in two phases. In 2000, the first phase was extended to 181 SROs. In 2001, the second phase was extended to 249 SROs. By the time of the study, all 387 SROs were covered under the CARD project.

Services Provided

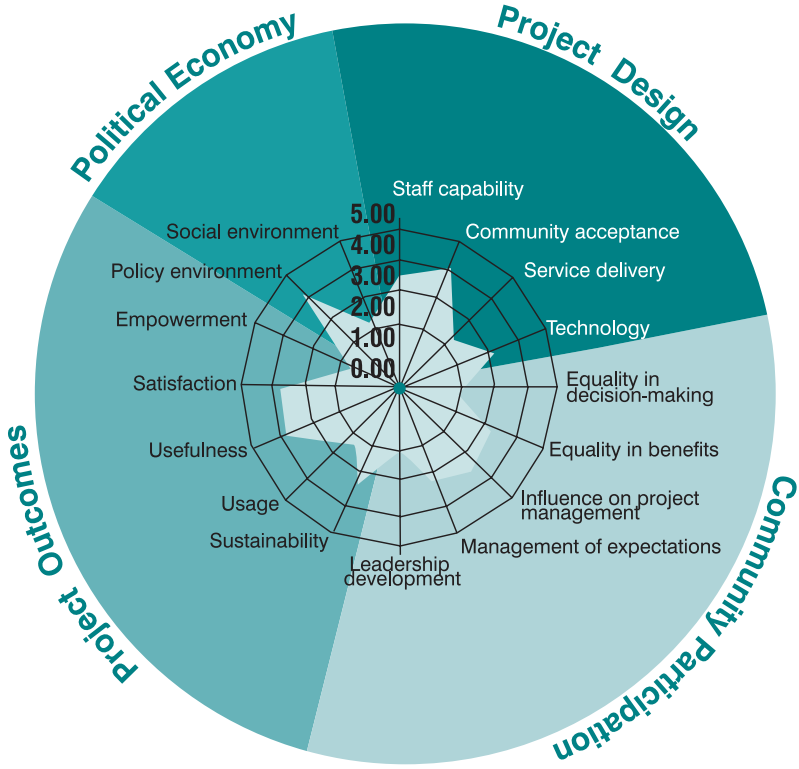
All the services of the Registration Department are provided to citizens for nominal user charges. The most popular services are registration of deeds, issue of encumbrance certificates and market value searches. The prevalent user charges are: Rs 95 for registration of documents (maximum of 10 pages with Rs 5 for every additional page), Rs 10 for motor vehicle search certificates, Rs 20 for encumberancy certificates and Rs 20 for certified copies of the documents.

Target Group and Intended Beneficiaries

The intended beneficiaries are all the citizens who want to register their deeds, get a valuation of their immovable property, certified copies of documents, encumbrance certificates and to register societies, firms, marriages, etc.

Institutional Arrangements

The Inspector General of Registration and Stamps heads the project, supported by the Technical Director (NIC), Chief Information Officer and Deputy Inspector General (IGRAS). Each District Registrar is responsible for the



How effective is CARD in simplifying and speeding up the registration of deeds and other services

functioning of CARD in the SROs under the district. One official from each District Registrar Office (DRO), at the rank of a senior clerk, takes up the task of the Data Processing Officer for two to five SROs, after intensive training. Each SRO has at least two data entry operators (one clerk and one section writer). All the hardware and maintenance of the LAN is handled by WIPRO, a private IT company, which has been awarded a maintenance contract for five years. All the software upgrades are done by NIC.

Technologies

The project works on a LAN. On every 387 SRO CARD office centre, there is provision for one server and four computers (three for B category SRO centres, two for C, D, E category SRO centres and one for F category centres). Each centre is provided with a scanner, a laser printer, a dot matrix printer and a UPS. The server uses Linux as the Operating System along with Oracle 8i for databases. The client end uses Developer 2000 whereas the front end is Windows 98/95 as well as Windows 98 for scanning.

The uptime of the system is more than 98 percent, owing to an effective maintenance contract. Each district office is linked through a network, through dial-up connectivity to the Inspector General of Registration and Stamps office server. The software takes care of security through a username and password and also maintains an audit for all activities. Automatic

backup of documents occurs at the client and server ends.

Primary Access Points

Primary access points for the citizens are the 387 SROs in the state.

Capacity Building

The project is implemented and managed by in-house staff. There are two clerks in each SRO. In all, 1,400 clerks/section writers have been given two-week training to take up the job of data entry operators; 76 senior clerks have been given 10-week training to take up the job of data processing operator job; 67 Assistant District Registrars have been given three-week training; and 40 District Registrars have been given one-week training. Roughly, 3,811 man weeks (76 man years) of training have been imparted so far. Technical staff has also been given training on the CARD software. User manuals on CARD and the imaging software have also been issued.

Constraints and Implementation Challenges

Some legislation such as the Registration and Stamps Act, Urban Land Ceiling Act, Surplus Agriculture Land Act, Endowment Property Act, and the Property Act needed a change to accommodate the new procedure. The Government of Andhra Pradesh issued a circular to provide legal sanction for the scanned documents. All registered documents and deeds of the previous 13 years had to be coded and digitized to ensure encumbrance certificates were valid. Properties change names, categories, size and utility over time and there are discrepancies in different departmental documents. The codification of all property types was a huge task. Similarly, guidelines for the costs of land and buildings as well as for the different purposes and areas covered had to be digitized. The guidelines for the market rates for municipal corporations, municipalities, other urban areas, major gram panchayats, minor gram panchayats, and cantonment boards were decided differently for 80 land types (such as residential, commercial, industrial, agriculture, dry land, etc.). The documents and deeds registered since 1983 have already been scanned and stored on CDs. The problem of shifting from the manual system to the new system was solved by computerizing all processes and procedures required at all the steps from acknowledgement of receipt to issue of a registered document. More than 5,000 government staff were trained in the new system. Maintenance of hardware, especially in remote rural areas, was arranged for by signing a maintenance contract with WIPRO. Power cuts of more than 12 hours were mitigated by installing UPSs at all the offices.

Project Outcomes

The project has increased the speed of registering property and producing related documents. Previously, citizens had to wait for three to seven days to obtain encumbrance certificates. After the CARD system was implemented, they receives such certificates in just 10 minutes. Similarly, certified copies of the documents were issued after seven days, while through CARD, citizens can now get them in only 15 minutes. The time taken to register a deed or a document has been reduced from three to seven days to one day. The CARD project registers 1.18 million documents and serves 5 million citizens in a year. Since the inception of the project, 4 million documents have been registered, 2.16 million encumberance certificates have been issued, 3.73 million registration check slips have been issued and 75,907 certified copies have been provided to the public.

Key Lessons Learnt

The project has been successfully implemented state-wide at a minimum cost. It shows that e-government solutions can be implemented in a span of three to four years, even with innumerable complications and procedures. The project also proves the hypothesis that e-government could be implemented by just training the existing staff, without adding new technical staff. Another lesson is that in the absence of PPP, public finances can be mobilized to get projects implemented.

Sustainability

The project has improved the government-citizen interface. Around Rs 300 million has been spent on the project, but no impact assessment had been carried out by the time of the study. The increase in revenue collection through CARD has still not been proven, but the project has generated more than it has invested since 1999. Rs 380 million have been generated from the registration of documents, Rs 37 million from the issuance of registration check slips, Rs 43 million from encumberancy certificates and Rs 1 million from certified copies. Up to the time of the study, the project had earned Rs 475 million against a one-time investment of Rs 300 million. The project will become further sustainable if all the services could be successfully made available online.

Replication and Scaling Up

The project has already been implemented in all the SRO centres in the state. Now, it is planned to network all SRO centres to the DROs through 64 Kbps dedicated leased lines and all DROs with state servers through 128 Kbps dedicated leased lines. It is also planned to

Human Interest Stories

In a few seconds, please

Thirty-six-year-old S.K. Gase works as an Estate Manager in Nagarjuna Consultancy. His employer bought 10.32 acres of land in Datanpally village, and his office sent him to find out the market value of the property, stamp duty and registration fees for the documentation. Gase came to Chevella SRO and submitted his application. Within 30 seconds, he learnt that the value of the property was Rs 29,000 per acre. He also got the information that he had to pay Rs 1,740 as stamp duty, Rs 1,450 as transfer duty tax and Rs 145 as registration fee.

"My job has become so hassle free"

Venkateshwar Reddy, a 38-year-old Recovery Executive at Rajdhani Urban Cooperative Bank, has been visiting many SROs every day to learn about the encumberancy of mortgaged properties of the bank. He has been doing this for 10 years. "My job was very difficult, as I was unable to put up reports to the bank management within the time limit. The SRO used to take many days to give this information to me." His work is now completed in just 10 minutes.

"From 100-page document-writing every day to a click of the button"

C. Hanumanthrao has been working as section writer for the Registration and Stamps Department for the last 18 years. Before CARD, he used to do writing/copying of 100 pages of registered documents every day. His fingers had started showing symptoms of arthritis. After the introduction of CARD, he saves scanned copies of registered documents on CDs in just minutes.

install network-monitoring software in the system as well as to introduce storage of scanned documents in the form of microfilms. Similarly, the department aims to upload record of documents on the web. The long-term vision is to provide all the services of the Registration Departments through the web.

The project has been replicated in the states of Maharashtra and Punjab with a few modifications. In Maharashtra, the entire project is implemented in an innovative PPP, in which government provides data, premises and service operators whereas the private partner takes care of the hardware, software, and network support and management of the facility.

Recommendations

Presently, besides photocopies, four copies of a CD of the registered documents are stored (two for the SRO, one for the DRO and one for the IGRAS). It is recommended that the triplication of storage and archiving of documents be eliminated. There seems to be an extra computer at each SRO: offices with four computers have three operators, those with three computers have two operators and those with two computers have one operator. The reason for the provision of one extra computer at all 387 SRO centres is not clear. It is recommended that this proportion be rationalized according to the workload. All the hardware provided to 103 SROs in the year 2000 needs to be changed or urgently upgraded. It is also recommended that the software should be upgraded so that scanned/digitized photographs of the people involved in the registration process could be electronically pasted onto the original and stored documents. This will dramatically improve the authenticity of the documents and the procedures. There is no monitoring of MIS in the SRO offices on a daily or weekly basis. The MIS monitoring system needs to be improved at DRO and IGRAS levels. Before spending Rs 50 million on networking SRO and DRO offices with 64 and 128 Kbps lease lines, it is strongly recommended that a feasibility study be carried out.

Contact Information

E-mail: card@ap.nic.in, card@ap.gov.in, card@igrsmail.ap.gov.in

Websites

http://www.ap.nic.in/CARD
http://www.igrs.ap.gov.in

Community Information Centres

Gangtok, Sikkim

Background

The project of setting up Community Information Centres (CICs) in Sikkim was launched by the Government of India in September 2000. Of a total of 487 such centres in the North Eastern Region of India, Sikkim was allotted 40 centres. A CIC is essentially a computer centre, equipped with six computers (server plus five client machines), printers (one laser and one dot matrix), a generator, and a direct satellite link for accessing the Internet. Two computer operators/instructors have been posted at each centre. The CICs have been set up with a view to spread ICT awareness among the people, both at rural and urban levels. The intention is to bridge the gap between the connected elite and the non-connected masses. The 40 CICs have been spread over Sikkim at altitudes as low as almost sea level and as high as 10,000 ft above sea level. The users are also equally diverse – from yak herders to the urban elite.

Goals and Objectives

The main objective is to spread the use of computers in various aspects of daily life, to promote the use of the Internet and for rural people to participate equally in the modern world. Through CICs, the rural people can download forms (e.g. birth certificates, employment cards, etc.) and obtain prices of agricultural commodities in different markets which can provide financial benefit to farmers.

Planning

It is proposed to use the CICs for e-edutainment in the future. A number of channels could be telecast through the VSAT-based network, as TVs with other associated infrastructure are already available at the CICs. Future prospects include provision of connectivity to schools, hospitals and post offices in major habitats.

Services Provided

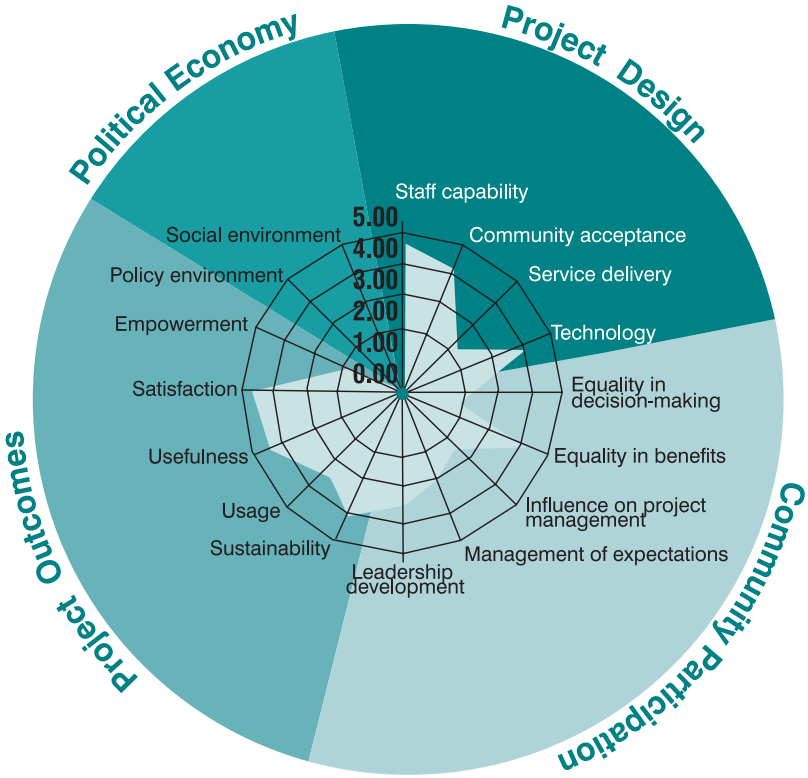
Basic services provided by CICs include Internet access and e-mail, document printing, data entry and word processing, and training of the local populace. In addition, several citizen-centric or Government to Citizen (G2C) services are provided. Some services include Birth and Death Registration Service Facilitation Centre (e-Suvidha) for different types of certificates issued by block and district administrations such as marriage certificates, etc. Similarly, agriculture prices and other agricultural market information are also provided to farmers, which enable them to buy and sell goods without being exploited by middlemen in the *mandis* and *bazaars*. The CICs also provide useful information on educational and employment opportunities. Several application forms for old age pensions, employment cards, driving licenses, ration cards, etc., can also be downloaded from the centres.

Target Group and Intended Beneficiaries

The primary target groups in Sikkim are the villagers staying in remote and hilly terrain of the North-Eastern area. One kiosk has been created at every block headquarter and it caters to all the villagers in that block.

Institutional Arrangements

It was decided by the IT Department that the day-to-day running of each CIC would be handed over



How effective are the Community Information Centres in providing access to information, education, markets and governance

to a committee consisting of the local panchayat president, or school principal or Rural Development Agency Director, as one member plus one CIC operator. However, the physical maintenance of equipment would be done by NIC and the disbursement of salaries by the IT Department.

Technologies

Each CIC is well-equipped with equipment, including one server machine, five client systems, one each of a VSAT, laser printer, dot matrix printer, modem, LAN hub, TV, web camera and two UPSs (1 KVA, 2 KVA). Each CIC has two CIC Operators (CICOs) to manage the centre and provide services to the public. The project is a joint effort of the Department of Information Technology (DIT) under the Ministry of Communications and Information Technology (MCIT), NIC and the state governments of the North-Eastern states.

Primary Access Points

Primary access points are the kiosks (CICs) created at each block headquarter, catering to around 50-100 villages.

Capacity Building

Since first opening in Yuksam, the CIC has seen the successful completion of the Basic Computer Awareness Training Programme for the first 10 batches of trainees and there has been an increasing number of interested persons. More than 80 people have been trained over the last three months, including 25

students, 10 housewives, 15 farmers, 18 teachers, and eight panchayati representatives. The trainees were in an age group ranging from 10 to 78 years, including schoolchildren, college students, NGO members, secondary and pre-school teachers, nurses, doctors, ration shop owners, forest guards, farmers, radio mechanics, barbers, small shop owners, tourist guides, porters, hoteliers, hotel receptionists and others. The CIC also took special care to conduct lessons for the less educated local people.

Constraints and Implementation Challenges

The project has been implemented in the most difficult hilly terrain of India, in an area that is predominately inhabited by tribal communities. The geographical condition of the area is such that one CIC in one block (catering to 50-100 villages) is quite far away from the houses of most of the villagers. The level of computerization and database development in north-eastern states of India is poor, making it difficult to implement the project. CIC managers are government servants or volunteers paid a monthly honorarium. This has resulted in a lack of enterprise at the kiosk (CIC) level. Heavy capital investments in the CICs and the network have caused increased inputs into maintenance and the management of technology. It has become very difficult to maintain the equipment in far-flung areas. Most services provided in the project are not considered essential or useful by most villagers. A lack of IT-skilled manpower in these areas has also been a major stumbling block in driving the technology and its impact down to the communities.

Project Outcomes

This project has not been very successful in achieving its goals and objectives. Most CICs are equipped with high-end technology equipment and hardware. But its utilization is sub-optimal. Only a handful of users come to the kiosks which indicates the poor outcomes of the project. The manning of CICs by government servants or volunteers has resulted in poor customer satisfaction. Maintenance problems with the equipment has caused many CICs to remain closed for weeks.

Key Lessons Learnt

High capital investment in equipment – hardware, software and networking solutions – is not likely to lead to a sustainable ICT project. Another key lesson learnt is that without community involvement and participation, no government intervention can help in alleviating poverty and providing efficient governance through the use of ICT. The kiosks can be operated more efficiently by entrepreneurs working on a profit-sharing basis. It is also important to create services that are considered essential, or useful, by the community, or the usage may turn out to be a disappointment. Providing Internet access at kiosks does not necessarily mean that the community will become well equipped to handle and use Internet facilities.

Sustainability

Many operational CICs charge nominal amounts from users for services which helps them to meet day-to-day running expenses for consumables, stationery, fuel for the Genset, etc. DIT/NIC will continue to provide manpower support to the CICs for five years and NIC will provide technical and maintenance support for this period. They will continue to provide satellite connectivity after five years. The CICs will then be handed over to the respective state governments. The private sector may collaborate with government for effective service delivery. Substantive revenue generation has been partly achieved by many CICs such as Golaghat, Assam and Gangtok, Sikkim, which pay the salaries of the operators from their revenue.

Human Interest Story

"I couldn't find the revenue official, but got land records from the kiosk"

The owner of a petrol pump, Parmanand Modi, wanted a copy of land records of his petrol pump land to get a bank loan. He searched for the patwari and could not locate him for three days. The bankers were insisting on filing the application in time so that the loan could be sanctioned before the end of the financial year. Parmanand's employee went to the kiosk and asked the kiosk manager whether the land records of the petrol pump were stored in the computer. The kiosk manager took Rs 25 and gave him copies of the records. Parmanand confirmed with the branch manager that the copies of the records from the CIC were acceptable at the bank. Later, the timely submission of the application resulted in the sanction of his loan.

Replication and Scaling Up

The project is to be replicated and implemented in all the blocks of all seven north-eastern states of India. But this scaling up will be done through funds provided by the Government of India. As the project is not sustainable or economically feasible, the chances of its replicability in any other part of India are remote.

Recommendations

It is recommended that the project should focus more on the community and less on technology. It would be better if the management of the project were taken away from NIC and given to some local body or a voluntary organization. More CIC activities should be taken up by the communities in order to improve community involvement and participation in the project. It is recommended that, in the operation of CICs, government servants should be replaced by volunteers engaged from within the community who work on a profit sharing basis. It is also important to create more locally relevant content. It is suggested that the usage of the CICs would improve if low cost training sessions on computers and ICT are provided. It is also recommended that users be charged for all services.

e-Choupal

Ujjain, Madhya Pradesh

Background

ITC Limited is one of India's leading diversified conglomerates. Traditionally a tobacco and cigarette producer, it has grown into a conglomerate dealing in hotels, packaging, agribusiness, IT, and fast moving consumer goods (FMCGs). ITC initiated its e-Choupal project in 2000 to streamline its dealings with Indian farmers. This is a project on a massive scale that ultimately aims to cover every sixth Indian village. Each choupal covers around six villages and 36,000 villages have been covered to date in Madhya Pradesh, Uttar Pradesh, Maharashtra, Rajasthan, Karnataka, and Andhra Pradesh.

Goals and Objectives

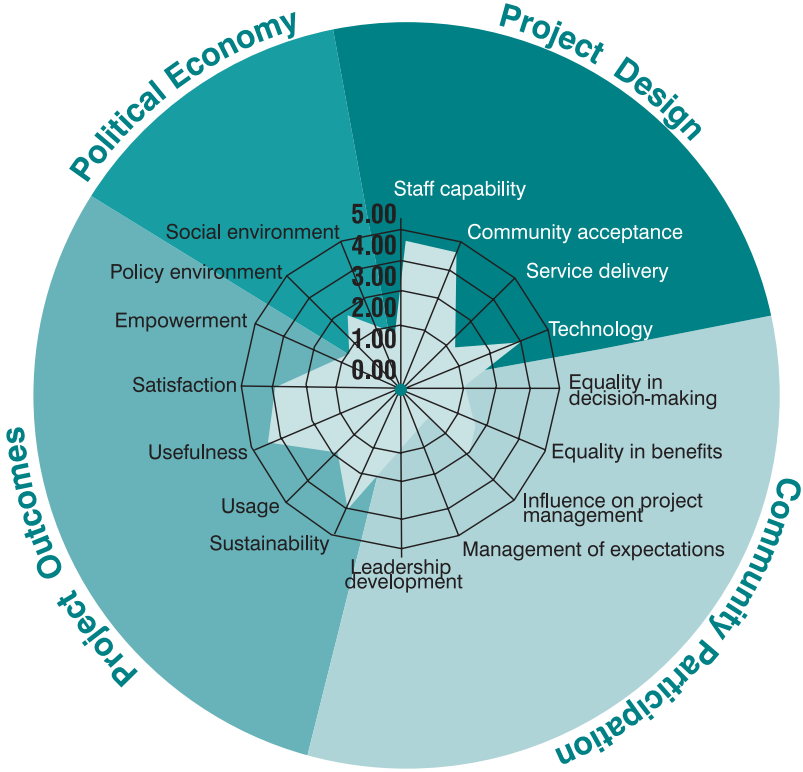
e-Choupal aims to provide Indian farmers ready access to crop-specific real-time information and customized knowledge in their native language. By doing so, ITC wants to improves the farmers' decision-making ability, thereby helping them to better align their farm output to the projected demand in Indian and international markets.

Planning

e-Choupal, the web-based initiative of ITC's International Business Division, offers the farmers of India all the information, products and services they need to enhance farm productivity, improve farm-gate price realization and cut transaction costs. Farmers can access the latest local and global information on weather, scientific farming practices and market prices at the village itself through the web portal – all in Hindi. e-Choupal also facilitates the supply of high quality farm inputs as well as the purchase of soybeans at the farmers' doorstep. ITC plans to operate such kiosks so that it can create an electronic stock exchange for the marketing of agricultural commodities through the use of ICTs.

Services Provided

e-Choupals help farmers realize larger harvests by providing them with the latest weather reports and best farming practices. The information is retrieved from the Internet or caches on hard disks, and is made available in the relevant local languages. Static content is installed on hard disk while setting up the Choupals or is made available on CDs. The e-Choupals also offer other critical services such as soil- and water-testing, which can further help farmers to enhance their yields. Apart from providing information on soya, the kiosks also have information about FMCGs and help villagers buy various products such as motorbikes, bicycles, tractors, etc. Importantly, insurance is one of the common products that is being sold across the network. e-Choupals have a facility for providing life insurance policies, goods insurance and other policies to the villagers. This service has added an extra benefit to the villagers in terms of minimizing their cost on travel. e-Choupal portals use Indian languages: Hindi, Marathi, Kannada, and Telugu. Through them, farmers can access the latest local and global information on weather, scientific farming practices, and market prices at the village level. e-Choupals also facilitate the supply of high quality farm inputs as well as purchase of produce at the farmers' doorstep.



How effective is e-Choupal in providing farmers access to crop-specific real-time information

Target Group and Intended Beneficiaries

The e-Choupal initiative strives to transform the Indian farmer into a knowledge-seeking producer. Farmers' access to information will help them make the right choice about farm inputs and agricultural commodities. The major focus of e-Choupal is on small and marginalized farmers.

Institutional Arrangements

The e-Choupal network is managed by the International Business Division of ITC Limited. Sanchalaks, the trusted local farmers who run the individual Choupals, are not official employees of ITC but serve as extended parts of the ITC organization, and simultaneously as commodity brokers and consumer goods salesmen.

ITC leverages the knowledge of the Sanyojaks who are grain merchants or wholesale dealers co-opted into the project. They are familiar with the land and have long-standing relationships with the villagers. They help manage the logistics of the e-Choupal network. Sanyojaks assist ITC teams in setting up new e-Choupals by conducting village surveys and helping identify the best Sanchalaks. They also help facilitate transactions by maintaining records, collecting price data from local *mandis*, and managing the physical flow of goods. In this manner, they still serve to compensate for infrastructure gaps along the supply chain, but no longer obstruct the flow of information and

market signals. The Sanyojaks are paid commissions based on the services they render, and typically make more money as part of the e-Choupal network than they did independently.

Technologies

The Choupals use Pentium computers along with a dot matrix printer and a UPS (500VA). ITC had initially upgraded telephone exchanges by using RAX Network Synchronization kits, but eventually in most e-Choupals, wireless VSAT links have been installed by bypassing the exchanges. Even with these improvements, the bandwidth often remains limited. Hence, e-Choupals have started compensating by caching static content locally. ITC also uses a specially designed template for managing data combined with new imaging techniques in order to speed up downloads and to optimize bandwidth use. To overcome the problem of sporadic electricity, several kiosk computers use back-up batteries recharged with solar panels.

Primary Access Points

Primary access points for the farmers are the e-Choupals, each located between six villages (42 such kiosks in Ujjain district). The kiosk has a website – http://www.echoupal.com – which contains all the information regarding agricultural products.

Capacity Building

ITC has been successful in building the capacity of farmers by increasing their knowledge in cultivating various agricultural crops and related information. Kiosks also provide information on land and soil, weather forecasts, news, e-mails, etc. The Sanyojaks are given basic training on using the computer, the Internet and the printer by the engineer deputed for each district.

Constraints and Implementation Challenges

The biggest challenge for the project has been to familiarize the first-time users in remote areas of rural India with computers and the Internet. When the e-Choupal concept was first proposed, there was some initial hesitation on the part of the farmers. Imparting training to the Sanchalaks on the use of the computer has also posed some problems and hence it takes a minimum of two months for them to learn how to use computers. The other major challenge for this project is to recruit a suitable person from each village who has leadership qualities and minimum education.

The project also has to surmount regulatory barriers. The Agricultural Produce Marketing Committee (APMC) Act prohibits the purchase of specified commodities (including several that ITC deals in) from any source other than at government-designated *mandis*. ITC has overcome this challenge by convincing the political and bureaucratic leadership of various state governments that the 'spirit' of the Act (to benefit the farmers) is better served through e-Choupals. As a result, some states have amended the Act, while others have allowed specific exemptions for such new business models.

Project Outcomes

- Enhanced relationship with the farming community across 36,000 villages so far.
- Reduced transaction cost for its agri-commodity purchases.
- Information on inventory retained by the farmers that can improve the quality of trading decisions.
- Provided means to expand the reach to the rural markets through the cross-selling of the company's products and services.
- Capacity building of the farmers.
- Increase of knowledge due to the use of computers and the Internet.

Human Interest Story

International market intelligence can lead to profits

Bhavarlal, a soybean grower in the Devgadh village of Ujjain district, earned a good profit due to the e-Choupal. He learnt from the Internet that Indonesia had produced a lot of palm oil that year and hence would be selling it in the Indian markets. Knowing this, he assumed that the rates in the local *mandis* would fall and therefore he sold his soybeans in good time to make his profit. This shows that timely information can help farmers, not only in improving their yields but also in getting better prices.

Key Lessons Learnt

e-Choupals deliver relevant technology in the hands of the farmers, which can improve the economic condition of the entire village. e-Choupal is one of the very few ICT projects in India that has effectively utilized e-commerce transactions for poverty alleviation. One of the key lessons is that ICT can reduce the number of middlemen involved between agriculture commodity producers and final consumers. Another key factor is that very simple technology solutions are available to create networks in rural areas, which can function as virtual agricultural commodity market places.

Sustainability

The project is financially sound and sustainable as the cost incurred on the establishment of the kiosk was recovered by the company in less than two years from profit generated. The recurring costs are borne by the kiosk operators who receive commission on each transaction. The project is vibrant and sustainable, and has a bright future.

Replication and Scaling Up

There is ample scope to scale up this project due to the wide range of services provided at the doorsteps of the villagers. This project has been successfully replicated in states like Uttar Pradesh, Rajasthan, Karnataka, Maharashtra and Andhra Pradesh.

Recommendations

It is recommended that e-Choupals be converted into one-stop shops wherein the villagers can also receive other relevant and essential services from the kiosk. It is recommended that new e-governance, e-education and e-health services be added on along with entertainment and computer education at these kiosks. It is also recommended that the commission agent recognized by ITC for each region be eliminated and replaced by a cooperative society or a cooperative bank. Other recommendations include linking up to various agricultural prices prevalent in major market places in India so that the farmers have access to all the markets; and that Government of India should facilitate similar kiosks wherein farmers can make transactions and these kiosks become small electronic exchanges with each other. Information regarding the kiosks among the villagers is not widespread. There is a need to conduct proper gram sabhas before installing e-Choupals in the villages. Importantly, more emphasis should be placed on the involvement of women due to their active participation in agriculture. Better planned course curricula for learning computers should be implemented for the Sanyojaks to provide further training to the villagers.

Contact Information
S. Sivakumar
Chief Executive - Agri Businesses, ITC Limited
E-mail : shiv@itc.in

e-Seva
Hyderabad, Andhra Pradesh

Background

The project was started as a pilot in the twin cities of Hyderabad and Secunderabad, and was thus called TWINS (Twin Cities Integrated Network Systems). It was started at a cost of Rs 10 million, fully funded by the Government of Andhra Pradesh. The project provided services such as registration of birth and death certificates, registration of vehicles and learners' driving licenses. After a successful pilot, 10 centres were started on 25 August 2001 and then the project was renamed as e-Seva (Electronic Service in Hindi). On 10 October 2001, a portal – http://www.esevaonline.com – was launched. Currently, there are 33 centres operating in the twin cities.

Goals and Objectives

- To provide real-time online transactions.
- To improve government-customer interface at all levels.
- To improve service quality and innovation.
- To improve operational efficiency.
- To provide cost-effective services.

Planning

It was planned along the lines of a similar initiative in Singapore. Singapore Online (http://www.singaporeonline.com) is a well-known web portal that provides information about so many items such as job vacancies and business opportunities.

Services Provided

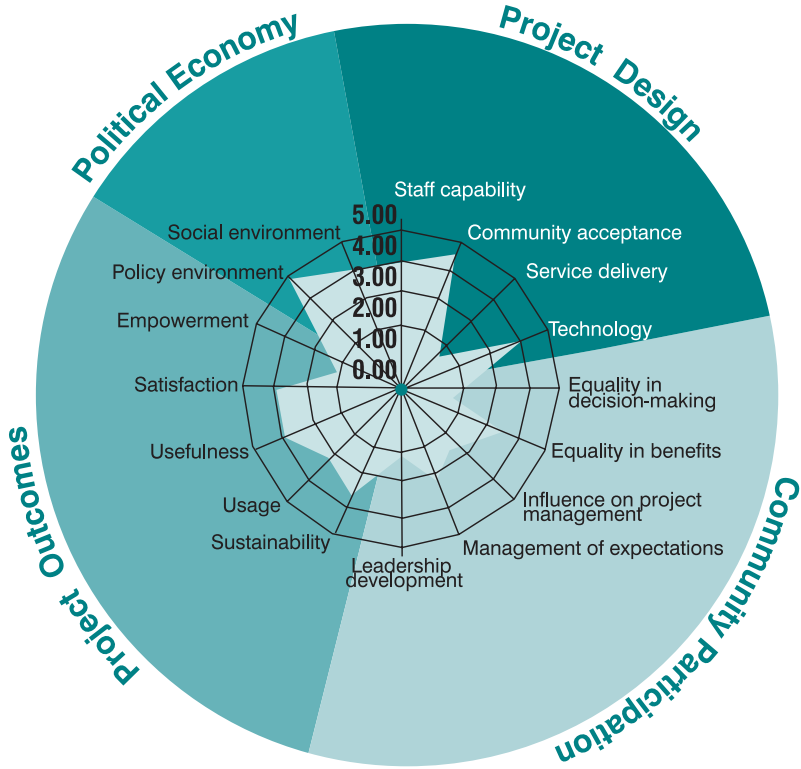
Presently, the e-Seva centres provide around 46 services such as payment of water and sewerage bills, property taxes, commercial taxes, income taxes, phone bills, registration of vehicles, issue of learner driving licenses, transfer of ownership of vehicles, registration of new trade licenses, renewal of trade licenses, registration of births and deaths, birth and death certificates, filing of passport applications, collection of examination fees, registration of documents and stamps (non-judicial), sale of bus tickets, sale of non-judicial stamps, collection of small savings, etc. The services are provided within 60 to 120 seconds. The centres operate on working days from 8 am to 8 pm and on public holidays from 9 am to 3 pm. Citizens are not charged for utility payments. Services like the payment of electricity/water/telephone bills and transport/property taxes are available on a 24x7 basis on the web portal.

Target Group and Intended Beneficiaries

Citizens of the twin cities of Hyderabad and Secunderabad are the target group and intended beneficiaries.

Institutional Arrangements

The Directorate of e-Seva is headed by a director and has two deputy directors, one assistant director (technical), one assistant director (promotion), three senior assistants, one grievance officer and two helpers. Almost all hardware and software services have been outsourced. A PPP was envisaged at the outset, in 2001. Global tenders were called for entrepreneurs to take up e-Seva centres. CMS Computers Ltd got the tender for managing the centres. Software was designed at a cost of Rs 2.5 million by another company called RAM Informatics. The Government provided the premises and the managerial staff. The managing company provided the hardware, networking



How effective is e-Seva in providing government-customer interface for a variety of online transactions

solutions, operators (with salaries paid by the Government), engineering staff, help-desk staff and security staff at all centres. The Government provided updated databases concerning the services while the company paid all telecom/leased line bills and electricity dues. A Memorandum of Understanding (MoU) was signed between the Government and the company for five years. On each transaction, Rs 5 collected from the concerned department as a user charge, of which 75-80 percent is paid back to the private partners. Earlier, four new-generation banks – Global Trust Bank, ICICI, HDFC and UTI – were selected to facilitate net-transactions of the payments. Later, two more banks, IDBI and Centurian Bank, also joined. A 4 percent surcharged was charged on every credit card transaction, which has been reduced to 1.5 percent.

Technologies

The network architecture is designed as an intranet on a WAN. The network is designed in three tiers. The first tier for the client-end is located at the e-Seva centres. The front end is Java-based. All centres are on 64 Kbps dedicated leased lines, with ISDN backup. The second tier has two Sun E250s and two Compaq ML530 data servers. The second tier also consists of application servers (using Oracle GiAS and running on Sun Solaris 8 Operating System), database servers (using Oracle 8i R3 and running on MS Windows 2000 Operating System), network monitoring servers (using Cisco Works and WhatsupGold on MS Windows 2000 Operating Systems), management servers (using MS putin), a firewall (using Cheuqn) and web servers (using Apache). All machines used in this

tier are Intel machines, along with Cisco switches and routers. The third tier is made of departmental servers with an Oracle database as the backend in the concerned departments (Electricity, Municipality, Passport Office, Transport Department, Registration, Commercial Tax, etc.). These servers keep consolidated databases. They are linked with a 64 Kbps DB link (except the Electricity Department server which has a 2 Mbps pipeline). The network architecture provides dedicated leased lines, with ISDN backup.

Primary Access Points

Primary access points for e-Seva services are the e-Seva centres, which are established on spacious premises. Each centre has a waiting foyer, help desk, token counter and eight to15 operator counters. Six of the e-Seva centres have ATMs (two each of State Bank of Hyderabad, State Bank of India and Andhra Bank). Citizens can excess the portal from their households as well to avail of the services online.

Capacity Building

All operators are given four-day operational training on the operator terminal. Some efforts have been made in providing IT training in the concerned departments. The government and its numerous departments have paid little attention towards creating an e-workforce. There is an over-dependence on private technological partners, CMS Computers Ltd and RAM Informatics Ltd, for all technological solutions. The dependence on RAM Informatics Ltd and Jyothy Computers to provide all e-worker needs to be rectified by building the capacity and skills of redundant government employees. This becomes important in the context of a proposed expansion of 237 new e-Seva centres and the fact that the Government has to pay monthly salaries to all the operators engaged in these 237 centres.

Constraints and Implementation Challenges

The initial resistance came from vested interest groups, especially government officials and middlemen. The central success factors are political will, bureaucratic support, e-support of departments and infrastructure, and public demand. The revenue database of numerous government departments has been exposed (without impregnable safety measures) by multiple agencies (e-Seva operators, banks, citizens from the Web, technological partners). The project has not yet shown that it is technologically and financially sustainable in poor and rural settings.

Project Outcomes

In the year up to the time of the study, the number of transactions for the year doubled and the payments increased six times. Between 18 July 2002 and 17 July 2003 (in one year), 8.27 million transactions took place in the e-Seva centres and Rs 32.796 billion was collected as payment from these transactions.

Key Lessons Learnt

e-Seva is India's pioneering e-governance project. It has paved the way for others to follow. It has also embarked on a sustainable PPP. This project has a very sound business model. The project has provided integrated multi-departmental government services at one stop. The software, hardware and networking technology has been functioning satisfactorily since the inception of the project with almost no instance of breakdown (uptime percentage is 99.6 percent). This has emphasized the importance of laying down a reliable telecommunication infrastructure for the success of e-governance efforts.

Sustainability

This project is financially sustainable. The government, private entrepreneurs and users are all winners in this project. The huge acceptance by the public of e-Seva counters also confirms its future sustainability. The organizational re-engineering and management practices adopted are also favourable for its sustainable existence.

Replication and Scaling Up

It is surprising that the country's most successful e-governance project has not been replicated in any other parts of India. The Government has decided to add 13 new e-Seva centres in the twin cities. This project is also going to be scaled up with the installation of 237 new e-Seva centres (including all 117 municipalities) in the rest of the 23 districts in the state of Andhra Pradesh. These new centres fall in six zones (four zones are taken up by CMS Technologies, one zone by United Telecom Limited, and one by CCS Technologies). Each district will be a separate intranet to start with, which will eventually be integrated into the Internet. Six new e-Seva centres have already been started in Rajmundri (Western Godavari district) on 30 July 2003. New services like railway reservations, sale of movie tickets, payment for traffic-related offences, payment of degree examination fees of the Open University, collection of bill payments of private landline and cellular companies, issue of encumbrance certificates, market value assistance, general insurance, reservation of tourism tickets for accommodation call centres, Indian Airlines ticket reservation, life insurance premium payment, issue of caste certificates, sale of the Indira Vikas Patra, renewal of drug licenses, issue of bus passes, etc., are also planned to be added. All ATMs of the State Bank of Hyderabad, State Bank of India and Andhra Bank will be converted to e-Seva centres.

Recommendations

The project is highly recommended for

Human Interest Stories

All cash, no files

S. Yadagiri, a 51-year-old accountant from the Vanasthalipuram e-Seva centre, takes his responsibility of handing over the cash collected daily to the agent of CMS Securities very seriously. He makes bundles of currency notes and cheques separately. On this particular day, Rs 1.88 million was collected in cash and Rs 0.24 million in cheques. He had only one small printout in front of him, from which he crossed checked collections from each of the seven counters. After cross-checking, he handed over all the cash and cheques to the agent, took the receipt on the printout and filed it in his monthly folder. That is it. His work was done. There was absolutely no file on his table or in his cabinet. He is happy that he has got rid of innumerable files, which used to be dumped on him when he was working as a junior accountant in the Irrigation Department earlier. He is handling cash, and no files in the e-Seva centre.

A short walk from the hospital

Sudhakar Reddy, 55 years old, was blessed with a son recently. He was in the nursing home with his wife and his first child. His wife insisted that he should take a walk to the e-Seva centre in the locality (LB Nagar) and make his electricity bill payment. He was hesitant because he did not want to leave his wife and child alone for a long period of time. However, he walked down to the centre to deposit Rs 228. To his surprise, the transaction was over so quickly that he was able to return to the hospital within 45 minutes.

replication and up scaling in the urban and semi-urban areas of India. Presently, the project is using a Java platform, which requires the creation of an interface to integrate databases that are in diverse formats. It is recommended that the data structure be kept uniform for all government departments. The Government should coordinate billing procedures for all relevant departments, so that citizens receive bills of different utilities at the same time, and have to travel only once a month to e-Seva centres for clearing them. This would increase citizen satisfaction and would take care of the customer load on the network. The bandwidth of the communication lines between the Citizen Service Centres and the Data Centre at Khairatabad, as well as between the Data Centre and Departmental Servers of utility providers may be increased (to say, 128 Kbps), based on a network audit, which should also show the density of traffic flowing in each segment.

All departmental servers should be shifted to the Khairatabad centre, which should be developed as a full-fledged data centre with a 'server-farm' maintained on 24X7 basis, with due disaster-recovery and business continuity provisions. e-Seva centres started in ATMs need to be revitalized and the procedures simplified, as only 12 transactions have taken place in the two years prior to the study, though there are six ATMs providing services. The usage of e-Seva centres in poor areas is very low (e.g., the Bahadur Pura centre has less than 300 transactions per month against an average of 25,000 in any other centre). Special efforts should be made to popularize the services amongst the poor and also to include services more relevant to the lower income groups. To reduce the huge expenses incurred in expanding the project, it is recommended that a change to Linux open source software be made. Basic amenities like toilets should be set up in all the centres.

The expansion of 229 new e-Seva centres in 21 districts is planned to start on a WAN. Instead, it would be more cost-effective for the government and more convenient for the citizens if the expansion were carried on the Internet. It is also important to take steps towards discouraging cash transactions and encourage the plastic-money culture, especially to attract more customers. A co-branded e-Seva Debit Card (like the Petro Card) could be developed, in association with major tech-savvy banks. With such a Card, it would also be possible to introduce innovative schemes for inducing citizens to pay their bills promptly, like the accumulation of 'usage points', 'loyalty points', 'timely-payment points' which could perhaps be redeemed as a certain percentage discount on the bills. There has been no effort towards the introduction of Smart Cards in the project, which could safeguard the transactions against frauds. The focus ofexpansion of the services is on those involving payments and revenue collections. Social-centric services are taking a backseat, but should be further considered.

Contact Information

N. Phani Kumar, Director
E-mail: phani@esevamail.com

Websites

http://www.esevaonline.com
http://www.ap-it.com
http://www.apts.gov.in
http://www.aponline.gov.in
http://www.ap.gov.in

Fast, Reliable, Instant and Effective Network for Disbursement of Services (FRIENDS)

Thiruvananthpuram, Kerala

Background

FRIENDS or "Fast, Reliable, Instant and Efficient Network for Disbursement of Services" was started in 2000 in Thiruvananthpuram by the Kerala State Department of Information Technology with the help of local bodies. The FRIENDS centre, or Janasevana Kendram, (Janasevana means serving people, Kendram means centre) is a one-stop integrated citizen service centre of the Government of Kerala. The centre functions as a single counter to remit utility bill payments, submit applications, seek information on government programmes and schemes, and provide access to other specialty services. After the success of the pilot, FRIENDS was launched in the remaining 13 district headquarters in 2001.

Goals and Objectives

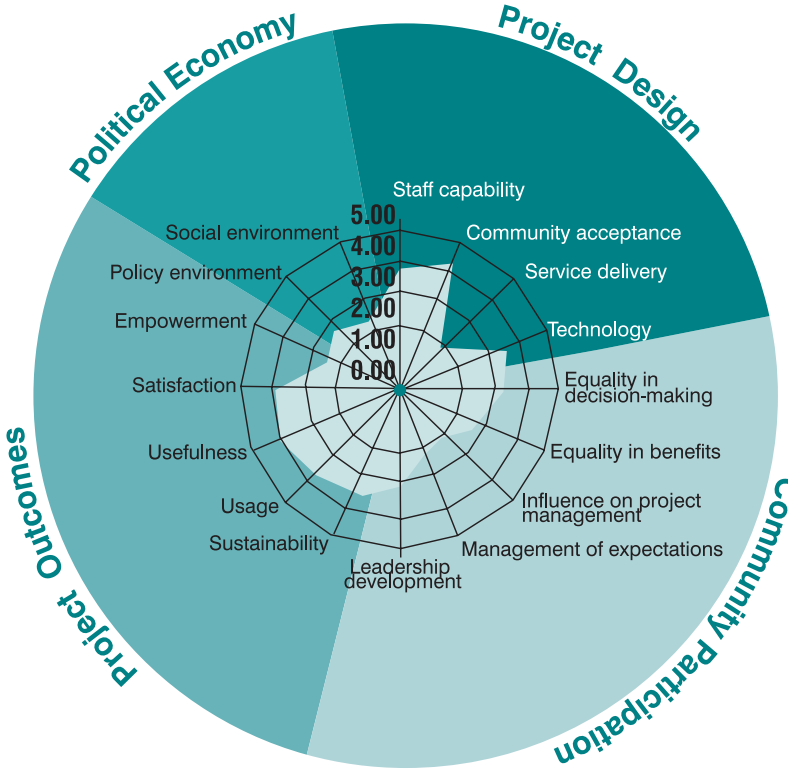
- To improve government-customer interface at all levels.
- To improve service quality and innovation.
- To improve operational efficiency.
- To provide cost-effective services.

Planning

The project was launched at Thiruvananthpuram in 2000, in a rather hasty manner, just before the assembly elections. FRIENDS centres were opened in all districts, even though networking and database integration were not taken up in the pilot. It was envisaged to expand the services in 2002 and expand the centres to talukas and blocks in 2003. By the time of the study, these targets had not been attained.

Services Provided

The centres work from 9 am to 7 pm in two shifts on all days including Sundays and are closed on every second Saturday and on public holidays. The operators or Counter Service Officers (CSOs) work in two shifts from 9 am to 2 pm and from 2 pm to 7 pm. The services offered at FRIENDS centres are: electricity bill payments (low tension and spot billing), fees for new ration cards, Kerala University examination fees, general fees for Kerala University, Motor Vehicle Tax, fee for licenses and permits from the Motor Vehicles Department, one-time vehicle tax, registration fee for motor vehicles, fees for trade licenses, building tax (one-time), basic land tax, revenue recovery, property tax, professional tax, fee for food license and trade license, water bill payments, telephone bills of Bharat Sanchar Nigam Ltd (BSNL). The participating departments are Kerala State Electricity Board (KSEB), Kerala Water Authority, Corporation of Thiruvananthpuram, Motor Vehicle Department, Revenue Department, Civil Supplies Department and BSNL. Each FRIENDS centre has 10 counters (Thiruvananthpuram has 20). Each centre has basic amenities for citizens like toilets, a queue management system, air conditioners, help desk, general enquiry counter and waiting hall. No user charges are taken from citizens. FRIENDS does not even charge service charges from government departments for the services provided (only BSNL pays Rs 6 per transaction service charge to the Government). All payments are received in cash. There are no payments by cheques or bank drafts but credit cards are accepted.



How effective is FRIENDS in providing government-customer interface for a variety of online transactions

Target Group and Intended Beneficiaries

The citizens of the Municipal Council of Malappuram and nearby five villages are the target population for most of the services. All citizens of the district can avail of the services pertaining to the Transport Department and telephone bills. KSEB electricity bills can only be paid by citizens residing in the Malappuram section of KSEB. At Thiruvananthpuram, electricity bills are paid for residents residing in 19 electric sections, water bills for those residing in five sections and Revenue Department services to residents of 15 nearby villages. Civil supplies services are available to only those residing in the jurisdiction of two rationing offices. Many citizens are confused whether their work falls in the jurisdiction of FRIENDS.

Institutional Arrangements

Each FRIENDS centre is managed by one Project Manager (PM) appointed by the Government from any of the departments (at Thiruvananthpuram there are two PMs). There are two system administrators for each FRIENDS centre for two shifts. These are trained personnel brought on deputation from the Centre for Development of Imaging Technology (CDIT), a Government of Kerala undertaking. There are 20 operators for 10 counters (53 in Thiruvananthpuram). They are designated as CSOs and are posted to FRIENDS on deputation from the participating departments. There are no accountants, clerks or peons at the FRIENDS centres. The PM reports directly to the Director, Kerala IT Mission, at Thiruvananthpuram.

Technologies

Every counter at FRIENDS has one Celeron 650 computer (10 GB hard disk, 64 MB RAM), one 80-column dot-matrix printer, one fake currency detector and one queue management system. The client terminal at the counter uses only Internet Explorer to browse software from the server and to send data to the server. Computers at the counter act as dumb terminals. They are linked to a LAN with the server. The server is a Pentium III (956 MHz, 26 MB RAM, 30 GB HD with RAID configuration). There is a backup server of almost the same configuration. There are three hard disks in the server, each of 9 GB, in RAID configuration for rebuilding the data if one of the hard disks crashes. The server uses Visual Basic at the front end and SQL Server 7.0 for data bases. There are no firewalls in the server.

Primary Access Points

Primary access points for the citizens are provided at the FRIENDS centres at district headquarters. There is one access centre in each of the 14 districts. There were no online services for the citizens at the time of the study.

Capacity Building

Not much effort has gone into building the capacity of PMs and CSOs. All the PMs and CSOs are given four-day training at the time of induction. A few have undergone a refresher course. Similarly, department heads have also not undergone any training regarding the system.

Constraints and Implementation Challenges

There was initial resistance from government employees of the participating departments. PMs and CSOs have been posted on deputation to FRIENDS without their consent. Employees on salaries of Rs 4,000 and Rs 7,500 per month were performing the same task as the CSO, which any operator could have done. All the employees posted at FRIENDS feel that there should a fixed tenure for one year only. Due to the freeze on the new intake of employees, the departments are showing reluctance to depute employees to FRIENDS. Departments have also been insisting on departmental help desks for each of them at FRIENDS centres. The amount collected each day is transferred to the State Bank of Trivancore branch, from where, based on a Bank Transfer Statement provided by FRIENDS, the bank remits the money to the treasury, after which FRIENDS issues cheques to the respective departments. This normally takes five to seven days' processing time, and no reduction has been possible. All the departments and FRIENDS reconcile monthly accounts with the banks each month.

The software for the project was created by a private organization, which was sub-let the work by CDIT. There were problems with Intellectual Property Rights which resulted in court action within six months of launching the programmes. This has severely hindered the growth of the project. There has been resistance from departments to go for full scale back-ending and consolidation of databases.

Project Outcomes

In one year (April 2002 to March 2003), 232,230 transactions were carried out at Malappuram centre. Of these, 47 percent were to deposit electricity dues, 43 percent to deposit motor vehicle dues, 5 percent to deposit water taxes and 5 percent for all other services put together. Rs 51.37 million has been collected from different taxes from this centre. On any average day, 400-450 citizens visit the centre. After introducing the collection of telephone bills, the number of users has increased. There is a growing demand from the citizens to expand services and to increase the number of centres in the district.

Key Lessons Learnt

The project justifies the idiom that "Simple is Workable". It has become a popular project among the citizens, even with a basic LAN and in-house software and with government staff managing the project. The project has also established that inter-departmental coordination could be established if there is sufficient government will. It is a first step in providing a one-stop shop to citizens for all government-related services, especially when departmental databases are uncoordinated and difficult to integrate. The project proves that even government funded and managed projects can bring about a remarkable change in the government-citizen interface.

Sustainability

The project is sustainable, but there is no in-built revenue stream in the system. There is neither the concept of user charges nor that of service charges (except for BSNL). The expansion, scaling up, and upgrading will suffer because of the absence of funds to be ploughed back into the centres.

Replication and Scaling Up

The project has the potential to be replicated

Human Interest Stories

"Why were these machines not invented earlier?"

Umar is in his late 60s. He lives in Chengottor village, 10 km from Malappuram. He is a farm labourer and earns Rs 80 a day, but usually finds work only for 15 days in a month. He has a wife and nine children. Two daughters are married and he lives with his seven sons, two daughters-in-law and four grand-children. One son works as a driver, one as a tailor and another in a bakery. The other four sons are studying in school. He came to a FRIENDS centre to pay Rs 200 for his own and his daughter's electricity bills. He took a bus from his village at 10.35 am and reached the centre at 11.00 am. He finished his work in five minutes and was planning to take the 11.10 am bus to return to his village. He detested going to the KSEB office earlier to clear his electricity dues as there were long queues and arrogant staff. He recounted an incident when after waiting for many hours when his number came up to pay his bill, the clerk left the counter at 3.00 pm saying that he should come next week. When he went one week later, a penalty for late submission was imposed on him. He said, "Allah be praised. These machines have brought so much comfort to us. I wish these machines had come into existence a long time ago."

Satisfied customer

Kunhar Vaidyar is a local medicine man. He lives in Mylappuram village, 1 km from Malappuram. He is 78, and got married 56 years ago but due to differences with his wife, he married a second time 22 years ago with a woman around 30 years younger than him, without divorcing the first wife He now has two families and takes care of his children in both houses. He earns around Rs 3,000 every month as rent and from his medical practice. He came to the FRIENDS centre to pay water bills for both his houses. He finds FRIENDS extremely beneficial to senior citizens. He says, "I am totally satisfied with the services the government is providing through the centre." He has no idea about the machines used on the counter of the centre. He smilingly asks, "Can this machine settle the 56 year-long differences that I have with my first wife?"

in all the urban areas of the country. By introducing PPP in the establishment and management of the centres, the replication process could be expedited. The scaling up was envisaged by integrating FRIENDS with Akshaya centres, but no specific modalities had been worked out at the time of the study.

Recommendations

Presently, citizens have access to these services only from the FRIENDS centre situated at every district headquarter. It is possible to set up new centres at every taluk or at block level. Some services are available to the citizens residing only in municipal areas and some are available to all citizens of the district. This creates confusion amongst the citizens, so it is recommended that all the services be provided to every citizens of the district (or all citizens residing in a defined geographical and administrative unit). Some centres are located in very conspicuous locations whilst others are somewhat inaccessible (at Thiruvananthpuram the centre is located on the second floor of a shopping mall and at Calicut the centre is on the fourth floor). It is recommended that such centres should be shifted to public places, which are easily accessible by the citizens. It is also recommended that acceptance of payments through cheques, demand drafts and credit/debit cards be initiated. This will reduce cash handling, which in turn will reduce security hazards. New generation banks should be made the sole bankers of the centre for which they should allow the use of debit cards. The treasury should beseparated from money transfer from FRIENDS to the relevant government departments. This would reduce the cash handling time to 24 hours.

Some PPP mechanism is urgently needed. Presently, all FRIENDS centres are fully funded and managed by the Government. The investment of Rs 2 million per centre constrains the Government from expanding the project further due to resource restrictions. Similarly, government employees should be withdrawn from CSO jobs and should be more effectively used in departmental back-ending of the databases. CSO jobs should be handed over to private entrepreneurs.

The system software should also be converted into Linux and security firewalls should be installed. Client-end screens are presently viewed through Internet Explorer, which raises security concerns. A new and more secure browser should be put in place. There seems to be a lack of motivation in networking the operation, which makes it a less effective system. There is a need to integrate departmental database servers with the server at the FRIENDS centre. Finally, all services should be made available online from the website.

Websites

http://www.friendscentre.net
http://www.keralaitmission.org

Gramdoot
Jaipur, Rajasthan

Background

Aksh Optifibre Limited (AOL) is India's second largest manufacturer of Optic Fibre Cable (OFC). It was set up in 1986 and has three state-of-the-art manufacturing plants in Rajasthan. Aksh Broadband Limited is an offshoot of Optifibre Limited, which aims to connect every gram panchayat of Rajasthan to the district and state headquarters. As an integrated solution provider, Aksh provides the hardware, software and allied solutions for total dedicated connectivity. Gramdoot aims to bridge the digital divide between rural India and the rest of the world by providing e-governance and rural convergence through broadband services on OFC, connecting 407 gram panchayats in Jaipur district of Rajasthan.

Goals and Objectives

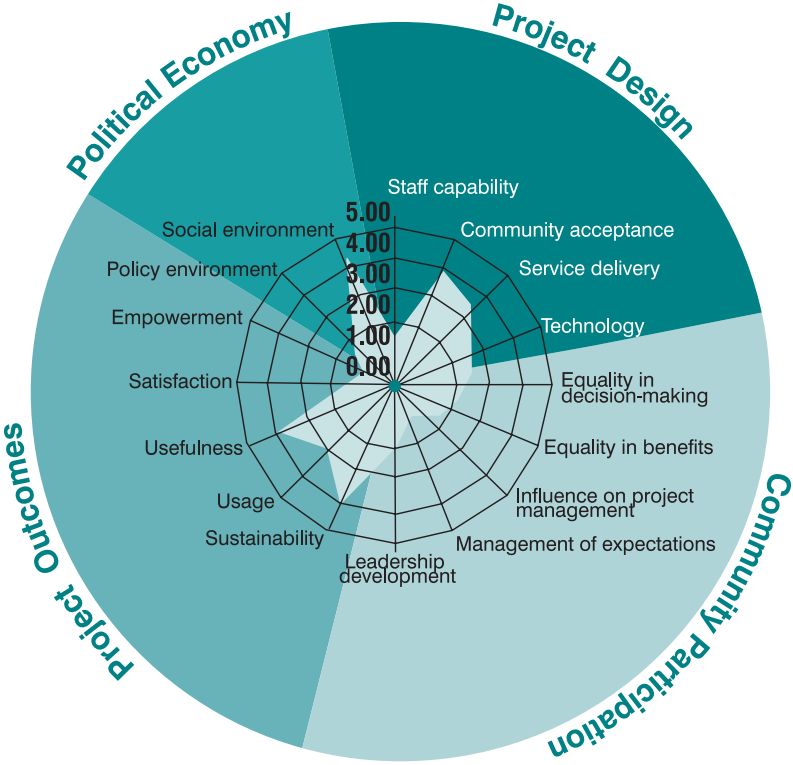
- To help bridge the digital divide between rural India and the rest of the world by creating the infrastructure.
- To provide cable TV, telephony and Internet connectivity to all gram panchayats.
- To develop a business model in rural broadband connectivity.

Planning

Gramdoot (meaning "messenger for the villages") was launched on 3 January 2002 by the Chief Minister of Rajasthan at Rampura Dabri village. The project was launched with three kiosks. A major drive to lay down OFC over electric poles was undertaken on a war footing; and 3,100 km long OFC had been laid at the time of the study, connecting all 407 gram panchayats of Jaipur district. The district has a geographical area of 11,151 sq km and is divided into 13 taluks (or tahsils) and 407 gram panchayats for administrative reasons. At the time of the study, 200 Gramdoot centres were operational.

Services Provided

Gramdoot provides numerous services. Complaints to the tahsil or district headquarters can be made from the Gramdoot kiosk. With this facility, problems regarding hand pumps, electricity supply and health-related services, etc., can be resolved easily at a nominal cost of Rs 10. Villagers can also file applications for obtaining various certificates such as caste/domicile/income certificates at Rs 20. Presently, 34 types of application forms are available online to the villagers at a cost of Rs 20 with a facility to transmit them electronically to the single window system at the District Collectorate. Land records are available from the centre at a cost of Rs 20. The Network Operation Centre (NOC) of the project maintains a mirror server of the land record server at the NIC. The patwari (village revenue official) visits the kiosk twice a week (after a Government Order issued in June 2002) and signs the documents which are then couriered to the villager. Prevailing market rates of agricultural commodities like grains, pulses, vegetables, fruits in the agriculture commodity auction centre (*mandi*) are available at Rs 5. Gram Daak (Hindi version of e-mail for the villagers), Gram Haat (online buying and selling of the products in rural areas) and Vaivahiki (matrimonial alliances) services are also available at the centres. There is a databank of information about the government's programmes/schemes, agriculture information and *pehchan*. An authentic database of villagers with their photographs is also available. High speed non-dial-up Internet access at 70 Kbps is



How effective is Gramdoot in providing TV, telephony and Internet connectivity to Gram Panchayats, including various government services

available to the villager at a cost of Rs 30 per hour. Web conferencing facility at a rate of Rs 5 for three minutes is also available. A 32-channel cable connection is also made available at a cost of Rs 80 per month. Computer training courses are held along with e-services like photo studio (Rs 10 for four passport size photos), Janampatri/horoscopes (Rs 51) and computer games (Rs 5 per game).

Target Group and Intended Beneficiaries

The intended target population includes all villagers residing in 407 gram panchayats. At the time of the study, villagers residing in 200 gram panchayats (387 villages) were the target population.

Institutional Arrangements

The organization is headed by the Chairman and Managing Director of the Aksh group of companies – AOL, Aksh Networks Limited (ANL) and Aksh Broadband Limited (ABL). Each company is headed by a Director. ABL has a Senior Vice President (Jaipur Operations) who heads the Gramdoot project in Jaipur district. Under him are the NOC Incharge (customer care, server room management, VoIP, cable TV), the Accounts Manager, the Marketing Manager, the HRD Manager and Manager (Stores and Purchase). There are around 42 employees who work in all these units put together. There are four Gramdoot managers (salary Rs 10,000 per month) and four network maintenance supervisors (salary Rs 10,000 per month), as well as a support team of three to five technicians.

Each of the 200 operational Gramdoot centres is manned by a Gramdoot operator (salary Rs 2,000 per month). The Senior Vice President liaises with the state government and district administration, and Gramdoot managers with tahsil-level officials for e-governance services.

Technologies

ANL has laid down 3,100 kms of OFC, covering all 407 gram panchayats of Jaipur district. OFC carries four fibres (for cable TV, computer network, telephony and redundancy). The OFC are laid over electrical poles for which ABL pays Rs 100 per month per pole to the Rajasthan State Electricity Board (RSEB). At the Gramdoot centre level, connectivity is provided to cable TV connections through an RF cable. The network uses Optic Node (used for cable TV transmission), media converters and switches (used for computer network) and VoIP (used for telephony) at Gramdoot kiosks. At all major branches, a Fibre Distribution Management System (FDMS) is used. Seetapura has a NOC for the whole project. Jethpura has another parallel head-end NOC. A speed of 1.2 terra bytes per second is possible in the network in each of 407 gram panchayats. At the time of the study, the system was restricting the broad band to 100 Mbps. The network provides intranet connectivity to 200 operational Gramdoot centres through Random Access Server (RAS) and LAN. Seetapura NOC has taken a leased line (64 Kbps) from the Software Technology Parks of India (STPI). ABL provides another leased line to the district administration. The network uses software produced by Drishtee Foundation which runs on Windows NT and the client end works on Windows Explorer. The Seetapura NOC servers are linked through leased line to the Land Record Server maintained by NIC in the district headquarters. ABL has provided Pentium III computer, ink jet printer, web camera, head phone, UPS backup and telephone connections to each of the 200 operational Gramdoot centres. The network is maintained by the sister company ANL and the services by ABL.

Primary Access Points

e-Governance services and other e-services are accessible to residents of 200 gram panchayats from the Gramdoot centres. These centres also provide Internet browsing and video conferencing/chatting facilities. Cable TV facilities (32 channels) are accessible to 7,000 villagers from their household TV sets in 187 villages. Telephony had not been made operational as at the time of the study.

Capacity Building

All 200 Gramdoot centres have been given seven-day training on hardware, networking, e-governance services, and cable TV operations at induction. Gramdoot managers and network maintenance supervisors are provided with on-the-job training.

Constraints and Implementation Challenges

The project faces some challenges, even after 20 months of operation. The project has laid down 3,100 km long OFC (with 100 Mbps bandwidth) to all 407 gram panchayats without any needs assessment and economic feasibility assessment. ABL has bought 3,100 km OFC from AOL and the cable laying work is done by ANL. The most important constraint was finances. ABL has mobilized its own resources to the tune of Rs 260 million. The decision to lay OFC underground was discarded even though it would have resulted in OFC and network safety and security. In place, OFC has been laid on electric poles as it was four times cheaper than underground cabling and 10 times faster to lay down. But this has resulted in a catastrophic scale of cable cutting by disgruntled cable TV operators already working in rural areas, by thieves to sell it in the black market and by dissatisfied cable TV consumers in rural areas. The OFC over electric poles is also prone to damage by vehicles and external forces. The situation has become so critical that of 200

Gramdoot centres, at any point of time, only 80-85 have connectivity. The laying of OFC on electric poles has also incurred enormous recurring costs due to payment of annual rent to RSEB and maintenance cost.

ANL maintains the network, but four teams have proven ineffective. The average time taken by ANL to rectify damaged cables (through splicing machines) is two to four days. ANL and ABL are at loggerheads about poor maintenance. Now, there is a possibility of merging ANL into ABL. Initially, Gramdoot centres were allocated and marketed by Drishtee Foundation. ABL claims 61 of these Gramdoots were unwanted and anti-social elements. Thirty-one have been dismissed after negotiation and compensation. ABL also claims Rs 1.6 million from Drishtee. The improper selection of Gramdoots in the initial phase of the project has created antagonism in the rural areas, and people have been damaging the OFC since then. Initially, cable TV subscribers were provided with pay channels (like STAR, Zee and Sony) but these popular channels have been discontinued since March, 2003 due to a hike in pay channel charges. This has resulted in dissatisfaction among the consumers.

Various e-governance services took a long time to start up. Three services (land record copy, complaint registration, and submission of applications) have become possible. But ABL remained unable to launch an effective publicity campaign to popularize these services in the rural areas. The back-end processing of all these services remains manual. Land records are physically taken by Gramdoots to village revenue officials for counter signatures. Similarly, complaints to the district administration are handled physically by the concerned officials and Gramdoots visit tahsil offices to deposit applications for caste/income/domicile certificates. There was an organizational crisis in ABL. The Senior Vice President was replaced in May 2003 and three deputy general managers' services have been discontinued. Many staff members have left the project at different points of time.

The intranet in 407 gram panchayats provides 100 Mbps connectivity. The network encounters a bottleneck when it comes to Internet browsing as leased lines taken for the network are only 64 kbps. ABL has not come out with any structured computer courses, thereby losing a huge potential of computer education in rural areas. Rural telephony over this infrastructure should have been a priority. ABL has been considering a tie up with Shyam Telnet (a basic telephone service provider).

Project Outcomes

ABL has invested heavily in Gramdoot without having any specific business model. Rs 185 million has been invested on the OFC (at a cost of Rs 60,000 per km); Rs 20 million has been spent on other equipment (ADFA, amplifiers, etc.); and Rs 35 million has been spent on buying computer equipment for 120 Gramdoot centres (around 80 centres are using rented computer equipment). Around Rs 260 million has been invested on establishing the project. Around Rs 20 million is paid in salaries every year to 350 staff working in the project. The annual recurring cost on rent payable to electric poles is around Rs 10 million. Similarly, ABL is paying millions of rupees annually on the rental of shops for all 407 centres, rent on computer equipment in 80 centres, and electricity and telephone bills at 200 centres. The financial returns on this capital investment and recurring costs are less than what they should ideally be.

Transactions volumes are also low. There were only 447 complaints, 450 certificates and 1,040 land record copies issued in the 20 months prior to the study from 200 Gramdoot centres. This provided earnings of only of Rs 0.5 million to ABL in 20 months from the whole network. There are 7,000 cable connections (each paying Rs 990 annually). This has provided an income of around Rs 10 million since inception

to the time of the study. The project's early outcomes were disappointing and its financial viability remains questionable. However, during the two years up to the time of the study, the project has achieved more. The number of services offered increased, the bandwidth to the NOC was increased to 2 Mbps from 64 Kbps, and discussions were held with the Andra Pradesh government in an attempt to extend the project's scope.

Key Lessons Learnt

An important lesson from Gramdoot is that the provision of only volume bandwidth without a business model could be a losing proposition. Nevertheless, the project has also taught an important lesson that OFC laid down to villages could be used for entertainment (cable TV), information (intranet/Internet connectivity), and communication (telephony). Feasibility studies should always be carried out before investing huge amounts in creating infrastructure in rural areas. To a certain extent, the project also shows that e-governance services are difficult to manage in business-owned (or for that matter NGO-owned) projects. Gramdoot has employed kiosk operators (paying them an honorarium of Rs 2,000 per month besides paying rent, electricity and telephone bills and stationery charges), which discourages enterprise in managing these centres. Salaried employees at centres always result in poor performance. A franchisee model at the telecentre level is a better option.

Sustainability

The financial sustainability of Gramdoot is doubtful. The project has invested heavily in infrastructure and is spending considerably on annual recurring costs. On the other hand, the returns are less than Rs 15 million annually (which is even less than the recurring costs). Half of the infrastructure is unused, 207 gram panchayats have not been using any kind of service, even though four-fibre OFC has been laid in the villages. Unproductive expenditure on paying rent to hire space in these locations was still going on at the time of the study. Internal conflicts of the organizations, frequent changes at senior management levels, under-utilization of capacity and lack of consumer satisfaction are likely to compromise the project's sustainability further.

Replication and Scaling Up

This project has not been replicated in any other part of India. ABL is trying for loans from financial institutions/banks for expanding services and the network. The project aims to make the remaining 207 Gramdoot centres operational in six months. The project is also striving to add telephony to all 407 gram panchayats. Scaling up has been initiated in Rajmundri district of Rajasthan and discussions were underway at the time of the study to form a partnership with Lupin Pharamaceutical Ltd to take up another district. ABL was aiming to provide broadband services through OFC to all 32 districts of Rajasthan by 2005.

Recommendations

Immediate intervention for the modification of the project model is required as it is undergoing a financial, organizational and managerial crisis. ABL should try to start the remaining 207 Gramdoot centres at the earliest (on a franchisee model). If only 50 percent of the existing centres are struggling to ascertain network connectivity, than there are troubling times ahead. The maintenance of the cable network requires technically and managerially experienced staff for handling cable work in rural areas. ABL should try to make profit-sharing partnerships with existing cable operators in the rural areas of Jaipur (there are more than 15,000 cable connections in the hands of 20 cable operators). The management of network maintenance, especially efficient catering of cable cutting and amplifier stealing complaints, in an

Human Interest Stories

"My *dhaba* is equipped with cable TV"

Mohanlal Prajapati runs a small *dhaba* in Mohana village. In a corner of the *dhaba* he has opened a provision store and in another corner there is an STD/PCO booth. A lot of truck drivers stop by at the *dhaba*. To attract customers, he took a cable TV connection from Mohana Gramdoot centre. He pays Rs 80 per month for the connection. He is very proud of the cable TV and has placed it over the cooler in the *dhaba*. He says, "My cable TV was a major attraction during World Cup cricket matches in February-March 2003. At that time, all major TV channels were telecast. But now, most of the popular TV channels (like Discovery and Star Plus) are not being shown. I am ready to pay Rs 100-125 per month, but they have to show me all these popular channels. Otherwise, I will be forced to discontinue the cable connection."

The addiction to video-conferencing

Mohana village had poor telephone connectivity before the OFC by Gramdoot was laid down. It was difficult to even make local calls. But now, things have changed. Video-conferencing facilities are available at Gramdoot centres at a cost of Rs 5 for every three minutes. At Rampura Dabri Gramdoot centre, Omprakash, age 20, comes in every week to video-conference with his friends who stay 30 km away. He has only completed class XII and his family has an income of less than Rs 3,000 per month. But he is addicted to video-conferencing. The centre operator even gives him a concession on the fee.

efficient manner has to be built up. The project should try to increase cable connections from 7,000 to 20,000 in one year and to 40,000 in two years by including popular TV channels in the package for consumers.

Organizational restructuring is also required, as presently everybody is doing everybody else's job. Role definitions at different management tiers have to be ensured, as they did not exist at the time of the study. Recurring expenditure should be reduced by cost-cutting methods. The project should stop emphasizing e-governance services, as they take time to become functional such that they can contribute returns on the initial investment. Instead, the project could develop e-health (telemedicine) and e-education (distance learning) through partnerships with educational institutions and hospitals.

The leased line of 64 Kbps between Seetapura head-end and STPI is not serving any purpose. It should be at least 2 Mbps (considering that OFCs provide 100 Mbps speed in the intranet). Through partnerships with ISPs, the project should try to promote Internet connectivity to the villages through a subsidized cost structure. Computer education has been left aside as a revenue stream. The Gramdoot centres are not catering to the tremendous demand for computer training courses in the rural areas. ABL should formalize various computer training courses and promote them in Gramdoot centres. Telephony should be started in the project as early as possible, as there is a huge potential in rural areas.

Contact Information

Lokesh Khandelwal
M18, Flatted Software Complex
EPIP Sitapura, Jaipur
Tel: +91 141 507 0999
Fax: +91 141 512 2999
E-mail: lokesh@akshbroadband.com

Website

http://www.akshbroadband.com

Gyandoot
Dhar, Madhya Pradesh

Background

The Gyandoot intranet community network was conceptualized on 1 January 2000, and installed and made operational within less than two months in the marginalized, poverty-stricken Dhar district in the Central Indian state of Madhya Pradesh. Gyandoot in Hindi means "purveyor of knowledge". The four pillars on which the Gyandoot community network was established were people, content, services and server.

Goals and Objectives

- To ensure equal access to emerging technologies for marginalized segments of the society.
- To create a cost-effective, replicable, economically self-reliant and financially viable model to take the benefits of IT to the rural masses.
- To implement a new grass-roots entrepreneurial model with the participation of groups of non-traditional entrepreneurs.
- To provide self-employment through entrepreneurship to local rural youth.
- To improve the quality, speed and sensitivity of the state delivery apparatus towards the needs of local citizen-customers.
- To impact IT on the government-citizen interfaces as the thrust area, so that the benefits of the knowledge economy directly reach the marginalized have-nots and know-nots.
- To search for the potential of rural markets in the digital domain.
- To analyze the processes and modalities involved in the socio-cultural environment while taking technology to the deprived communities.

Planning

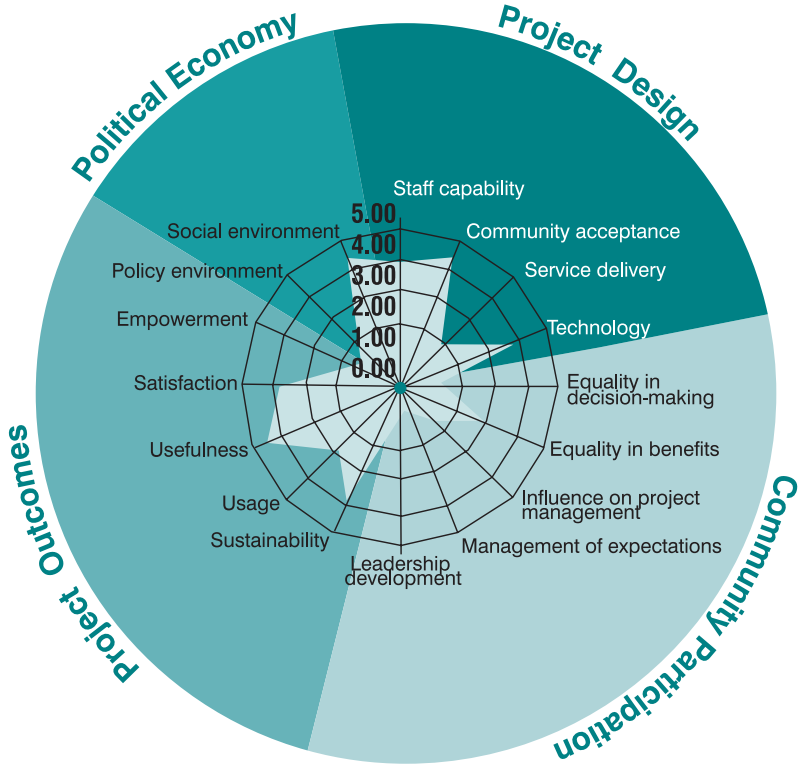
The Gyandoot project was planned using finances from the community as well as from private enterprises. The database and the server were placed at the district council office. It was decided to create an intranet network with dial-up modem connectivity to rural kiosks. The selection of services to be provided was decided on the basis of a participatory rural appraisal. Kiosks and telephone connections were selected at prominent places in the villages. The procurement of hardware was done by the village community and the managers for the kiosks were selected from the community, to work on a profit-sharing basis.

Services Provided

It was decided at the outset after consultation with the villagers to provide all the proposed facilities in the local language (Hindi). Software, eventually developed and installed for the network, was user-friendly and menu-driven at the client end. Initially, the network offered five services. Within a few months of its installation, the network was offering 22 services including rates of agriculture produce, land records, grievance redressal, Hindi e-mail, rural matrimonial services, rural e-market, application for caste/residence/income certificates, information regarding government programmes and schemes, etc. Later, educational, health and commercial services were added.

Target Group and Intended Beneficiaries

The intranet covered five out of 13 blocks (geographical administrative units for development work) in the district. Forty kiosks



How effective is Gyandoot in providing a variety of online government and non-government services

cater to inhabitants living within a radius of 5 km from each of these kiosks. The network provided kiosk access to inhabitants of 550 villages with a total of half a million population.

Institutional Arrangements

The community network is owned by the district council and the kiosks are managed by village councils. A project manager maintains the database and the server room in the district council. He is supported by four assistant managers, who are government servants. The kiosk managers are village volunteers, who were selected by the community and who manage the kiosk on a profit sharing basis. Various departments of the state government provide logistical support and databases for the network.

Technologies

Initially, dial-up telephone connectivity through modems was used as the media for communication. It was decided to use Pentium III computers available in the district council as RAS. The RAS was a P III 450 MHz CPU with 128 MB SDRAM-ECC, 2 X 9 ultra SCSI Hard disks, 2 MB Graphic Controller Card, 15" colour monitor 48 X CD-ROM. A CD writer and diesel generator were procured for the server room. Five telephone lines dedicated to the server room were installed. Besides the software, which was specifically designed for the intranet, the branded software products and platforms which were used included Microsoft SQL Server, Microsoft Windows NT Server, Microsoft Windows 98 Operating System, Visual Basic, Java Development Kit, and Microsoft Access, C-DACs ISM fonts.

WiLL was introduced in the network as the backbone media in May 2001. The network used CorDECT, which is a WiLL technology developed by TeNeT group, Chennai. Based on the Digital Enhanced Cordless Telecommunications standard specified by the European Telecommunications Standards Institute (ETSI), CorDECT WiLL provides cost-effective, simultaneous high-quality voice and data connectivity in both urban and rural areas. This technology provides voice communication using 35 Kbps and Internet connectivity at 35/70 Kbps.

Primary Access Points

Initially, 21 community-owned client sites/nodes working as rural cybercafé and cyber offices were established in 21 remote villages. Later, 19 privately-owned kiosks were added to the network.

Capacity Building

The project manager selected to manage the network is a professional IT expert. Four assistant managers are provided training in networking and database management. A three-day training was organized for all the kiosk managers manning the kiosks. All the head of the departments were given two-day computer training courses.

Constraints and Implementation Challenges

The biggest stumbling block in the creation of a community network were the bureaucratic procedures. The resistance from different departments of the state government was significant. Although it was easy to convince the district councils to provide funds for the server room and the village councils to provide funds for the rural kiosks, it was difficult to standardize the databases in different departments and to convince their staff to upgrade and update the databases. Power cuts in rural areas also hinder the usage of the kiosks. Telephone connectivity in rural areas is poor and has resulted in unstable and unreliable Internet connectivity. Existing laws, rules and regulations also created obstacles in the implementation of the project. Interdepartmental coordination, database management and streamlining departmental procedures became important implementation challenges.

Project Outcomes

Gyandoot has been described as a path-breaking e-governance and community network project. It has not only been effectively used for community participation in planning, execution and management but it has also created a new thinking regarding private and community funding in the establishment of community networks in India. It has been successfully proven as a viable business model. The network also established the acceptability of user charges by the villagers, functionality of CICs and the operational viability of WiLL technology. There were some pitfalls. The computerization of land records took almost two years to become fully functional on the network. The major hindrances remained the management of government functionaries at the grass roots and lack of technical backup. The e-health services were marred due to poor support from the health department. The web-based and intranet services could not be integrated. The network has been replicated in 30 districts in India.

Gyandoot has won the prestigious Stockholm Challenge Award, 2000 and CSI National Award for Best IT Usage in India, 2000. The network has been adjudged a best practice by the UNDP, Asian Development Bank, International Monetary Fund, World Bank, *Time* Magazine, World Economic Forum, the Government of India and the Planning Commission of India.

Key Lessons Learnt

Rapid rural appraisal and participatory rural appraisal provided the necessary inputs for the effective implementation of a community networking project. Intranet networking is a better medium for community networking, especially in rural areas where connectivity is sub-optimal or poor. Profit sharing between community institutions like village councils and private entrepreneurs has proven to be an effective symbiotic relationship. User charges are easily paid by the poorest of the community and are an effective means of making the network financially sustainable. Students and educated youth are the foremost users of the services.

Sustainability

The Gyandoot project was initiated with investments from the community and private entrepreneurs. The project was managed by the community with the help of private entrepreneurs. User charges are utilized in

Human Interest Stories

"My information tool for my small business"

Lalita Bai used to sell vegetables on the roadside in Dehri Sarai village, a few 100 metres away from the kiosk. She purchased potatoes, onions and garlic in wholesale from a trader within the village. She used to see the wholesale trader visit the information kiosk quite often. One day, by chance, she overheard him talk about the availability of cheaper goods in Indore, Dahod and Surat. Simply out of curiosity, she went to the kiosk herself. She saw a young boy sitting in front of some machines. She gathered her wits and with a lot of hesitation asked the boy what he was doing. She asked him to give her the same information about potatoes, onion and garlic, which the wholesale dealer had taken. She discovered that she had been paying extra unnecessarily to the wholesale dealer. She took a decision immediately and, the very next day, boarded the bus to Indore. She bought a fortnight's stock at a cheaper rate. Ever since, she has been visiting Indore or Dhar, depending upon the prevailing rates, once every fortnight. She has realized the benefits of information, which was available at Rs 5. She shared this information with her fellow vegetable vendors too.

"Now, caste certificates get done in time"

Shankarlal, resident of Dehri Sarai village, wanted a caste certificate urgently. He could not get a scholarship until he submitted the certificate. He walked into the kiosk in his village and asked the *soochak* to forward his application for a caste certificate. The documents submitted by him along with the certificate at the *soochanalaya* were adequate. He had planned to come back for more information on it after a fortnight but was pleasantly surprised, and very thankful, when the *soochak* came to his house after six days. He told him that the revenue department had informed him by e-mail that Shankarlal's certificate was ready and that he could pick it up from Dhar. He went to the tahsil office and collected the caste certificate. The school headmaster was surprised by the quick submission of the certificate. Shankarlal spread the word regarding the easy and less cumbersome mode of acquiring caste certificates among his friends.

managing the kiosks and they provide remuneration to the kiosk managers. The burden of managing the kiosk is neither on the community nor the government. The project has been designed in such a fashion that its financial viability is ensured. The expansion of the project through increases in services, increases in the number of kiosks and the introduction of WiLL technology has also improved its sustainability.

Replication and Scaling Up

Gyandoot has been replicated in 33 districts in Madhya Pradesh and 12 districts in other parts of India. The network has been already replicated in numerous districts such as Balaghat, Bhind, Panna, Ratlam, Khandwa, Khargone, Badwani, Ujjain, Mandla, Jhabua, Dewas (all in Madhya Pradesh), Hisar, Sirsa (Haryana), Hamirpur (Himachal Pradesh), and Godhra, Surat (Gujarat). UNDP has sanctioned six projects on the line of Gyandoot in India.

Recommendations

The land record database is huge and is not properly maintained. It is recommended that land record databases be maintained and managed, the village maps be digitized and more useful services be introduced on the network. It is also recommended that local telephony from the kiosks be improved, as WiLL technology has been introduced in the network. Liaison with the telecommunication department to improve the Internet connectivity in the rural kiosks will be a good idea. e-Payment services for various government fees can be implemented so that citizens can deposit their electricity, telephone, water, property fees, etc., at a single kiosk. It is better for the sustainability of the project that more services are added on the network based on feedback from the villagers. It is also recommended that all the district servers be networked and integrated with the state-level server node.

Contact Information

District Collectorate, Dhar
Chief Executive Officer, Zila Panchayats
E-mail: gyandoot@hotmail.com

India Agriland
Nellikuppam, Tamil Nadu

Background

EID Parry (East India Distillers, a 212-year-old company) is closely linked to the farming community through its Sugar Division, with 100,000 registered sugarcane growers, and its Farm Input Division, with about 300,000 end-users. EID Parry operates in three industry segments:

- Producing and selling farm inputs such as fertilizers, pesticides and seeds.
- Producing and selling sugar (produced from four sugar factories in Tamil Nadu).
- Producing and selling sanitary ware across the country.

EID Parry has partnered with N-Logue Communications Pvt Ltd to open 38 telecentres, called 'Parry's Corners', as well as 10 'Chiraag' centres.

Goals and Objectives

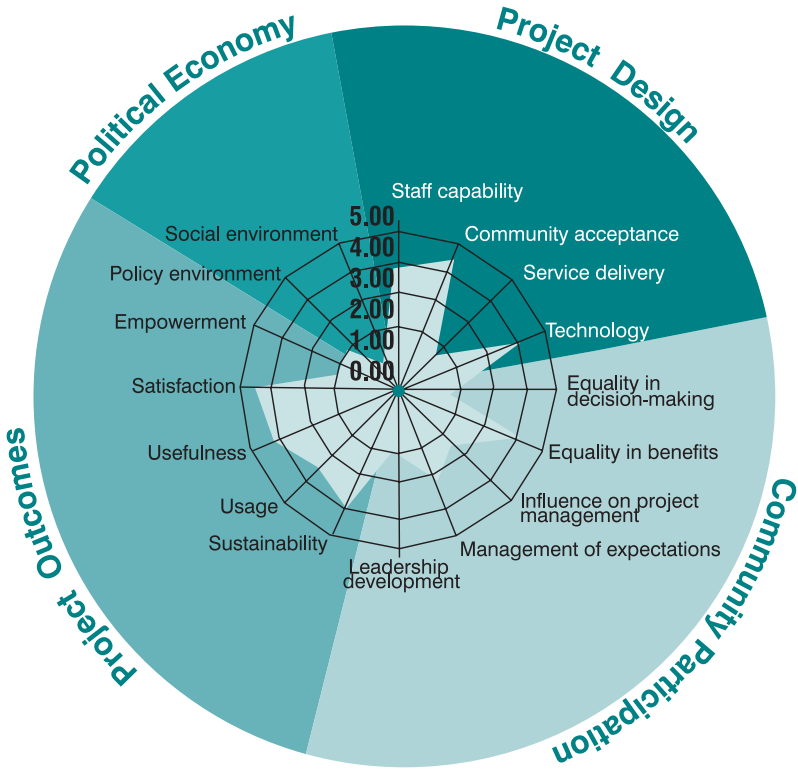
- To disseminate market and commercial information among farmers.
- To educate farmers on the latest developments in agri-science and post-harvest technology.
- To provide access to farmers to the right markets (for both farm and non-farm produce) through affordable credit and transportation solutions.
- To assist farmers in raising their income three-fold in next five years.

Planning

In November 2000, EID Parry started two Parry's Corners using CorDECT technology developed by Prof Ashok Jhunjhunwala (and the TeNeT group) from IIT-Chennai and marketed by N-Logue Communications Pvt Ltd. EID Parry is not the Local Service Provider (LSP) for N-Logue but has taken up 38 franchisees in 38 villages in and around Nellikuppam, where the company has a 175 years-old sugar factory, in the Cadallore district of Tamil Nadu. It has developed content through in-house expertise in its Sugar and Farm Input Division and Corporate R&D Lab, and is working with the Tamil Nadu Agriculture University and its research stations, Tamil Nadu University for Veterinary and Animal Sciences, the National Horticulture Board, AMM Foundation and the Muruguppa Chettiar Research Centre. The content is in the local language (Tamil) and it includes a Cane Management System (CMS). These 38 Parry's Corners have taken loans from the Indian Bank and have entered into an agreement with EID Parry to provide an outlet to sell sugar, chocolates/candies, tea, fertilizers and to procure paddy for them. They use CorDECT technology for 36 Kbps wireless connectivity, for which EID Parry pays to N-Logue Communications Pvt Ltd a sum of Rs 650 per month per Parry's Corner for unlimited use of connectivity. There are also 10 'Chiraag' centres opened by private franchisees directly with N-Logue Communications Pvt Ltd for which they pay Rs 750 per month per centre for similar connectivity. All 38 Parry's Corners and 10 Chiraag centres use Chiraag software.

Services Provided

The following services are offered through 38 Parry's Corners: a CMS which provides all factory and farmer information concerning sugarcane, including crushing details of sugarcane and payments payable to farmers. The software also provides local news, agriculture news, weather



How effective is India Agriland in disseminating market, commercial and technical information to farmers

forecast, e-mail, information on cultivation and farming techniques of local crops, veterinary services. There is also a farmer's calendar and farmer's calculator. All these services are available to all farmers at a user charge ranging from Rs 5 to Rs 10 per service. The software has exhaustive local databases of farmers concerning their land, crop patterns, commodity marketing, etc.

Parry's Corners also collect soil samples for testing (at Rs 15 per sample) and sell seeds (Rs 1/kg commission), sugar (Rs 0.50/kg commission), tea (Rs 2/kg commission) and chocolates/candies (at variable commission). They also procure paddy from farmers (Rs 5/100 kg bag commission). Some services available on the Chiraag website are available at 10 Chiraag centres and at 38 Parry's Corners. e-Governance services (called Min Arsu) are available, in which farmers access welfare schemes and download applications relating to revenue, industries, taluk and use services like birth and death certificates, registration for old age pension, water connection, change of name on property.

Chiraag software also provides medical consultation with Arvind Eye Hospital (Pondicherry), ARR Hospital (Caddallore) and WebHealthCenter (a Chennai-based health portal). Patients can send an e-mail to the doctors along with photos (of eyes) taken with a web camera, with a filled in questionnaire and voice over attachment regarding the medical problem. Doctors provide their consultation based on this information. The services link to Agriweb, online tutorials for students, and computer games, job search, examination results, bus/train routes and timings, veterinary consultations, village information and Chiraag

Radio are also available online. All these Chiraag services are available at a user charge varying from Rs 5-15. Computer training courses (Blue Book and Green Book courses for class I-V and class VI-X students) are also offered. A fee of Rs 300 is charged for a six-month course. All centres have Internet browsing facilities and they host voice/video-conferencing/chat sessions (at a cost of Rs 25 per hour) as well.

Target Group and Intended Beneficiaries

The primary intended beneficiaries are farmers (mostly cultivating sugarcane and paddy) and villagers residing in 45 villages in the Nellikuppam area of Caddallore district of Tamil Nadu and three villages in Pondicherry. They can all access the services at the 38 Parry's Corners and 10 Chiraag centres.

Institutional Arrangements

The project is headed by a Deputy Manager (IAL Operations) of EID Parry, who has an office in Chennai. The EID Parry server team has three supervisors or assistant managers (one for paddy procurement, another for the daily updatation of the website and hardware problems and a third for payments and sugar). Four field officers monitor and provide logistical and strategic support to Parry's Corners. The N-Logue team is headed by a Deputy Manager (Project), who is located in the server room in the Administrative Unit at Nellikuppam Sugar Factory.

The support N-Logue team consists of two technical engineers (for survey, installation and customer complaints), one in charge for sales and one marketing manager. The project has formed partnerships with three health providers, Caddallore district administration, Agriculture University, Veterinary College and one private engineering college. All 48 centres/ kiosks are manned by private entrepreneurs who have entered into a franchisee agreement with EID Parry or N-Logue. There are Farmers Clubs organized in all 38 Parry's Corners and Kids Clubs instituted in all 10 Chiraag centres.

Technologies

The Server Room has one Dock Interface Unit (DIU, with six BUIC cards), two servers (a Master Internet Server and a Redundant Internet Server), and two Operation Monitoring Consoles. These are connected through modems and routers to six Compact Base Stations (installed on 95 metre high chimney/tower of the factory). There are two Repeater Base Stations (in Puddapate and Arasadikuppa villages). Satyam Info provides leased lines (64 kbps) linkage to CBS. There are two PIII PCs with the Chiraag team and two PIII computers with the Agriline team in the server team. The server uses Windows NT, ASP and HTML for web-based applications and SQL for the database. CorDECT technology provides 35/70 Kbps connectivity (with simultaneous Internet and telephony) within an area of 25-30 km radius. The DIU in the Server Room can accommodate up to 20 BUIC Cards (and can support 1,000 subscribers). Presently, there are 87 subscribers (38 Parry's Corners, 10 Chiraag centres, three educational institutions, three government connections, two solution providers, 11 factory connections and 13 private connections).

Primary Access Points

All the villagers residing in 45 villages (in Nellikuppam area of Caddallore district of Tamil Nadu) and three villages in Pondicherry can access these services at 38 Parry's Corners and 10 Chiraag centres.

Capacity Building

All the kiosk operators (manning 38 Parry's Corners and 10 Chiraag centres) have undergone one week's training on hardware, server and maintenance, Internet browsing and marketing. EID Parry has also trained 150 farmers to use the Net and portal (to view their transaction record with the sugar factory).

Constraints and Implementation Challenges

The project faced implementation challenges with the community and technology. There has been lukewarm response from village councils. This has been compensated by excellent participation by farmers' organizations and clubs. Commodity trading in sugar, tea, seeds, fertilizers, chocolates/candies still largely remains offline. The Commodity Trading System (CTS) is still in its formative stages. The installed capacity of 1,000 subscribers is not fully utilized. There were only 87 subscribers at the time of the study. The network is only used for data transmission, as voice transmission has not been finalized. Talks with Tata Infocomm are underway to use their OFC lines and setup to take up voice transmission as well. Less than 10 percent of sugarcane farmers are using CMS, which is making some headway but its universal usage will take some time. Internet browsing is not very popular with the villagers. Though the network provides continuous and unlimited connectivity at Parry's Corners and Chiraag centres, only a negligible proportion of the volume bandwidth is currently utilized.

Project Outcomes

The EID Parry and N-Logue partnership has grown over the three years prior to the study. The CMS has become popular with some sugarcane farmers. Health consultancy, especially related to eye ailments, is quite popular. The Blue Book and Green Book courses for children (age group six to16 years) have been tremendously successful. The project is providing an income of Rs 2,000 to Rs 4,500 per month income to kiosk operators from offline and online activities.

Key Lessons Learnt

The successful partnership between EID Parry and N-Logue Telecommunications Pvt Ltd has shown that such partnerships between the business community and technology providers can result in sustainable and viable projects. The project also highlights that industries and businesses having a rural base would benefit by creating communication channels through community networks. The kiosks must become not just information centres but also catalysts for the economic growth of the villages. How this can be attained can be learnt from the India Agriland Project. Many financial institutions, especially banks, are convinced about the economic feasibility of the project and are coming forward to provide term loans at low interest rates without collaterals, with a period of moratorium. The potential offered by such networks could be tremendous and beneficial to the citizens and the project partners.

Sustainability

The project is sustainable as the partnership is mutually beneficial to the business house and the technology provider. All Parry's Corners and Chiraag centres have been repaying bank loan instalments and depositing monthly connectivity charges regularly with N-Logue. Most Parry's Corners are earning Rs 1,500 to Rs 3,000 net income every month, which makes the operations financially viable. The earnings at Chiraag centres have still to be built up. The long-term sustainability of the project would finally depend upon increasing the number of CorDECT subscribers from 87 to 1,000, starting with vocal transmissions, using all available bandwidth at the kiosks and putting CTS online.

Replication and Scaling Up

The project has not been replicated in other parts of India. Warana Wired Village has recently adopted CorDECT technology (see page 121). N-Logue has entered into agreements in Tamil Nadu with numerous private entrepreneurs as LSPs in Alagumalai (Koimbatore), Teni (Teni),

Human Interest Stories

Kids and their new play field

Samundeeswari is the 12-year-old daughter of a bullock cart driver from Valapet village. She studies in class VI in the nearby municipal school. Her father earns a meagre sum of Rs 1,500 per month. A few years ago she saw computers for the first time in a clothes shop. She asked many questions about the machine, but her parents could not provide satisfactory answers. Then, she learnt about Thirukandeswaram Chiraag centre. She motivated her father to pay Rs 100 for the Green Book Course at the centre. Now she visits the centres with her six school mates. She wants to own her own e-mail account by the end of the course.

A one-stop shop for sugarcane farmers

Priya is 22 years old and has completed MCom and DCA courses. She started a Parry's Corner in her house in Malaigimedu village in November 2000 in partnership with her brother. She has one Pentium III computer, a web camera, multimedia kit, and 4-in-1 (printer, scanner, fax, and copier). She also sells sugar, tea, seeds and candies for EID Parry on a commission basis. She procures paddy from farmers for the company. She has done video-conferencing with the District Collector and with the Arvind Eye Hospital for the villagers. She earns Rs 3,000 per month for the family. She says, "Money is no criterion. People are ready to pay for services. They only approach the kiosk based on their needs."

Thiruvallur (Thiruvallur) and Thirupattur (Siv Ganga). EID Parry plans to replicate the project in three other sugar factories in Tamil Nadu and wants to scale up the services by introducing CTS. The plan is to scale up the project to increase the number of Parry's Corners to 100.

Recommendations

There are only 87 subscribers of the CorDECT technology against the installed capacity of 1,000. It is necessary to attain at least 80 percent of the installed capacity by an intensive drive to register new customers in rural areas and by making strategic partnerships with LSPs. The technology offers unlimited access to 35 Kbps bandwidth to all these kiosks, but only 2 percent of the available bandwidth is presently being used. It is advisable to create content and services which motivate villagers to browse the web more often. The use of voice transmission over the WiLL network needs to be sorted out at the earliest. The content on the Chiraag centres mostly revolve around video-conferencing, for which the need in the villages is almost negligible. It is recommended that e-education (including distance learning), e-governance and e-business services be provided. Content development is an area wherein efforts are still required. There is an urgent need to develop new partnerships with schools, colleges, universities, health centres and hospitals, local/regional/national employment providers, various tiers of local bodies, various departments of the government, etc.

Contact Information

EID Parry (India) Ltd
Nellikuppam, Cuddalore District, Tamil Nadu
Tel: +91 442 445 5212
Fax: +91 442 445 5335
E-mail: raghunandank@murugappa.co.in

Websites

http://www.indiagriline.com
http://www.tnnel.chiraag.com
http://www.n-logue.co.in

Janmitra
Jhalawar, Rajasthan

Background

The Government of Rajasthan has enacted the 'Right to Information Act, 2000'. UNDP and DOPT, India, have launched 'Improving Citizen's Access to Information' projects in six different parts of India. These projects were launched in 2001 in Mandya (Karnataka), Bhuj and Kutch (Gujarat), Kalahandi (Orissa), Bhopal (Madhya Pradesh) and Jhalawar (Rajasthan). The one in Jhalwar, called Janmitra, is aimed at building the capacity of the public authorities for improving citizens' access to information to achieve transparency and accountability in governance at all levels.

Goals and Objectives

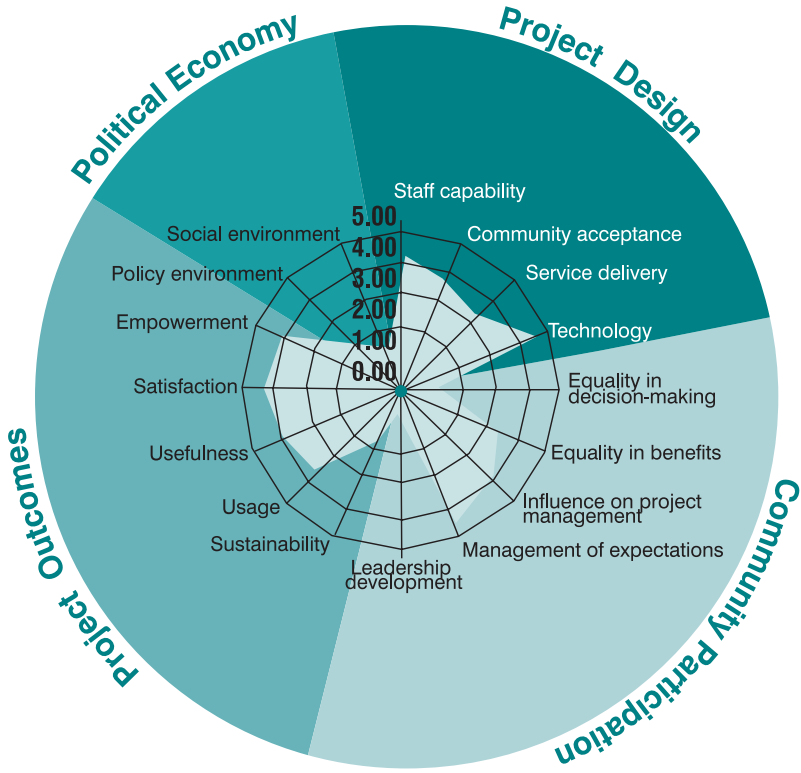
- To establish one-stop shop contact points for citizens to access various government services and information.
- To establish a self-sustainable transaction-based financing model by proactively involving citizens, private entrepreneurs and government in this task.
- To establish an IT driven MIS at the District Collectorate towards efficient and effective administration.

Planning

The project was sanctioned in January 2002 and launched in March 2002 in Jhalawar district of Rajasthan. A needs assessment of the citizens was carried out and after discussions with concerned departments, the services for the project were finalized. A society named 'Janmitra Society' was formed for the implementation and monitoring of the project. RajComp, a Government of Rajasthan undertaking, was given the responsibility to prepare software for the project. Two officers were selected from each department for the project. Applications were invited to establish Janmitra kiosks at 17 major towns and villages of the district. A total of 137 applications were received. Villages for the kiosks were selected based on OFC connectivity, population, rural market place, link with major roads, community response and community participation. Out of 137 applications, based on hardware availability, location of the kiosk building, telephone connectivity, and enterprise skills of the applicant, local residence of the applicant and their educational background and knowledge of computers, 21 applicants were selected. These kiosk owners then signed an agreement with Janmitra Society for a period of one year (an annual license fee of Rs 6,000 was planned but was not deposited). All the hardware and equipment were bought or owned by the kiosk operators and they manage the kiosks on a franchisee basis from the earning from user charges. Nine new kiosks were also launched in August 2003.

Services Provided

Various e-governance services are provided on the network. Land records are issued at a cost of Rs 20 (Rs 10 for the Government and Rs 10 for the kiosk owner). In 1999 data were updated and records of all land, including urban land and non-agricultural land, are provided from the kiosk. Anyone can ask for the record of any survey number without filing a written application. Patwaris (or village revenue official) visit the kiosk in their jurisdiction on Mondays and Thursdays and sign the records. The records are then delivered to the user by the kiosk owner either



How effective is Janmitra in providing one-stop access points to various government services and information

by hand or by courier. All other land-related records (like girdabri and maps) are manually provided by the patwaris.

Redressal of complaints related to 14 different departments can be sought from these kiosks at Rs 10. The complainant is given a receipt on filing an application and redressal takes seven to 15 days. The complaint is sent physically to the concerned department through a courier along with the online transmission. The District Collector monitors them every Monday. The redressal or the action taken on the complaint is made available online.

Rs 20 is charged for the online submission of applications (old age pension, caste certificates, domicile certificates, arms license, social security schemes, etc.). The application is also sent physically through courier. The project also provides e-mail facilities, online *mandi* rates of agriculture/horticulture produce, online rural market place (*gramhaat*), matrimonial alliances (*vaivahiki*). Public awareness services about health, education, animal husbandry and agriculture are also available. One hundred and fifty application forms (pertaining to government departments), the Below Poverty Line list, list of development works, citizen charter, electric connection priority list, village-wise immovable property rates and village-wise drinking water resources are also available to the users. The kiosks open from 9 am to 7 pm, but only provide e-governance services on working days from 10.30 am to 5.30 pm. Numerous offline services like games, DTP, job work, computer training, etc., are also available at these kiosks. Eighteen of 30 kiosks have Internet connectivity

and they provide Internet browsing. Ten kiosks have STD/PCO kiosks. All 30 kiosk owners have been bestowed with powers of stamp vending, petition writing and deed writing as well. All the services are provided at user charges.

Target Group and Intended Beneficiaries

The target groups are citizens residing in 17 towns and villages (and nearby villages) in the district, and various government departments.

Institutional Arrangements

UNDP and DOPT (Government of India) are the funding agencies. The District Administration is the overall owner of the project, RajComp and Department of IT (Government of Gujarat) have developed software and provide technical support. The Janmitra Society has been registered at the district level under the Societies Act. The Society has a District Collector as Chairman. There is a Technical Committee, a General Advisory Committee and a Financial Committee. Two qualified technical persons have been kept on contract by the Janmitra Society.

Technologies

The project is based on a rural intranet network with a P III (800 MHz, 256 RAM 20 GB HDD) RAS linked through two modems connected to two dedicated BSNL lines. There is another redundant server in the server room. The server uses Windows 2000 Server as the Operating System and SQL Server as the database backend. The front end of the software is in Visual Basic 6.0 and ASP. Intranet connectivity is available at 128 Kbps, and 21 departments can connect to the server through dial-up connectivity while 13 departmental offices are on LAN with the server. The data files are transferred as XML files and uses Batch Mode Technique. That is, data is transferred in batches rather than as individual files, so the kiosk operator connects only once or twice in a day.

Primary Access Points

Primary Access Points are 30 Janmitra centres established by the time of the study. The services are not available on the World Wide Web.

Capacity Building

The initially selected 21 kiosk owners were given 18 days of intense training on hardware, software, network, services, entrepreneurship development, etc. All the district level officials were given four-day training. Two persons from each department have been identified as nodal officials and have been given training. New inputs are provided to kiosk owners and officials in monthly meetings.

Constraints and Implementation Challenges

The mindset of government departments and their officials was seen as a major constraint at the time of the launch of the project. All the officials and concerned personnel of related departments have been trained and the mindset has been largely changed through capacity building modules. These departments have been provided with computers and have either LAN or dial-up connectivity with the server. The project area has a low rate of literacy (only 60 percent and the female literacy rate is as low as 40 percent). There is a lack of IT awareness among the general population. The publicity and awareness campaigns regarding the project have had very limited success. The large geographical project area and social problems between various communities have always resulted in implementation challenges. The databases in different departments are built on different platforms and have different data structures. The integration of these databases

is very challenging. The online processing of complaints and applications is still not taking place. Most departments are manually and physically handling these applications and complaints after online submission and offline delivery of original documents. Manual land records are still issued by the village revenue functionary, which has resulted in two parallel systems. Data updating, especially of land records, has numerous problems. Mutations are taking place manually and are not being registered on the database regularly. There is a dearth of technical manpower in the district. The ratio of technical manpower and onsite requirement for support is not proportional. Rural areas in Rajasthan are facing power cuts for as long as 12-14 hours a day. The UPS provides some kind of back-up, but the power shortage is so acute that it has become an important implementation challenge for the project. Similarly, at the initial phase of the project, telephone connectivity was a major cause of concern. However, there has been a lot of improvement in the connectivity.

Project Outcomes

The project has been under implementation since March 2002. In three months (May-July 2003), 810 users obtained land records from the kiosks, 355 users filed complaints and 214 users used online applications. Considering the situation of the project area, the response towards these three e-governance services can be termed as satisfactory. All the kiosk owners are also successfully acting as stamp vendors, petition writers, computer education providers and DTP providers. The project has resulted in transparency and accountability through a single point contact with the government. The project has provided a healthy revenue stream to the majority of kiosks.

Key Lessons Learnt

The Internet has miniscule content in the local language and there is an absence of any context with local needs. In rural areas, Internet connectivity is also not available in remote places. The project has successfully confirmed that community networks in rural areas need not necessarily be on the Internet; and that the success of an ICT project in a rural area depends on the needs assessment at the initiation of the project and on proper selection of villages and entrepreneurs. The integration of various e-services and offline activities (along with other related services) can generate enough revenue at information kiosks. In the project, most kiosks are earning Rs 2,500-4,000 per month of net income. Some kiosks are earning as much as Rs 4,000-7,500 per month. Another lesson from the Janmitra project is that the franchisee model (based on enterprises with user charge sharing) is better than telecentres manned by employed staff. e-Governance services are possible only when government departments streamline, reprocess and e-enable their functioning. Government has to be a major partner in any successful e-governance networks. A crucial lesson learnt from the Janmitra project has been that a close partnership with government is essential in a successful e-governance project.

Sustainability

The project's sustainability depends upon its level of institutionalization. It still remains person driven, with the present District Collector providing the leadership. What will happen to the project after his transfer is yet to be seen. The Janmitra project has been a financially sustainable one, but its sustainability on administrative grounds is not confirmed yet. Most successful projects in India have failed after the transfer of the project champion from the project area.

Human Interest Stories

Financially healthy telecentre

The Janmitra kiosk at Bhawanimandi is owned by Pradeep Soni, a 30-year-old post graduate and a diploma holder in computer applications. Besides a Pentium III computer with a printer and a UPS, his kiosk has a scanner, a photocopy machine, STD/PCO and a TV repairing unit. His services include stamp vending and petition work along with computer education, DTP, job work, etc. He earns Rs 1,000 per month from Internet access. His monthly earnings from the STD booth is Rs 3,000, photocopy work is Rs 2,500, online services Rs 2,500, offline services (including computer education) is Rs 2,500, and from the TV repairing unit Rs 1,500. His monthly expenses are around Rs 4,000, and he earns Rs 8,500 per month as net profit. He thinks that this has become possible because he has developed his kiosk as a 'Composite Information Centre'.

Online tracking of complaints

Twenty-eight-year-old Mahesh Kumar Jain comes to the Pachpad kiosk every week. He is keeping track of the complaint he filed a month ago from the kiosk. His father, a gramsewak (village development functionary), died last year while in government service. Mahesh had applied for his own appointment as a gramsewak on humanitarian grounds in Jhalawad. He used to travel 135 km to reach there and wasted many days and thousands of rupees in travelling. When he heard about the Janmitra centre, he filed his appeal electronically. He came to know from the district administration that he was not eligible for the job as he was not a graduate (a pre-requisite for the job). He has re-applied for the job of a clerk. He is satisfied now with the progress of his application. He knows that his appointment as a clerk is just around the corner. Now, he is thinking of settling down and getting married.

Replication and Scaling Up

Janmitra has been replicated in Dehradun district of Uttaranchal. The Government of Rajasthan has decided to replicate the project in eight districts of Rajasthan. The project was to be scaled up to 40 centres over the three months following the study. Electricity, water and telephone bills payments from these centres are planned to be added to the services. Online court cases and online education are envisaged to be added to the system shortly. The project was planning to use WiLL technology from CorDECT in Khanpur and Bhawanimandi blocks, which will provide connectivity to all 400 villages in these blocks.

Recommendations

There is a need to implement a publicity campaign to popularize the e-services offered by the network as these have not become popular in the rural areas. The project has not yet realized the full cooperation of the gram panchayats. Local and traditional bodies in rural areas should be involved in the campaign. It is recommended that land record mutations should be initiated online and security features built up to safeguard unauthorized updating or manipulation of land record databases. It is also recommended that departments be streamlined so that online processing and disposal of complaints and applications become possible. This would require a significant amount of back-end processing. The project should start e-payment services at the earliest, as it is a felt-need of the villagers and the community. In-house capacity building should be taken up, as the project is technically dependent on two technicians hired for server room management by the Janmitra Society. These two technicians were expected to leave

the project when the project funding stopped in December 2003. The network should try to use 2 Mbps leased lines provided under RajSwift. Presently, the bandwidth is idle. e-Health and e-education services on the network are absent on the network. The project should strive to include these vital services in the network. The project should shift away from a 'e-governance' focus to a 'community network' focus.

Contact Information

Praveen Gupta
Collector and District Magistrate
Garh Palace, Jhalawad, Rajasthan
Tel: +91 141 238 1394, +91 141 238 4681,
+91 141 510 3902, +91 743 223 3616
Fax: +91 743 223 0404
E-mail: janmitra_society@rediffmail.com

Website

http://www.raj.gov.in/janmitra

Mahitishakti
Panchmahal, Gujarat

Background

e-Governance activities in Gujarat have been initiated by numerous government entities and at different levels such as departments, district offices, commissioners and also other state agencies. These have been in the form of electronic documentation and information exchange, information and service delivery to citizens, process automation and smaller computerization initiatives. One such initiative has been taken in the Godhra district of Gujarat. This project is known as 'Mahitishakti' ("power of information").

The Mahitishakti project was started in 2001 and has facilitated information access for the rural citizens of the Panchmahal district. The project is implemented through about 80 information centres (Mahiti Shakti Kendras) through which citizens can access various types of information, Gujarat Geographic Information System (GGIS) maps, medical information, legal aid, online submission of applications, e-Darbar and opinion poll facility, grievance redressal, *Mahiti Mahisagar* (an electronic newsletter), photo gallery, entertainment like music, magazines, other useful Internet sites, etc. The project was supported by UNDP, the state government and actively promoted by Gujarat Informatics Ltd (GIL).

Goals and Objectives

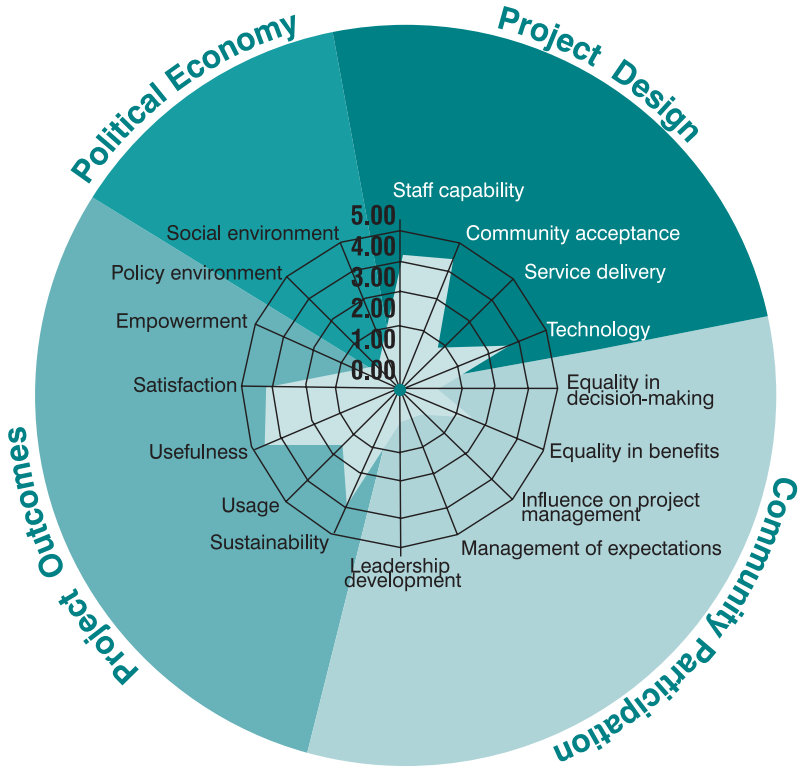
- Electronic/online form submission, transactions and information exchange (e.g. citizen-government).
- Immediate access to information on government schemes and subsidies, etc.
- Online grievance redressal.
- Enhanced and effective citizen-to-government interaction.
- Dissemination of useful citizen-centric information, transactions and services.
- The broad goals of the project are:
  - Transparency: Periodic display of the progress/status of schemes and plans.
  - Right to Information : Empowering the consumer of information.
  - Demystifying the office: Addressed with due support and access mechanisms.

Planning

The Collector of Godhra held discussions with the Concept Centre for Electronic Governance (CCEG) of IIM-A in October 2000 to develop a portal for enabling Citizen to Government (C2G) and Government to Citizen (G2C) transactions using IT as a medium. This was based on participatory rural appraisal exercises carried out by various NGOs. In October 2001, the project was launched by converting 14 STD/PCOs as Mahiti Shakti Kendras (MSKs).

Services Provided

Over 200 forms have been made available for transactions between citizens and the government. These forms carry details of the documents to be attached with the main form at the time of submission. The forms and checklists have been made available as printouts at a prescribed fee at the MSKs. Information pertaining to ongoing schemes like those under the District Rural Development Agency (DRDA) and District Planning Board (DPB), Tribal Area Sub Plan (TASP) and scarcity relief works, etc., are also available. The web-enabled version of the GGIS developed by Remote Sensing and Communication Unit



How effective is Mahitishakti in enhancing citizen-to-government interactions and providing online government services and information

(RESECO) gives details of the resources available in every village of the district which are available in a query-based system. An electronic newsletter called *Mahiti Mahisagar* featuring medical help, legal help, a science corner, a children's corner, etc., is published. There is also a grievance redressal forum for citizens to voice their specific complaints. Electronic form submission for applications such as National Old Age Pension Scheme (NOAPS) are available, as well as water-related grievances and ration card applications. The applicant fills the form at the kiosk. The back-end process is carried out by the government staff and the final reply is sent to the applicant by e-mail and post. The portal also provides a chat session with the ministers and senior officers of the district. There is useful information on over 30 specific crops grown in Panchmahals, giving details of the seeds, fertilizers, insecticides , pesticides and organic manure, etc., exclusively prepared for the portal by the Gujarat State Fertilizer Corporation (GSFC) Foundation. Access to the electoral roll is also available.

Target Group and Intended Beneficiaries

Having been established in a backward area, the primary focus is on the tribal communities and families living below the poverty line. The secondary focus is on the general citizens of Godhra district.

Institutional Arrangements

A trust has been set up at the district level under the chairperson of the Collector, Panchmalals, with other district officials as its members. Each MSK is charged with an annual empanelment fee

of Rs 8,000. The legal enabling framework between the trust and the MSKs is attained through a detailed contract agreement. The district information officer of NIC does the monitoring and is also the webmaster of the website. Data entry operators process the data for the portal. The line departments upgrade and update the information. NIC, RESECO and GIL provide the technological support to the MSKs.

Technologies

This project focuses on leveraging existing infrastructure with minimal additional costs/ resources such as converting the MSKs from existing STD/PCO booths. These MSKs have a computer with 128 MB RAM, 1.7 Ghz, 40 GB HDD and a dot matrix printer. A portal has been developed in ASP, Java and HTML whereas the database is in Access and Oracle. The client-end is on Windows 98. This portal has been developed by IIM-A. GIL and Adit Microsys (a private agency) manage the server whereas connectivity is established through a dial-up modem.

Primary Access Points

The primary access points are the nearest MSKs. There are 73 MSKs (48 STD booths and 25 dairy cooperatives).

Capacity Building

The MSK operators are provided with on-the-job training on using the computer and the portal.

Constraints and Implementation Challenges

The district of Panchmahals (Godhra) faced the worst ever communal riots lasting for six months in 2002, which hampered the growth of the project. STD/PCO booth operators have high expectations, which became difficult to manage through the basic ICTs that were deployed. There is a paucity of online dynamic data on the network, as mostly static data is being used. The management of the servers by Adit Microsys, located hundreds of kilometres away from the project site, also hampers the efficient management of the network. The apathy of government officials of line departments and technical departments is also a major implementation challenge. There is a conflicting situation between NIC and Gujarat State Wide Area Network (GSWAN), so much so that they are grossly under-utilized. Large files take a lot of time to download due to poor connectivity. Internet connectivity is poor as only six out of 80 MSKs have Internet connections. Frequent interruptions caused by irregular power cuts for three hours in the daytime obstruct the smooth functioning of the MSKs. Backend processing of the information received from MSKs is non-existent.

Project Outcomes

As many as 200 forms have been made available online. Some process reengineering has also taken place after approval of the government, reducing paperwork, for instance, in the NOAPS, the applicant does not now need to append the proof of age, income and residence while submitting the form. The Mahitishakti website is available on a 24x7 basis and facilitates online filling of forms, complaints, applications, etc. The most commonly used service is downloading the government forms. In all MSKs, 85 percent of the revenue is generated from downloading these forms. Most of the MSKs are not connected to the Internet. There is no intranet connectivity at the kiosks. Most MSKs are using CDs to download government forms, voter lists, BPL list and list of development works, etc.

Key Lessons Learnt

The project underlines the importance of an assessment of community needs before a planning community network. The strategy of converting existing STD/PCOs into MSKs is quite practical as an already established infrastructure can be optimally utilized for information and

Human Interest Story

From a bookstore to the MSK

After completing his graduation, Girishbhai Joshi started working at the Pathik General Store, owned by his parents. The shop sold books and stationery items. He later started providing STD/PCO and photocopier services at the store. In September 2001, he took a bank loan of Rs 47,000 from Bank of India under the Pradhan Mantri Rojgar Yojana. Out of the money he borrowed from the bank, he bought a Pentium III computer, an HP inkjet printer, a web camera and a UPS in order to start MSK services from his bookstore. He has earned Rs 134,000 from selling 9,900 forms. He also provides Internet browsing at the cost of Rs 20 per hour and has also undertaken DTP work. He says, "I used to earn Rs 4,000 per month from the STD booth in my store earlier. With a gross reduction in the STD charges, this income has plummeted to only Rs 1,000". He feels online registration for employment and availability of land records could improve the profitability of the MSK.

communication needs. The project highlights the importance of intranet networks in rural settings as Internet connectivity is still very poor, especially in rural areas. The innovative use of GIS for citizens is a pioneering application. The project also effectively uses the local language, which facilitates usage of the network by citizens.

Sustainability

The project has converted existing STD/PCO booths and milk cooperative into MSKs. No project funding has been provided for this conversion; entrepreneurs have financed their own MSKs. However, the financial sustainability of these MSKs is doubtful. Internet connections are not available in most MSKs. Online transactions are also not taking place properly. The whole project is centred on downloading government forms whereas these forms cannot be submitted online. Each MSK has invested Rs 50,000 to set up the kiosk but the return on investment is poor. Most MSKs earn less than Rs 750 per month. The sustainability of the project is further undermined by the fact that there has hardly been any addition in the services offered by the project since December 2002.

Replication and Scaling Up

A total of 84 outlets at Dairy Cooperatives and 22 outlets of the District Cooperative Banks are planned to provide information at the grass-roots level. The state government has been planning for funding support from the UNDP to scale up the project in 28 districts of Gujarat. It has signed an MoU with N-Logue Communications Pvt Ltd to provide CorDECT technology for 10,000 villages in the Gyan Ganga project. Electronic payments of electricity bills, water bills, telephone bills, property taxes, etc., are also planned for this implementation.

Recommendations

Most of the data on this rural portal is static and online transactions are not taking place. However, it is recommended that electronic payments of different dues and taxes should only start after ensuring e-readiness of the network. The absence of land records in the project slows down its growth. Income at most MSKs comes fromdownloading government forms and is therefore very low, which is causing anxiety and unrest amongst MSK owners. Procedural restructuring and reengineering of government processes has not been taken up.

Other income generating sources like stamp vending, deed-petition writing, etc., could also be added. It is also recommended that backend processing should be urgently improved, as it has become a major bottleneck in the growth of the project. It is also recommended that e-education, e-health and e-commerce activities be included in the project. The capacity building of government officials managing the project is far from satisfactory and needs to be improved. There is a need to increase utilization of land and GSWAN for the betterment of the project. It is also recommended that MIS be developed for the network. It is essential that all services should be made functional and operational, and sustainability and its viability should be assessed before scaling up the project.

Contact Information

E-mail: godhra@guj.nic.net
md@gujaratinformatics.com
satyarth@aditimicrosys.com

N-Logue Telecentres
Madurai, Tamil Nadu

Background

The Sustainable Access in Rural India (SARI) project, in association with N-Logue Pvt Ltd, has established 30 public access Internet kiosks in villages across Madurai, Tamil Nadu. This public-private programme also involves the Indian Institute of Technology-Madras (IIT-M), Massachusetts Institute of Technology (MIT) and Harvard University. The technology provides high speed Internet wireless access to more than 1,000 systems within a radius of 25 km. The kiosks have been established by individuals who invested Rs 50,000 in computers and other accessories. Now these owners, who have installed the user-friendly Tamil software 'Padhami', 'Padhakkam' and 'Minnal', make an average income of Rs 2,500 a month and their patronage is growing steadily. As of the time of the study, a large number of villagers in these 30 villages have e-mail identities, which they use, among other purposes, for seeking assistance from the Government under various schemes. The SARI project has evoked excellent response from the Government and the public.

Goals and Objectives

The goals of SARI are to demonstrate the impact of ICT on issues like health, learning, empowerment of the poor and economic development, in a sustainable manner. The project aims to provide access to computing and networking through community centres. This project was envisaged as an experiment to test and develop low-cost connectivity options. The major objectives are:

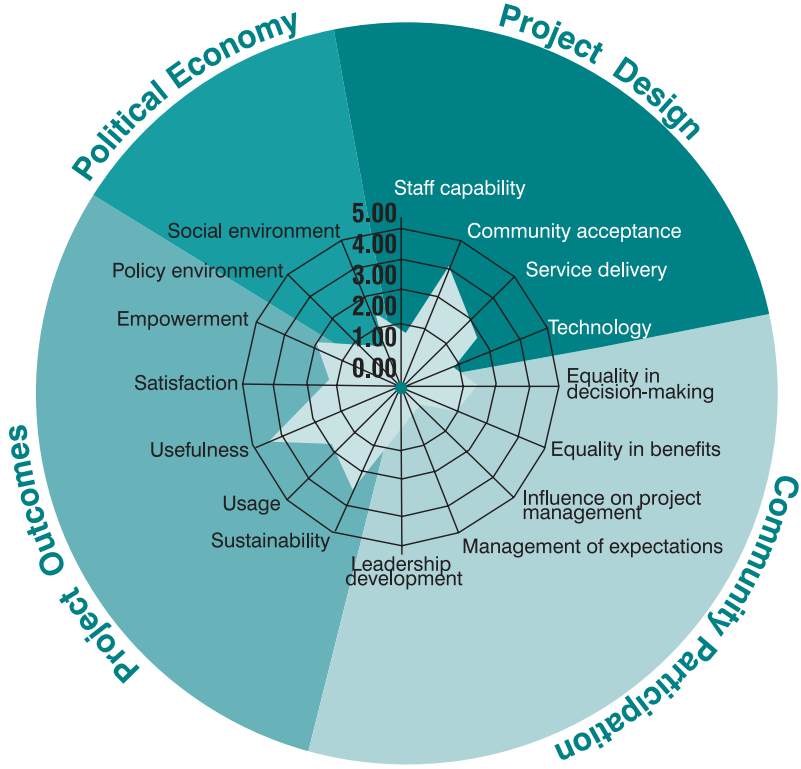
- To research and develop appropriate access devices for rural Internet and telephony.
- To research and source other supporting technologies such as alternative sources of power.
- To research and facilitate the development of applications that will be useful to the users of the service in these villages.
- To provide Internet and voice connectivity to rural India.

Planning

N-Logue Telecommunications Pvt Ltd has planned widespread use of CorDECT technology in rural areas. For this purpose it has developed partnerships with schools, colleges, hospital, and the local administration to start 78 centres. The project is fully funded by N-Logue Telecommunication Pvt Ltd.

Services Provided

This project provides health services: the webhealth centre (a product of Tata Consultancy), and consulting with Arvind Eye Hospital. The kiosk operators take the patients' photographs and send them to the hospital. Video-conferencing consultations are conducted with related universities and hospitals on veterinary, agricultural and educational problems. The kiosk also provides various certificates like birth, death, old age pension, and caste certificate as well as providing information on various governmental schemes. Entertainment and educational material is available online: astrology services, job services, travel and railway information, village information, Chirag radio (songs online).



How effective are the N-Logue Telecentres in providing low-cost connectivity to rural India

The kiosks also facilitate the following services:

- Offline applications.
- E-mail.
- Entertainment based on Internet.
- Online knowledge delivery.
- Online application for certificates.
- Advertisements.
- Insurance applications.
- Online medical check-up.

Target Group and Intended Beneficiaries

The beneficiaries are the rural people from remote villages of Madurai. N-Logue encourages small entrepreneurs in all small towns and villages where it sets up its operations, to promote Internet awareness.

Institutional Arrangements

At the top level is N-Logue, which provides equipment, training and support and also takes care of regulatory and connectivity issues. To represent the second level, N-Logue identifies partners with a local entrepreneur (LSP) in every area in which it wishes to operate. These LSPs find subscribers, provide services and collect payments. At the lowest level are the village kiosks, which provide services and information aimed at the rural market. With the help of N-Logue, the LSPs recruit the local entrepreneurs who set up the kiosks. Thus there are up to three business entities involved in the operation – N-Logue, the LSP and a kiosk operator. They must work together for the operation to succeed.

Human Interest Story

"Earlier, we had to pay at least Rs 250 to get an income certificate or old age pension. Now, the cost is only Rs 29, which includes a printout of the e-mail acknowledgement from the tahsildar," says 70-year-old Mondi of Pathinettangudi.

Technologies

Internet access and networking is achieved with technology invented by TeNET (a spin-off of IIT-M) called WiLL. The server room has an interface unit with a capacity of 1,000 connections. There are two Pentium III servers with 20 GB hard disk (HDD), a UPS, generators and an operating maintenance console. Each kiosk has one Celeron PC (1.1 GHz), 20 GB HDD, 64 MB RAM, one dot matrix printer, one web camera, one UPS and one wall set with antenna.

Primary Access Points

The primary access points are the Chirag kiosks located in the houses of the villagers.

Capacity Building

Basic training on computers, the Internet and use of other services has been provided for two weeks. This training is provided inhouse whereas monthly kiosk meetings give a refresher course to the managers of the kiosk. Special training is also given to the operator in charge of technology on server management and refresher courses (held in Chennai). Local people with a minimum high school education and three to 12 months of computer education were selected as kiosk operators. They undergo eight days of formal training provided by the company. This is, at present, being imparted at Madurai Centre for Entrepreneurship Development. The training covers:

- Basics of computers.
- Use of Internet and other related services like e-mail, information searches, etc.
- Various applications developed specifically for this project like e-government services.
- General maintenance of various electronic gadgets installed at the information kiosk.
- Marketing of services offered by the information kiosk at the local level.

Constraints and Implementation Challenges

The introduction of new CorDECT technology in rural areas is an implementation challenge. The limited numbers of telephones in the rural areas are inadequate to fully utilize the capacity provided by the CorDECT technology. Building three towers and six repeaters along with kiosks maintaining line-of-sight access is not a small technological challenge.

Project Outcomes

This project has been successful in motivating the rural masses to use Chiraag services. The project has generated interest amongst the villagers on the Internet. The kiosks charge only Rs 25 for surfing. The project has generated earnings of Rs 2,500- 3,500 per month per kiosk. The project technology also provides simultaneous connection of voice and data transmission. Video-conferencing facilities available at the kiosk have been effectively used for telemedicine purposes. The project has been widely replicated in many parts of India.

Key Lessons Learnt

CorDECT technology provides simultaneous voice and data transmission. This reduces the cost of telephony, Internet surfing, and video-conferencing in rural areas. The poor rural health infrastructure in India has created considerable scope for the use of telemedicine, which can bridge the divide in the health infrastructure in India.

Sustainability

The project works on user charges. The technology is cost effective, but returns from investments still do not fully justify the existence of the project. The approach of using self-help groups in managing the kiosks is innovative but the kiosks are unable to provide adequate remuneration to all members of the group.

Replication and Scaling Up

The project has been replicated in many locations in Tamil Nadu including Nellikupam, Madira, Tirpur, Bhawani, Melladudurai, Shivganga and Tiruvallen. At the time of the study, 6,000 kiosks in Gujarat and Maharashtra had been sanctioned to be opened using the same methodology of implementation. The project has also been also replicated in Andhra Pradesh and Karnataka.

Contact Information

SARI in Madurai, Tamil Nadu
The Telecommunications and Computer Networks Group
Departments of Electrical Engineering and Computer Science & Engineering
IIT-Madras, Chennai 600 036
Tel/Fax: +91 44 235 2120

Self Employed Women's Association (SEWA)

Ahmedabad, Gujarat

Background

Self Employed Women's Association (SEWA) is a women's trade union that first registered itself in 1972. It is a member-based organization working for poor women workers in the informal sector. Its members consist of street vendors, hawkers, kite makers, gum collectors, artisans, salt workers, etc. SEWA organizes workers to enter the mainstream of the economy through the strategy of struggle and development. SEWA has more than 750,000 members across India and more than 530,000 members in Gujarat. Two-thirds of its membership in Gujarat lives in rural areas. SEWA incorporates three movements: cooperative, women and labour. It believes in struggle and development: struggle against constraints and limitations imposed on women by society and the economy, and development to strengthen women's bargaining power and offer them new alternatives. SEWA has realized the power of ICTs for the development of the informal sector.

Goals and Objectives

SEWA's two main goals are to organize women workers to obtain full employment and self-reliance. Work security, income security, food security and social security are important aspects in this regard. To achieve these goals, SEWA has adopted an integrated approach of promoting collective strength and bargaining power for capital formation at the household level. Access to financial services to build capacity has been made possible so that members can compete in the market place and access market infrastructure, technology, information, education, and relevant skills, asset building, healthcare and child care.

Planning

SEWA uses ICT for enhancing efficiency and efficacy for its women members as well as for institutional capacity building. SEWA believes that, by doing this, it can create more employment opportunities for women.

Services Provided

SEWA has an integrated approach through which it assists its members in different ways:

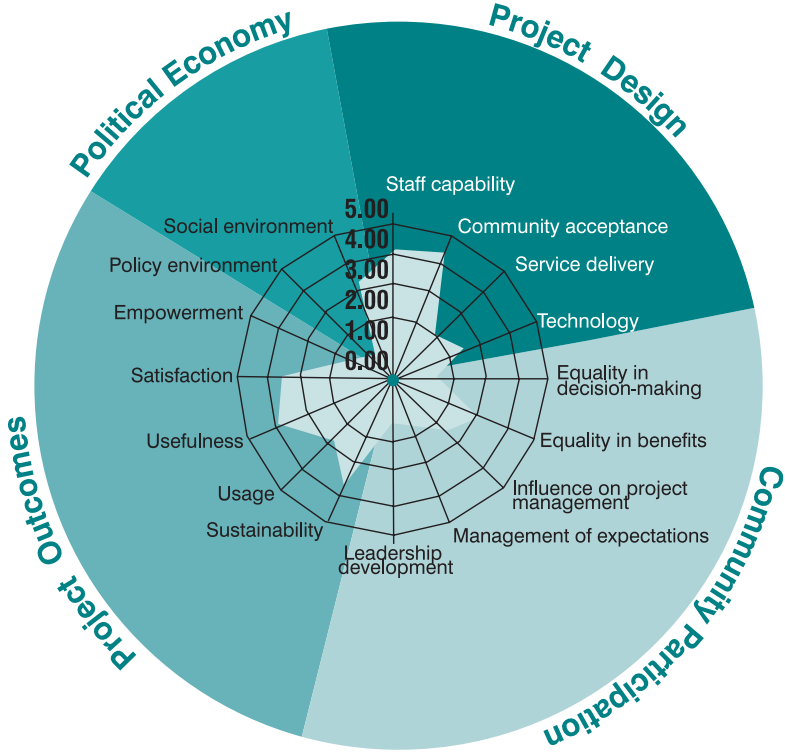
- SEWA bank for savings and credit.
- SEWA social security (this includes insurance, healthcare, childcare).
- Mahila SEWA housing trust.
- SEWA Academy for all kinds of trainings.
- SEWA Video.
- SEWA Gram Mahila Haat.
- SEWA Trade Facilitation Centre.
- SEWA Union.
- SEWA rural district associations (Gram Vikas).
- SEWA BDMSA (Banaskanth DWCRA Mahila SEWA Association).

Target Group and Intended Beneficiaries

SEWA has a membership of over 530,000 women in Gujarat. The annual membership fee is Rs 5. To become a member, an individual be in the BPL category. All members of SEWA are informal sector women workers.

Institutional Arrangements

SEWA has a bottom-up administration approach. The executive committee consists of 80 percent members and 20 percent non-members. Members are representatives from



How effective is SEWA in building women's capacity towards employment and self-reliance

various trades. The president is also elected from the members in the executive committee.

Technologies

SEWA believes in tools and technologies that secure livelihoods, build capacity and provide alternate employment opportunities to members. ICT for them means telephone, fax, video, Satcom and computers, and SEWA has used a wide variety of tools and technologies since its inception.

Primary Access Points

SEWA has 14 district associations. Each association has more than 18 activities, such as savings and credit, housing, nursery, watershed development and other activities pertaining to the area. These associations act as a hub for the rest of the activities, hence the satellite communication programme (SatCom) is conducted at these offices. Telephones, fax, xerox and computers are also installed at these offices. The majority of its members use these centres for retrieving information. In some districts, SEWA has started developing Community Learning Centres (CLCs). These centres are located as clusters, with one centre for 12-13 villages. CLCs act as hubs for activities such as training and capacity building, Jeevan Shala (life school), savings and credit, housing, embroidery, salt laboratory, gum collection, etc. This centre includes a satellite communication set-up, 24-hour video-conferencing, data warehousing and disaster mitigation-related information.

Capacity Building

SEWA has been successful in building the capacity of poor women workers in the rural and

urban informal sector by introducing various ICT tools and technologies. It started the video unit in 1984, which created a great impact on policy decisions pertaining to the life of informal sector women workers. With its satellite communication programme, started in 2000, it has educated members about the importance of insurance in their lives. This tool proved to be very useful at the time of an earthquake, for relief work and reconstruction. SEWA has also started video-conferencing for training in embroidery, advocacy, consultancy, and experience sharing amongst different districts. It has recently started computer training aimed at its members and their children. This programme has started showing good results. Members are able to access relevant information. Their ability to find alternative employment opportunities has increased tremendously.

Constraints and Implementation Challenges

SEWA strongly believes in development. The key challenge is getting women workers organized so that they have collective bargaining power. The other biggest challenge is the provision of appropriate tools and technologies for such women. 'Appropriate' means customized and financially viable. The language constraint is also a challenge to the further successful implementation.

Project Outcomes

SEWA uses a variety of technologies for spreading information to its members. SEWA makes sure that the video replay programme reaches all members, including the ones at the remotest places. The Satcom programme helps the members to directly interact with key officials. The outcome that the SEWA programme seeks from its computer training programme is self-reliance and creation of alternate employment opportunities. Until now, over 100 members have started using computers in their day-to-day activities.

Key Lessons Learnt

SEWA has created a blueprint for the informal sector. It has initiated many needs-based projects like water campaigns, policy-related changes, microcredit and microinsurance. In short, SEWA has adopted an integrated approach in a real sense. To provide an informal sector women worker with livelihood security and for her to achieve self-reliance, many requirements have to be met. The provision of savings and credit facilities, childcare, housing (asset building), watershed development, healthcare (hospital, midwives cooperative, insurance), training and capacity building are just some in which SEWA has been effective. SEWA has adopted ICT tools and technologies to facilitate members in achieving their objectives. A variety of tools are being used for this purpose. The technology used in SEWA is customized, hence it is optimally utilized. Technology has played an important role in the lives of thousands of its members.

Sustainability

SEWA's project is sustainable because it has a community-based approach. The programme is based on membership fees. SEWA does not believe in providing services for free. Until now, the project has relied on contributions from the members themselves.

Replication and Scaling Up

SEWA's various programmes have been replicated in more than five countries. SEWA, as the largest primary trade union for informal sector women workers, has been a role model in setting the blueprint for this sector. From the point of view of scalability, SEWA has adopted the latest tools and technologies, based on their relevance to the project. SEWA was the first women's video cooperative, established in 1984. It started with Umax format. Then it was extended to Beta version and gradually to VHS.

Human Interest Stories

Video and vegetable vending

Leelaben joined SEWA 30 years ago. Then, in 1984, SEWA decided to introduce women to the power of video. Since that three-week workshop, life has not been the same for this humble vegetable vendor. Her first film was *Manek Chawk* (a crowded market of Ahmedabad). This film created a radical change in the policy of the allotment of space to vegetable vendors in the crowded streets of Ahmedabad city. She captured the harassment caused by the traffic police and trespassers to vegetable vendors. When this case was taken to court, it was declared that space should be allotted on the terrace of the vegetable market. This decision was impractical for women members as it was difficult for them to carry vegetables weighing 10 or more kilos up to the terrace. They were also not sure whether customers would come to the terrace to buy their vegetables. Therefore, the women vendors arranged a meeting to discuss this problem. Leelaben captured their discussion, which was heartrending. Then she presented it to the Municipal Commissioner of Ahmedabad. After watching the video, the Commissioner was in tears. It compelled him to change the policy and allocate space for two baskets from each vendor in the busy market.

The power of computers

Shobhnaben is a member of SEWA, active in savings and credit as well as a housing team leader. She used to work in the fields with her parents; and had no education due to financial constraints and workload. However, she did not give up her ambition. She completed a computer training programme at SEWA, and is the only woman who knows how to use a computer in her village. She insisted that the government school purchase a computer so that the future generation could become computer literate. She is now teaching schoolchildren computers from which she makes an income.

Now, the digital format has been adopted. The video team is made up of both literate and semi-literate members. SEWA was the first organization to optimally utilize a satellite communication programme and then to extend this to 24-hour video-conferencing. Currently SEWA is providing consultancy in developing a customized CD-based programme for financial literacy to microenterprises. SEWA has also developed a course curriculum especially for semi-literate women, which can be replicated in similar areas for computer training.

Recommendations

SEWA needs to complete proper documentation, particularly in project management activities. Proper documentation for each project is essential in evaluating project outcomes and deciding the sustainability parameters. Even though the infrastructure is available at the district level, the centre is yet to optimally utilize ICT tools. To the spread of membership across Gujarat and India, there is a dire need to establish a networked solution. This will enable faster internal and external communication.

Contact Information

Director, Rural Development
Self Employed Women's Association
Opp. Victoria Garden
Bhadra, Ahmedabad - 380 001
Tel: +91 79 550 6444
Fax: +91 79 550 6446
E-mail: mail@sewa.org

Website

http://www.sewa.org

TARAhaat
Jhansi, Uttar Pradesh

Background

TARAhaat (meaning star marketplace in Hindi) is a gateway that connects the village user to information, social services, entertainment, and also to various markets, through a network of franchised cyber centres, customized in the language of their choice. TARAhaat covers all three components for rural connectivity: content, access and fulfilment. The TARAhaat.com mother portal, a growing repository of information on issues of sustainable development, furnishes content. Access is provided through a network of franchised local enterprises. Delivery of information, goods and services is provided by local courier services or franchised TARAvans. The pilot phase began in August 2000 in the districts of Bundelkhand, surrounding the city of Jhansi. TARAhaat has been conceived with the view that it has to be mastered and used by people with wide variations in literacy, language, financial liquidity and levels of understanding.

The project is implemented by an NGO called Development Alternatives, which has a staff of more than 400. It is a national not-for-profit organization working for 18 years on issues of sustainable development (equity, efficient management of resources, environmental conservation and empowerment) in the field, creating sustainable livelihoods (village industry, reforestation, water retaining structures, low energy buildings and materials, eco-friendly products and services). The other partners in the project are: Indira Gandhi National Open University, National Youth Cooperatives, Hindustan Lever Limited, Development Gateway (World Bank), Global System for Sustainable Development (MIT), Hughes Escorts Communications Ltd, People First, DESI Power Ltd, Excelsior Capital Management, and James Martin & Co.

Goals and Objectives

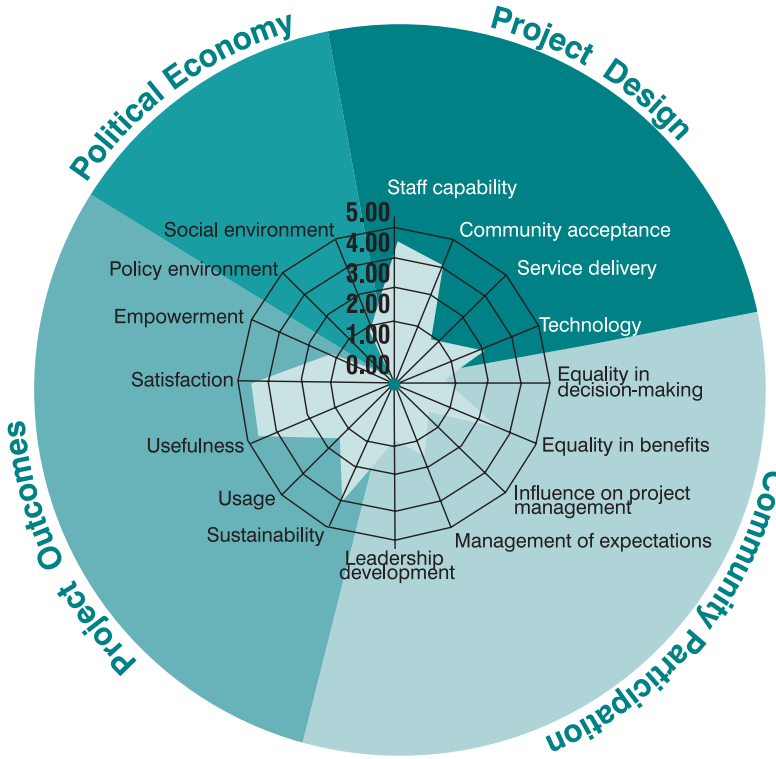
The objective of the portal is to enable a flow of knowledge services and products to the vast rural base of users and consumers. These objectives – in particular, changing attitudes, informing the people, demolishing myths, developing human capacity, creating support groups, etc. – can be achieved by using IT as a tool for social development and empowerment.

Planning

TARAhaat was initiated by the NGO Development Alternatives as a business model in which different project partners got together to provide server, software and network support, and private entrepreneurs took up rural kiosks as franchisees. The project was planned in such a fashion that services provided in TARAhaat.com will motivate rural entrepreneurs to open up rural kiosks on a franchisee basis; they will provide various services to the villagers on a user-charge basis.

Services Provided

TARAhaat is a company dedicated to continuous innovation and product development. It creates its products and services in response to the needs of its customers. Its current products are focused on education, communication and e-governance. Its educational products, developed by TARAhaat's educational wing TARAgyan, range from those that equip



How effective is TARAhaat in connecting villagers to information, social services, entertainment and markets

individuals with the skills needed to succeed in the job markets to those that enable them to compete in the global market place.

Content on law, governance, health and livelihoods is already available, and content is added every day. Commodities market information, listings of the local yellow pages, and information about products are also available. One of the largest revenue streams of TARAhaat is envisaged to be e-education. The portal has begun delivering a basic computing course that combines classroom teaching and hands-on computer practice (offline and online).

The subsidiary units in the portal include:

- TARAdhaba which provided connectivity to villagers.
- TARAbazaar which provides access to products and services needed by rural households, farmers and industries.
- TARAvan which delivers goods ordered.
- TARAdak which connects the rural families to the daughter married far off and to the son posted on the front.
- TARAguru which provides mentoring and consultancy to village-based mini-enterprises.
- TARAscouts/TARAreporter which collects relevant information for the portal.
- TARAvendor which runs the store that will cater to products available at Tarabazaar.
- TARAcard which enables the villager to order goods and services on credit.

Target Group and Intended Beneficiaries

The target group is communities residing in rural areas of central India. The intended beneficiaries are rural folks and students.

Institutional Arrangements

TARAhaat.com is a portal centrally managed by Development Alternatives. The project implementation agency reports about the performance to the project partners. Rural kiosks managed by entrepreneurs as franchisees are monitored and supervised by a team of project managers and field officers.

Technologies

As a website on the Internet, TARAhaat is available to any user on the web. During the pre-rollout pilot phase, it was accessed through 20-odd TARAkendras by a growing number of users in two rural regions of the country: Bhatinda (amongst the richest regions) and Bundelkhand (amongst the poorest). TARAhaat brings the Internet and its benefits directly into the lives of rural poor in the remotest villages of India. It is a unique combination of a mother portal nurturing several vertical and horizontal portals within it, together with franchised cyber kiosks and delivery vans. TARAhaat combines a mother portal, TARAhaat.com, supported by franchised networks of village cybercafés and delivery systems to provide a full range of services to its clients.

Primary Access Points

Primary access points are the rural kiosks established in the rural areas and owned by private entrepreneurs as franchisees.

Capacity Building

TARAhaat provides training and management support to its network of franchised TARAkendras to enable them to provide standardized services. It also acts as a central provider of the products and services needed, adapting them to meet the local needs of each region.

Constraints and Implementation Challenges

The project has been launched by an NGO to initiate a sustainable network with the support of project partners and private entrepreneurs. The project faced difficulties in managing most of the services envisaged, as the government departments did not support the NGO initiative as originally expected. Some of the services provided in the network did not motivate villagers to come to the kiosks as they were considered not much use. The returns from the rural kiosks were miniscule compared to the investments made by private entrepreneurs. As around a dozen project partners were engaged in funding, the project faced the problem of too many investments in superfluous activities. The project also depended heavily on e-commerce activities, which could not be realized in the project area.

Project Outcomes

TARAhaat has begun to tap opportunities to mobilize hidden or under-utilized assets and to generate new ones. The revenue streams of TARAhaat provide for profit generation at each step of the supply chain, serving to further cement all its networks together. For the family, this portal provides a window to the world, enabling them to connect locally to international information, health, matrimonial and mailing services. The farmers benefit through weather forecasting, procurement services and sales negotiations. The younger generation benefits through career counseling, entertainment, and educational and career opportunities.

Human Interest Stories

Speed of technology and business

Lalitpur is the largest commodities trading centre of Bundelkhand and attracts itinerant traders daily from as far away as 150 km. They could not believe that they could get speedy information about their business at this (or any) TARAkendra. Ashok Kumar, a commodities trader from Delhi, said, "My father earlier made a profit margin of 20 percent because he had a car. Nobody had the information at the speed that he did. Long-distance call kiosks and, recently, roaming mobile phones, have changed all that so that margins are now below 5 percent. With the farmer having market knowledge, business will get even more competitive." He is transforming his business to real estate and rural cold storage facilities.

Computers to the rescue

Veerpal Kaur and Gurubhakt Singh, who had not seen a computer till a few months ago, are learning to operate a computer at their village TARAkendra and enjoying every bit of it. They are familiar with the basics of computers –DOS, MSPaint – and can also surf the Net. The story, echoed by many youth in the villages of Bathinda and Bundelkhand, are especially significant as both are physically handicapped and could not have travelled to town to learn computing. Their self-esteem is regenerated enough for these two high-school dropouts to seek higher education and a career in IT.

While the project provides a menu of services that is similar, in many ways, to other rural ICT projects, its current business model requires a considerable influx of capital before it can become self-sufficient.

Key Lessons Learnt

TARAhaat revealed a unique prospect for creating a financially viable rural network but it has failed to deliver the goods and has been unable to attain all its objectives and goals. The project relies on a combination of the mother portal nurturing several vertical and horizontal portals within it, together with franchised kiosks and delivery vans. The software used in the project is very user-friendly and has been professionally created. But poor backup arrangements and support system has made it nearly useless. A key lesson learnt is that as in the case of dot com firms, backward integration is important in rural ICT networks too.

Sustainability

TARAhaat was conceived as a business model. Twelve different private partners invested to start rural-based services from privately owned kiosks. The returns expected from privately owned kiosks did not materialize. The emphasis remained on preparation of the software and less importance was given to the services provided by the project. In the first two years of the project, the losses incurred on kiosks forced the owners to shut them down. The project has failed in fulfilling its business model objectives.

Replication and Scaling Up

TARAhaat was launched as a pilot in late 2000 in Bundelkhand, Madhya Pradesh and Uttar Pradesh. In 2001, TARAhaat expanded its operations into Punjab. Presently, TARAhaat has 22 centres. The financial structure of TARAhaat breaks new ground by providing simultaneously for equity shareholder value and societal stakeholder wealth in a manner that maximizes both.

Recommendations

It is recommended that the kiosks should not be expanded in other regions of rural India unless the present setup is made financially viable for the project partners and private entrepreneurs. It is also recommended that functional relationships be built with government departments through which numerous e-government services can be delivered to the masses. e-Education and e-health services in TARAhaat.com should be outsourced to other agencies working in this field. The cost of creating rural kiosks can further be curtailed so that their financial feasibility improves. More concrete steps are required to promote ICT-related services in rural areas. TARAhaat.com can also try to include more computer education in rural areas through its kiosks. It is recommended that more community practitioners than technologist be employed in the project.

Contact Information

Rakesh Khanna
TARAhaat Information and
Marketing Services Ltd
B-32, Tara Crescent
Qutab Institutional Area
New Delhi - 110 016
E-mail: tarahaat@sdalt.ernet.in

Website

http://www.tarahaat.com

Vidyal Information Service Provider (VISP)

Thiruchirapalli, Tamil Nadu

Background

Activists for Social Alternatives (ASA) is a registered public trust working for more than 17 years as Grameen microfinance replicaters in South India. Its focus is on the empowerment of the rural poor and socially disadvantaged through microcredit and education programmes. It has been functioning in this field since 1993 in five districts of Tamil Nadu. It has 2,000 *sanghas* (women credit and thrift groups) and 60,000 women members. The organization provides loans ranging from Rs 2,000 to 6,000 at 12 percent interest rate for income generating activities and also for consumption activities. It has loaned Rs 480 million to around 39,000 members. The repayment rate of loans has been 98.4 percent. ASA decided to use the women sanghas to help bridge the digital divide. In May 2003, Vidyal Information Service Provider (VISP) was launched in six villages in phase I.

Goals and Objectives

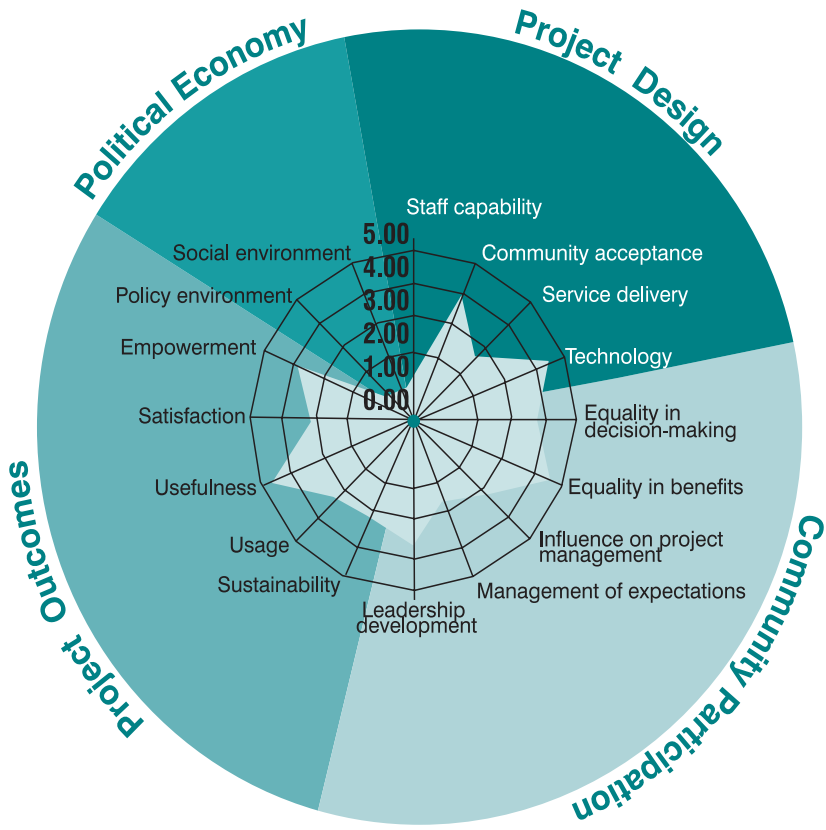
- To empower the weaker sections of the rural community through the use of ICT.
- To ensure equal digital opportunities to the have-nots in the villages.
- To build a vibrant rural economy by becoming a rural ITES provider.
- To build a sustainable, replicable and scalable business model.
- To create rural techno entrepreneurs by leveraging the existing microfinance network of ASA.

Planning

The credit and thrift activities of ASA were adapted from the Gameen Bank of Bangladesh. The Grameen Technology Centre (GTC) provided financial and technological support to ASA for the implementation of VISP. The Drishtee Foundation was engaged to provide technical inputs and software/networking to the project. This foundation is a major IT-enabled service provider of platforms to deliver information and services to rural India and has the experience of managing 200 kiosks across five states. It was envisaged to start the VISP project in six villages (Somerasampettai, Kallukudi, Ramachandra Nagar, Thuvarankuruchi, Vaiyampatti and Manapparai) in phase I after carrying out a needs assessment of the villages. The location of the kiosks, or Community Technology Centres (CTCs), was chosen by the villagers and the entrepreneur was selected by the sangha members. The cost of the kiosk has been kept at the lowest at Rs 48,000. Each kiosk has one Celeron computer, a printer, a scanner, a copier, and a UPS, along with furniture, a telephone line and an ISP connection. Fifty percent of the project cost has been sanctioned as a long-term loan by ASA (12 percent interest; nine-months' grace and five-year long repayment schedule).

Services Provided

The services provided at VISP centres include the provision of prices of agricultural commodities, information on horoscopes and rural market places, matrimonial services, educational services, healthcare services, grievance redressals, provision of government forms, etc. Users are also provided discount



How effective is VISP in providing access to a range of government and non-government services and information

coupons to three private hospitals of Thiruchirapalli. They can get a 10-20 percent discount when submitting them to the hospitals. Other services include web browsing, DTP, data entry job work, net-to-phone and basic computer education. At the time of the field visit, most of the services were not made operational.

Target Group and Intended Beneficiaries

The target population is the residents of villages (and nearby villages). The emphasis has been on empowerment of the women members of sanghas.

Institutional Arrangements

There is a programme coordinator from ASA, a consultant from GTC and a technical resource person from Drishtee. Besides, a technical assistant, a marketing manager, and a service coordinator are provided by the implementation agency, ASA.

Technologies

The client end uses Windows 98/XP as the Operating System and Internet Explorer. The software is in Tamil. The server is maintained in the field office of Drishtee at Thiruchirapalli. The server is run on Windows 2000. The web server is IIS, database server is SQL 2000 and is on the ASP 2.0 platform. All the online

services are planned to be provided through the website, to be maintained by Drishtee.

Primary Access Points

The primary access points are the six VISP centres in six villages.

Capacity Building

The VISP centre entrepreneurs have been given two weeks of training on the use of software, financial management and entrepreneurship development at Thiruchirapalli.

Constraints and Implementation Challenges

Currently, the VISP centres are only providing limited offline activities. The connectivity of the kiosks created so far has not stabilized and that hinders the proper functioning of the network. The locations identified for kiosks are also not the most prominent ones in the project area. Most kiosk owners have other means of livelihood. Because of this, they do not pay the expected attention to kiosk operations. The project has made an attempt to use Drishtee software, which has been used across many Indian states. The software does not meet the requirements of the villagers. To a certain extent, the software does not match the objectives and goals of the project organization as well.

Project Outcomes

The cost to set up a kiosk is minimized in this project. This makes the management of the kiosk more profitable compared to the investment. The project has generated enthusiasm among villagers in using IT to alleviate poverty. The use of standardized software without creating local content has become a crucial challenge in managing the project. Poor connectivity through dial-up modems slows down the growth of the project. Most services, especially those related to e-governance, are not provided optimally by the district administration. This has created a major hindrance in its usage by the villagers.

Key Lessons Learnt

One of the key lessons learnt is that it is possible to reduce the initial investment cost of the kiosk. This, in turn, increases the financial feasibility of the kiosk. ASA has ensured that the capital investment on the kiosk was kept as low as Rs 48,000 (Celeron computer for Rs 23,000, scanner and printer for Rs 8,000, UPS for Rs 2,500, furniture for Rs 3,500, telephone line and ISP connection for Rs 3,000 and working capital of Rs 8,000). ASA has been working with women over the last decade and has been trying to piggyback the ICT network on the positive synergistic energies built in sanghas (as done by Grameen Trust in Bangladesh to implement Grameen Phone). Another important lesson learnt from the project is that the CTCs should be established initially in only those villages where there is demand. The project has also largely avoided 're-inventing the wheel' by involving Drishtee Foundation in the development of software and establishment of network.

Sustainability

The project had been operational for only a short period by the time of the study. The restriction on the initial capital cost of the VISP centre increases the chances of future viability.

Replication and Scaling Up

The project has not been replicated anywhere else. Until the project outcomes are substantial and its financial viability is proven, there is little chance of it being replicated. Even then, it could be replicable (with some modifications) in places where microcredit operations have been established. ASA is keen to scale up the project

to 30 villages in six months following the successful outcome of phase I, and to continue opening increasing numbers after that. The project also plans to scale up services by including electricity billing, telephone billing, and railway reservations, stamp vending licenses, bus reservations, and video-conferencing.

Recommendations

Training provided from VISP centres should be standardized. Internet connectivity is poor, and that has reduced the demand for Internet browsing. There is an urgent need to establish reliable online connectivity, as all online services are to be provided from an Internet website. The Drishtee Foundation has been working in five Indian states in the field of community networking. It has developed user-friendly software for Indian villages and is using the same software (with Tamil fonts) without any customization. It is important that the software used in the project should cater to the local needs. The rural bazaar and matrimonial services have no local database. Mechanisms to build and update such databases should be explored. The local village council (gram panchayat) has not been involved in planning, implementation or monitoring of VISP centres in the village. Similarly, the project seems to be functioning without much support or involvement of various government departments. The e-government services promised by the VISP centres are still far away from implementation. e-Governance would be possible through VISP centres only after the involvement of various state government departments and all the three tiers of panchayat institutions. The project should try to impart e-education and e-health services through these centres, as these services could be engaged much more easily. Even offline activities, like horoscopes, a telephone directory, government information, government forms, etc., have not been provided. There is little use providing static information online.

Websites

http://www.vispindia.com
http://www.asadev.com
http://www.gfusa.org
http://www.drishtee.com

Warana Wired Village
Kolhapur, Maharashtra

Background

The Warana Wired Village Project was launched by the IT Task Force of the Prime Minister's Office to demonstrate the use of ICT to accelerate socio-economic development of a cluster of 70 villages around Warana in the Kolhapur and Sangli districts of Maharashtra. The Warana complex was selected, as an example of successful integrated rural development through the formation of cooperatives. This complex includes 25 cooperative societies, with an annual turnover of Rs 6 billion involved in the production of sugar and dairy products, poultry, and building construction.

The Warana Project is jointly executed by the National Informatics Centre and the Planning Commission, Government of India; the Directorate of Information Technology and State Government of Maharashtra; and the Warana Sahakari Dugdh Utpadan Prakriya Limited (WSDUPL), Warana Nagar. The total cost of the project is Rs 25 million which was borne jointly by the three agencies in a ratio of 50:40:10.

Goals and Objectives

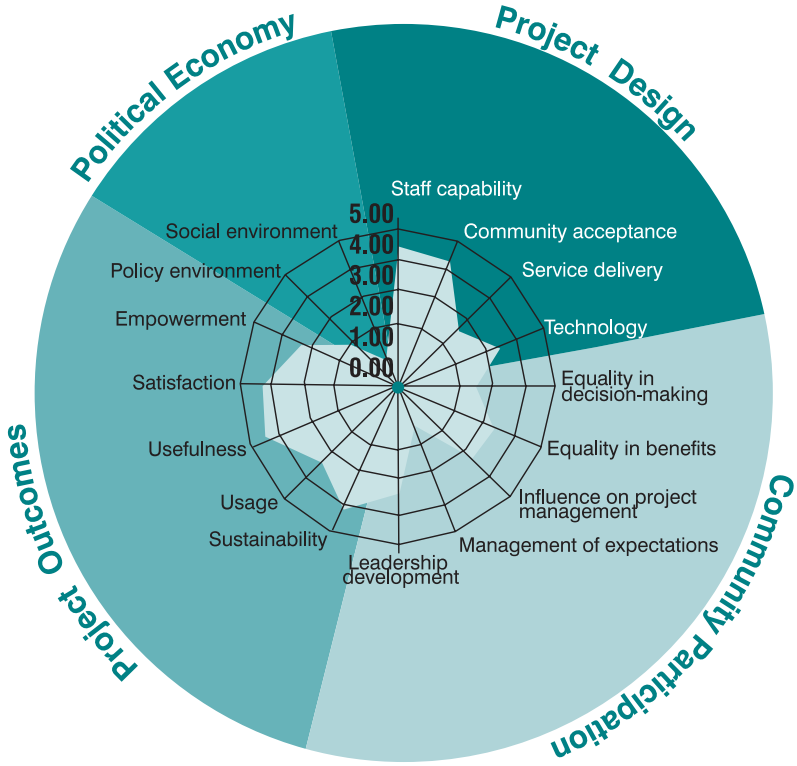
- To provide computerized facilitation booths in 70 villages, which are linked up to the central computer network at Warana Nagar.
- To bring Warana Nagar on NICNET.
- To increase the efficiency/ productivity of the existing cooperative societies by providing state-of-the-art computer communication network and latest database technology.
- To create a database of villagers on various socio-economic aspects.
- To provide tele-education to both primary and higher educational institutes by developing IT centres at most populous points.
- To establish GIS of 70 villages.
- To create greater transparency in the functioning of the cooperative society.

Planning

The Warana Wired Village Project was launched as a first wired village pilot with the joint effort of Government of India, Government of Maharashtra and a sugar cooperative. It was expected to wire 70 villages of Kolhapur and Sangli district of Maharashtra so as to establish a rural network connecting these villages with a computer network. Primarily, the project planned to provide IT facilities to sugarcane growers and members of the sugar cooperative societies. During the implementation of the project, various other services, like land records, prices of agricultural commodities in different markets and knowledge about various agricultural practices were provided. Some of the centres were linked with a VSAT and others were provided connectivity with dial-up modems.

Services Provided

The system includes web-based and intranet-based applications. The web-based applications are the agriculture produce market information system, agricultural schemes and crop technology information system, computer learning aids, village information systems, educational and vocational guidance systems, government documents and procedures systems, and computerization of the local cooperative market. Intranet-based systems



How effective is the Warana Wired Village Project in supporting 25 cooperative societies and accelerating socio-economic development

include the wired management of sugarcane cultivation, land records, the computerization of the Warana Milk Dairy, and a Grievance Registration and Redressal System.

Target Group and Intended Beneficiaries

The target beneficiaries are farmers, sugarcane growers and other villagers. It is intended to serve the information needs of farmers for cultivation practices, pests and disease control, marketing information and information on processing, bill payment position of sugarcane and dairy products.

Institutional Arrangements

The kiosk managers are usually government servants who are officially allocated the management of kiosks in rural areas. The content has been created in the local Marathi language by the NIC office in Pune, Maharashtra, through extensive interactions with the cooperative societies. The content is regularly maintained and enhanced at the location of the central system within the local university.

Technologies

NIC Pune is responsible for the design, development, and implementation of the Warana Wired Village Project. Both the University and business centres of Warana along with the six most populous villages (IT centres) around Warana have been chosen to house the VSATs. The IT centres are equipped with dial-up capability and UPS back-ups. Facilitation booths have been set up in 70

villages. These centres have one multimedia computer equipped with a high speed modem (33.6 Kbps), for the dial-up link. The protocol used is SLIP/PPP. The operating system on the computer is Windows 95, and an HTML browser installed for accessing the web server. Communication is sustained between the IT centres, business centres, and village booths using dial-up connections over the LAN. The Institute of Engineering Technology houses the central hub.

The central hub facilitates all web, database, intranet, Internet, and e-mail applications. The central hub's servers store updated market information along with information pertaining to the many databases, which include dairy, educational, geographical and agricultural information. Information such as land records has been put onto CD-ROMs. The intranet-based e-learning program is menu driven with a variety of software applications. Application content is administered from the central hub. The system is maintained in association with NIC, Pune.

Primary Access Points

Primary access points for the services provided in Warana Wired Village project are the rural kiosks established in 70 villages. The information or services are available through a government servant managed kiosk. The connectivity available at these access points are either through VSAT or through dial-up modem.

Capacity Building

The project staff at the server end has been given extensive training in database management, networking and hardware maintenance. The kiosk managers in rural areas were given training for three days to use software effectively and to operate hardware equipment efficiently.

Constraints and Implementation Challenges

Warana Wired Village Project, as a pioneering community network project, has faced numerous constraints and implementation challenges. The standardization of databases at the sugar cooperative was an initial challenge which was effectively handled. The problem of connectivity in rural areas was taken care of through VSAT along with dial-up modem connectivity. Software prepared by NIC was upgraded many times to facilitate smooth functioning of services on the network. The kiosks have been managed by government servants which has created a situation where the services are available at the kiosks only on working days between 10 am and 5 pm. The initial inertia of kiosk managers in managing the kiosks in remote rural villages has caused a deterioration in the quality of services provided at the kiosk. Power shortage in rural areas of Maharashtra has also been a key issue.

Project Outcomes

The applications related to agriculture produce, schemes and crop technology as well as for education are not being used fully. One reason is the slow access to the Internet, insufficient awareness creation among the villagers, and the low levels of literacy in the area in spite of high levels of income. Although a number of different products and services were promised, this enormous infrastructural investment currently serves only as a distributed accounts system for the Warana sugarcane cooperative. The multiple utility card could not be made operational. There have been problems in the implementation of computerization of land records. The GIS has become obsolete, to a large extent, due to lack of updation of the database. Windows-based applications like crop guide, schemes of agriculture department, employment schemes, collectorate procedure, and vocational guidance are non-interactive and have not been updated. The market rates

of the agriculture produce have been dysfunctional and lie unused due to poor information management. The network has been reduced to computerization of the sugar cooperative, mostly due to non-participation of the local villagers. Not even a fraction of the project cost could be recovered in the three years up to the time of the study. The project remained dominated by NIC officials and technocrats, causing severe problems in community participation and management of services. The pilot project, due to its very high cost, has not been replicated anywhere in India. But, it has provided innumerable insights to the knowledge initiatives in the field of local governance started in India after 1998.

Key Lessons Learnt

There are three key lessons:

1. Any application should be developed only after an accurate assessment of the needs of the people as the project is intended to create direct impact on their livelihoods.

2. Once the information needs of the community are assessed, content and software applications should be developed with the continuous involvement and feedback from the community. The lack of local participation in content creation, as well as in software development, might not bring the intended results. This partly explains why much of the information, including that on sugarcane growing and agricultural prices, is unutilized and has not been updated regularly. A top-down approach will most probably lead to a waste of resources in the initial period of the project, without ensuring its future sustainability.

3. Specific efforts should be made to improve women and poor people's access to information. It has been observed that women generally visit information kiosks to obtain sugar factory services while only men are using the Internet services where available. With no means to get women involved and, in particular, to ensure that women are trained to become information kiosks operators, there is a possibility that they will be further marginalized.

Similar considerations apply in case of poor people. In Warana, the information kiosks are mostly accessed by members of the cooperative societies and farmers who own their land. The poorest, landless labourers and tribal groups currently do not have a reason to visit the information kiosks because they do not need the services connected with sugarcane growing and harvesting. However, information on government schemes offering employment, or on educational opportunities for children, would be of significant importance to the poorest. Once such information is made available, efforts should then be made to improve access by the

Human Interest Story

Making life easy

Ramakant Kale, a sugarcane farmer, owns one hectare of land in Pargaon village of Kolhapur district. There were long delays in sugarcane deposits and complaints about the content of the sugar in the cane when the weight and content of the cane were monitored by the Sugar Cooperative Society. Ramakant goes to the kiosk now to discover the weight of the sugarcane he deposited. He can also cross-check the amount of money he is supposed to receive from the Society. Warana Wired Village project has thus made his life much easier.

poorest to the kiosks. Finding people with the right mix of skills and motivations is a necessary condition for any project to succeed in bringing ICT to rural communities.

Sustainability

The Warana Wired Village project has been implemented with high capital investment. Extra emphasis on hardware and technology has resulted in high capital costs. The project has been funded by Government of India, the state the Government of Maharashtra and the Cooperative Society. The very high capital investment has resulted in the project becoming a research project. It has become less replicable mainly because of this. The returns from the initial investments are low. The kiosks are manned by government servants whose salaries are paid by the state. The project is not sustainable and depends on more funding from government for its existence.

Replication and Scaling Up

Warana Wired Village project has been widely replicated, in different forms and in different ways in different parts of India. It has been of the model of all initiatives in India, which have used ICT for poverty alleviation and governance to rural kiosks as access points.

Recommendations

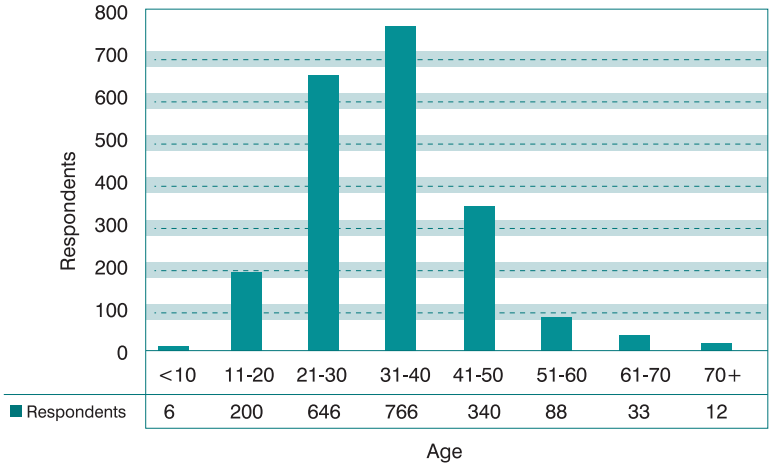
It is recommended that the sugar cooperative databases be more integrated and made more interactive so that cane growers can obtain all the services related to sugarcane growing and selling to the sugar cooperative. It is also recommended that land record databases be improved as they are not readily available from the kiosks and the available data are often not updated. Government servants and paid volunteers should be discontinued. Volunteers from the villages should be engaged in the management of the kiosk on a profit-sharing basis. It is also recommended that the focus of the project should shift from hi-tech technologies and technical equipment to community and social participation.

Annex 1: Demographics

Age

The model age band of respondents was 31-40 and the distribution of their ages is shown in Figure 8. Slightly more than 67 percent of respondents were between the ages of 21 and 40.

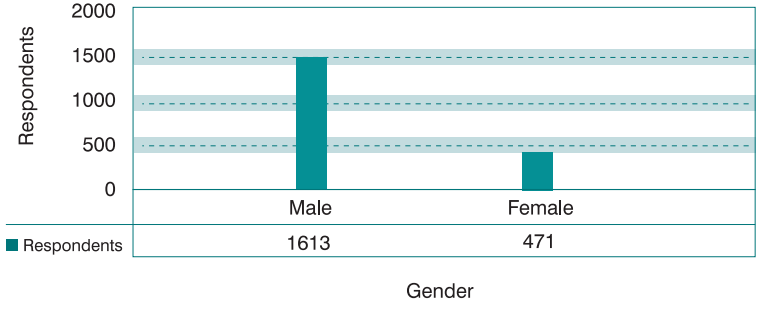
FIGURE 8. RESPONDENTS' AGE



Gender

Figure 9 displays the gender distribution of the study; with 77.3 percent of respondents being male and 22.6 percent female.

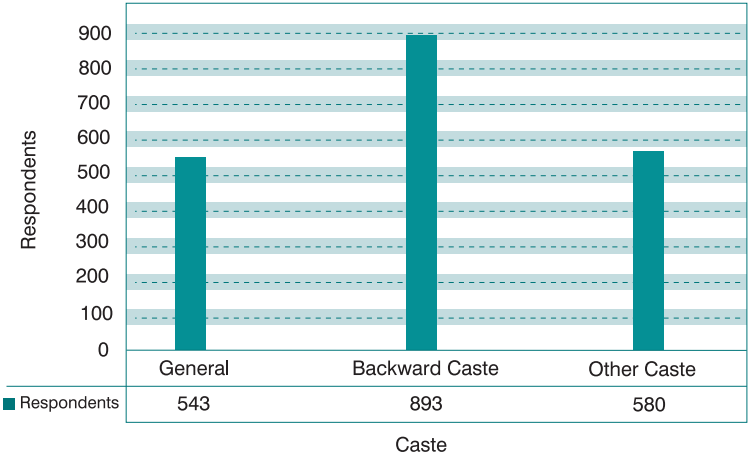
FIGURE 9. RESPONDENTS' GENDER



Caste

Figure 10 shows the respondents' caste distribution, with 26.9 percent general caste (which is the "higher" caste, 44.3 percent backward caste ("the lowest") and 28.8 percent other caste (in the middle).

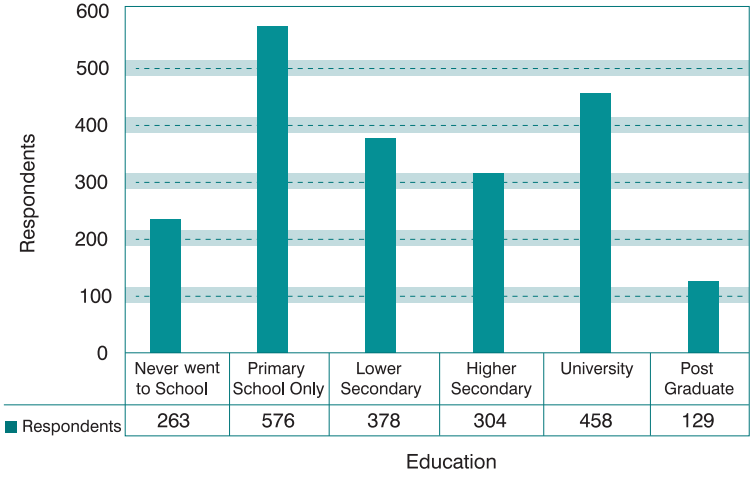
FIGURE 10. RESPONDENTS' CASTE



Education

Figure 11 shows the educational profile.

FIGURE 11. RESPONDENTS' EDUCATION PROFILE

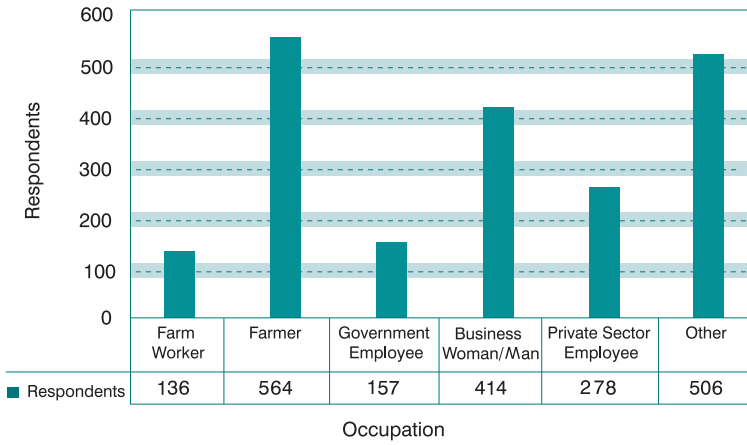


Occupation

The occupation profile of the respondents is shown in Table 4 and Figure 12.

Table 4. *Respondents' occupation profile*		
Farm Worker	136	6.6%
Farmer	564	27.4%
Government Employee	157	7.6%
Business Woman/Man	414	20.1%
Private Sector Employee	278	13.5%
Other	506	24.6%
Total	2055	

FIGURE 12. RESPONDENTS' OCCUPATION



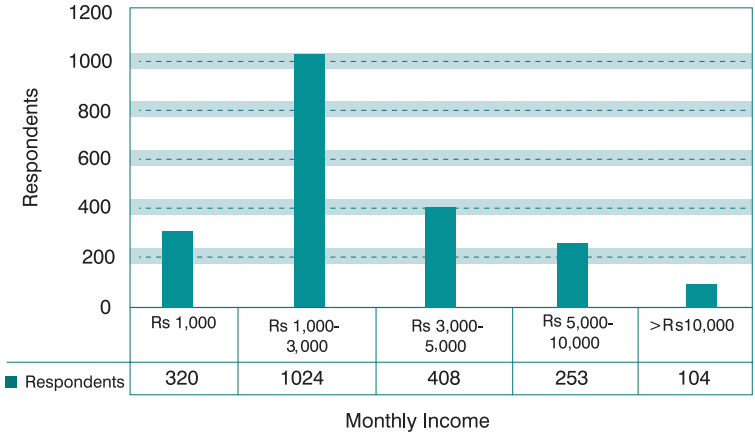
Income

The income profile is shown in Table 5 and Figure 13.

Table 5. *Respondents' income profile*			
Monthly	Number		US$ per day[v]
up to Rs 1,000	320	15.2%	0.7-2.2
Rs 1,000-3,000	1024	48.6%	2.2-3.7
Rs 3,000-5,000	408	19.3%	3.7-7.4
Rs 5,000-10,000	253	12.0%	7.4
>Rs 10,000	104	4.9%	>7.4
Total	2109		

[v] At the exchange rate of Rs 45 to the US$. Governments and aid agencies generally designate a daily income of US$ 1 as a crude but convenient indicator of income poverty in the least developed economies and US$ 2 per day for middle-income economies.

FIGURE 13. RESPONDENTS' INCOME PROFILE



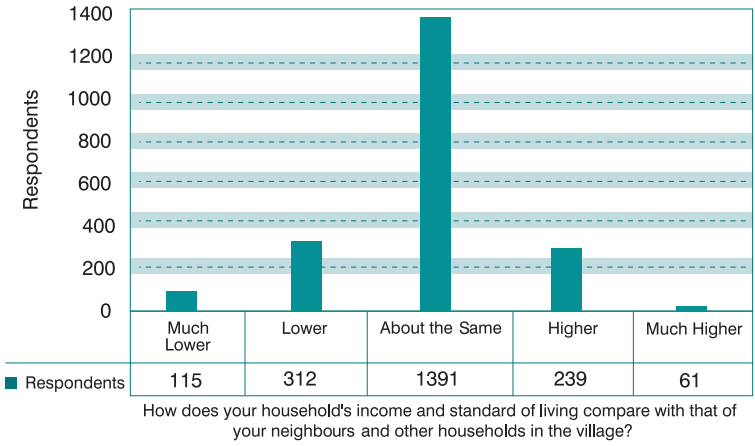
Relative Standard of Living

Respondents were asked if they felt they were worse off or better off than their neighbours, or about the same. The results are shown Table 6 and Figure 14.

Table 6. *Respondents' relative standard of living*

Much Lower	115	5.4%
Lower	312	14.7%
About the same	1391	65.7%
Higher	239	11.3%
Much Higher	61	2.9%
Total	2118	

FIGURE 14. RESPONDENTS' RELATIVE STANDARD OF LIVING



Details of Replies to the Questionnaire for all Projects

Table 7. *Average values for remaining responses*

	Question	Average	Scale[a]
9	How far do you live from the centre?	3.70	km
10	Do you consider yourself to be aware of the technology used in the centre?	3.30	On a scale of 1-5
11	Do you consider yourself to be fully aware of the services of the centre?	2.04	On a scale of 1-5
12	Do you feel you are able to participate in meetings or discussions relating to the centre?	2.00	On a scale of 1-5
13	Do you feel you might be invited to undertake any role of responsibility in the operation of the centre?	2.02	On a scale of 1-5
14	Do you feel that women are well represented in discussions about the centre?	3.00	On a scale of 1-5
15	Do you feel you are able to influence the management of the centre in its operations?	2.42	On a scale of 1-5
16	Is the centre useful to you and your household?	4.24	On a scale of 1-5
17	How has the centre helped your household?	*	*
18	How likely are you to use the centre in the future?	4.38	On a scale of 1-5
19	How frequently has someone from your household used the services of the centre?	2.80	On a scale of 1-5
20	Do you think that such a project was required by the community in the first place?	4.08	On a scale of 1-5
21	Who told you about the existence of the project?	*	*
22	Is the operator manning the centre necessary?	2.98	On a scale of 1-5
23	Do you feel hesitation to interact with the operator?	1.43	On a scale of 1-5
24	Are you satisfied with the services of the operator?	3.63	On a scale of 1-5
25	How much do you value the services of the centre?	4.38	On a scale of 1-5
26	Have you been able to increase your income or well being as a result of using the services of the centre?	3.10	On a scale of 1-5
27	Has the centre helped you voice your opinion to others?	2.28	On a scale of 1-5
28	Has the centre helped you make useful contacts?	2.13	On a scale of 1-5
29	Has the centre helped you to build helpful relationships with others?	2.12	On a scale of 1-5
30	Overall, are you satisfied with the centre services?	3.89	On a scale of 1-5
31	Do you think that more services should be made available at the centre?	4.29	On a scale of 1-5
32	Do you think that services provided at the centre are worth the charges?	4.17	On a scale of 1-5
33	Do you recommend such a centre in areas where they presently do not exist?	4.59	On a scale of 1-5

** Questions 17 and 21 required discrete answers, not scaleable, and the responses are summarized as follows:*

[a] '1' indicates low or strongly disagree, '5' indicates high or strongly agree.

Table 8. *How telecentres have improved the households*

	Akshaya	Anand	Bhoomi	CARD	CIC	e-Choupal	e-Seva	FRIENDS	Gramdoot	Gyandoot	Agriland	Janmitra	Mahiti-shakti	N-Logue	SEWA	TARAhaat	VISP	Warana
Has not helped																		
Got better price information						100		7	103			80					3	
Improved farming practices	9					98						1					7	113
Made useful business contacts	3	100						6				7			100		10	1
Helped treat an illness												12					78	
Helped child (or myself) learn something new												60					6	
Helped find work outside village	92							6				46					4	
Enabled communication with others outside village	3							6				6					1	
Helped solve a problem	11							3				70					7	1
Assisted with family problems								2				10		1			2	
Helped with school work								7				29		2			21	
Helped obtain important supplies								5				4	5					
Helped get taxes and bills paid			104	30			147	117		7	99	4	57	1				
Helped avail a government work done	3							30	103	98		77	20	101		26		2
Others	2			118	101			8		1	1			12		75		

Graphically, the data in response to question 17 regarding how the centres have helped their users, can be depicted as follows:

FIGURE 15. HOW TELECENTRES HAVE IMPROVED THE HOUSEHOLDS

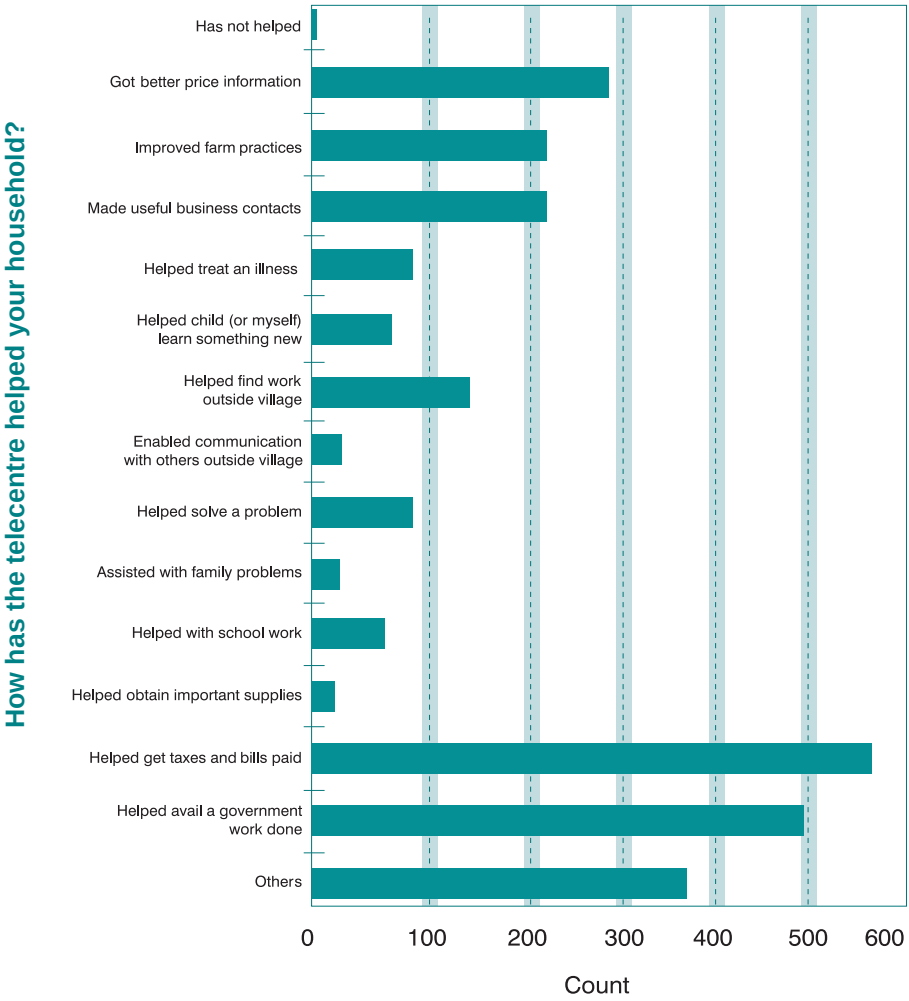
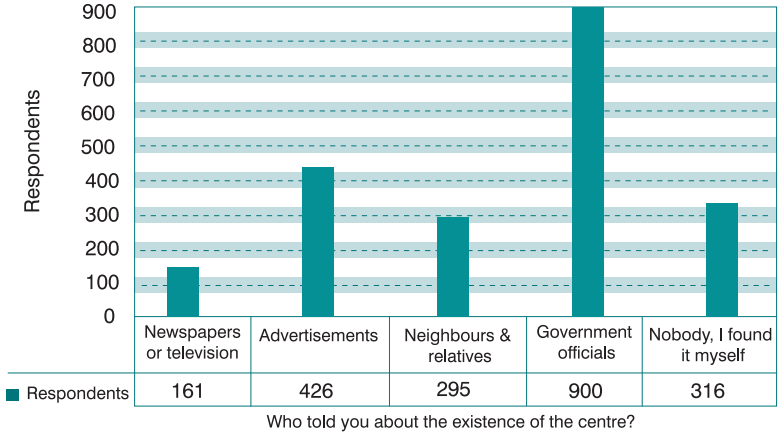


Table 9. *Medium of telecentres awareness*		
Newspapers or television	161	7.7%
Advertisements	426	20.3%
Neighbours & relatives	295	14.1%
Government officials	900	42.9%
Nobody, I found it myself	316	15.1%
Grand Total	2098	

FIGURE 16. MEDIUM OF TELECENTRES AWARENESS



Annex 2: Advanced Findings from the Data Analysis

Introduction

Further examination of the data reveals some inter-relationships, and by triangulating the outcome with some of the qualitative evidence from observation and interviews, the following results can be obtained.[vi]

Descriptive Statistics

Table 10 provides the mean and standard deviation for each of the indicators in the study. The measurement scales were from 1 to 5.

Table 10. *Descriptive statistics*

	N	Mean	Std. Deviation
Usage	2156	3.0179	.84701
Technology awareness	2156	3.2653	1.19400
Management of expectations	2156	2.0190	1.20444
Equality in decision-making	2156	1.9750	1.24171
Leadership development	2156	1.9708	1.05645
Equality in benefits	2156	2.8590	1.22978
Influence on project management	2156	2.3789	1.14097
Usefulness	2156	4.2034	.87172
Sustainability	2156	3.6509	.81318
Community acceptance	2156	4.2163	.75798
Service delivery	2156	3.6320	.88522
Staff capability	2156	3.5102	1.58162
Empowerment	2156	2.1348	1.00909
Satisfaction	2156	3.8103	1.14665
Valid N listwise	2156		

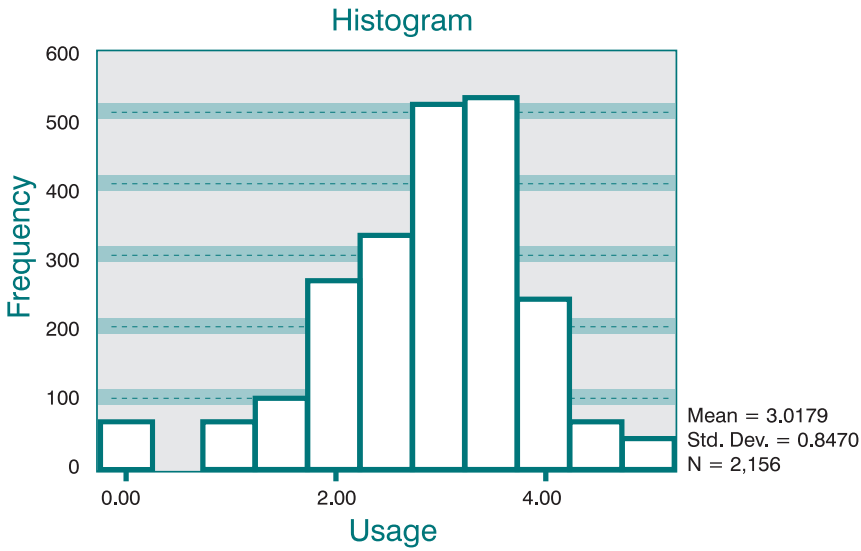
[vi] Data analyses were conducted using SPSS.

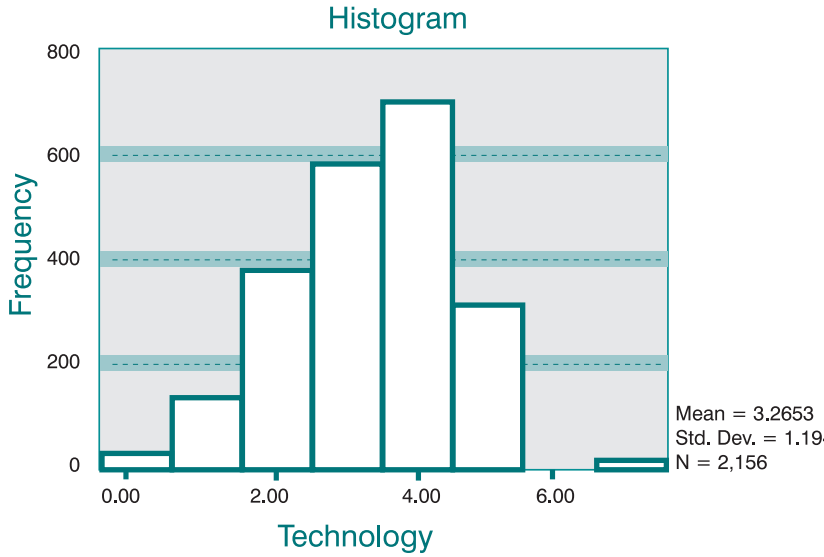
As an aid to understanding the meaning of these values, the following histograms enable us to visually examine their distribution; important for statistical tests that assume normal distributions. The histograms depict the number of responses that occurred within the defined ranges of values shown, indicating any clustering of values and any extreme values. We can see immediately that the values for the indicators – management of expectations, equality in decision-making, and leadership development – all components of the Community Participation construct, are skewed to the low end of their respective scales, confirming what is indicated by their mean values. Usefulness, sustainability, community acceptance and satisfaction are skewed to the high end. On the other hand, staff capability depicts an uneven, twin-peaked, distribution of values, which on closer examination, is explained by a bi-polar pattern consisting of rather high scores for 15 of the projects and rather low scores for the other 4. These are shown in Table 11.

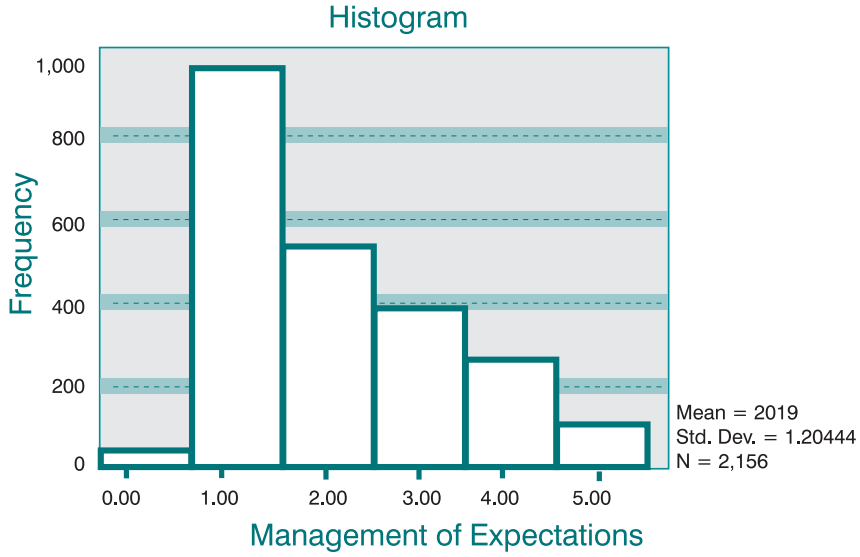
Table 11. *Staff capability*

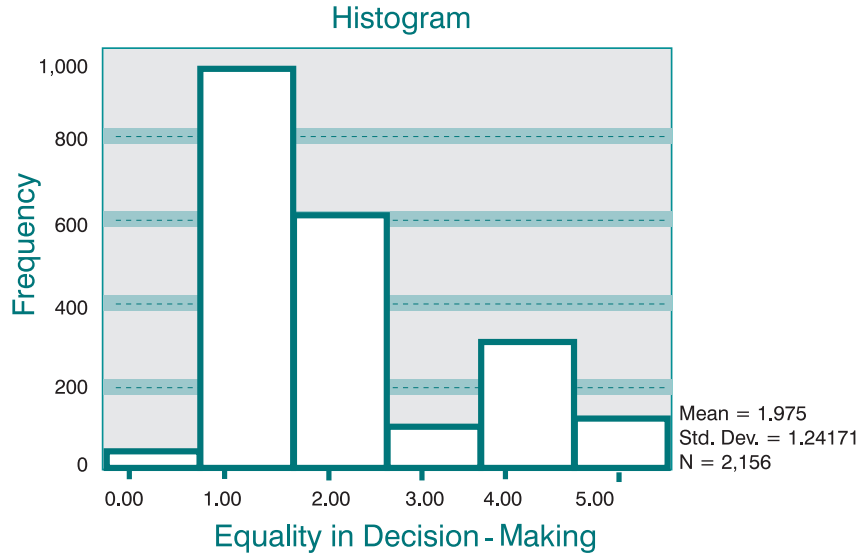
Project	Mean
1. Akshaya	3.25
2. Anand	4.38
3. Bhoomi	4.81
4. CARD	3.86
5. CIC	4.68
6. e-Choupal	4.58
7. e-Seva	3.97
8. FRIENDS	3.95
9. Gramdoot	1.00
10. Gyandoot	4.28
11. India Agriland	4.10
12. Janmitra	4.06
13. Mahitishakti	3.66
14. N-Logue	0.93
15. SEWA	4.38
16. TARAhaat	4.68
17. VISP	0.99
18. Warana	4.16

Histograms of Scores for each Indicator






Histogram
1,000
800
600
400
200
0
Frequency
0.00
1.00
2.00
3.00
4.00
5.00
Management of Expectations
Mean = 2019
Std. Dev. = 1.20444
N = 2,156


Histogram
1,000
800
600
400
200
0
Frequency
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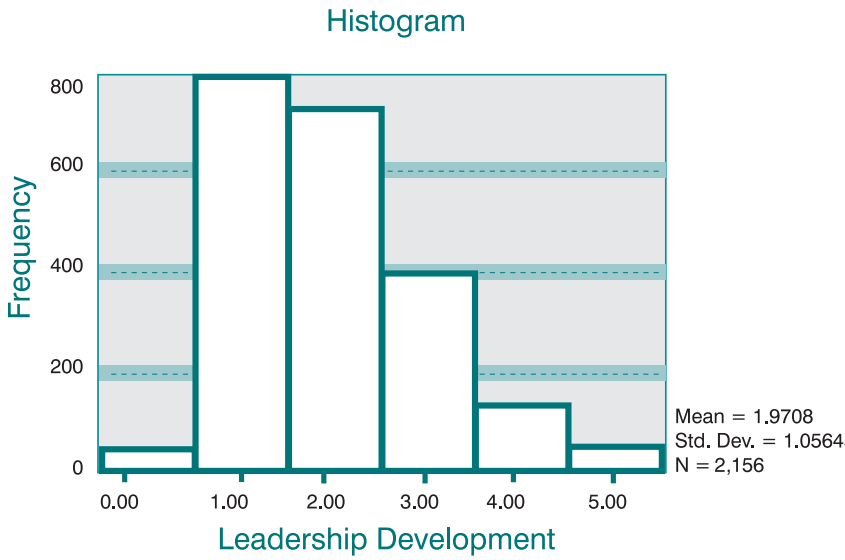
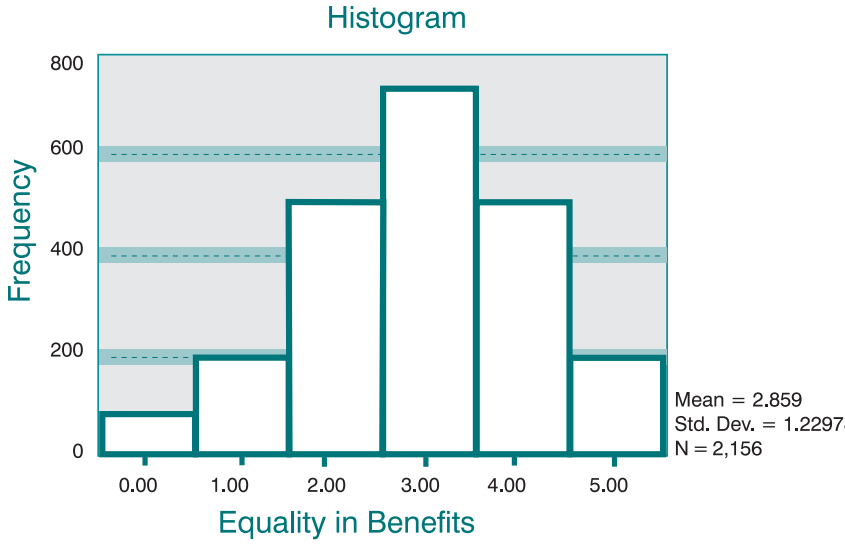
1.00
2.00
3.00
4.00
5.00
Equality in Decision - Making
Mean = 1.975
Std. Dev. = 1.24171
N = 2,156


Histogram
Frequency
800
600
400
200
0
0.00
1.00
2.00
3.00
4.00
5.00
Leadership Development
Mean = 1.9708
Std. Dev. = 1.05645
N = 2,156


Histogram
Frequency
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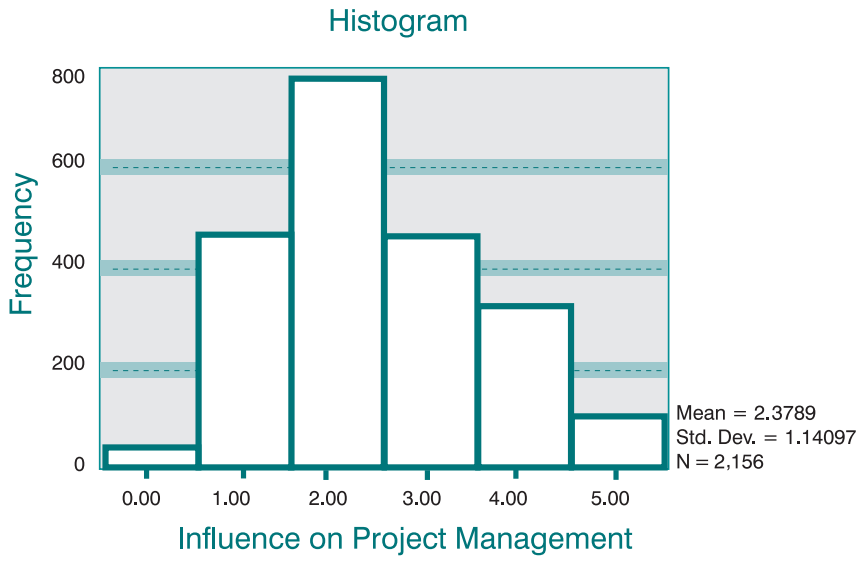
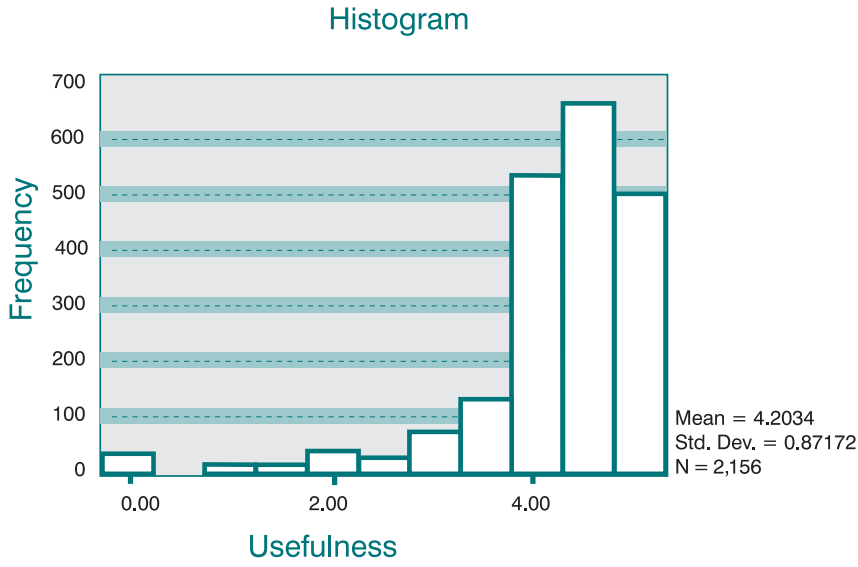
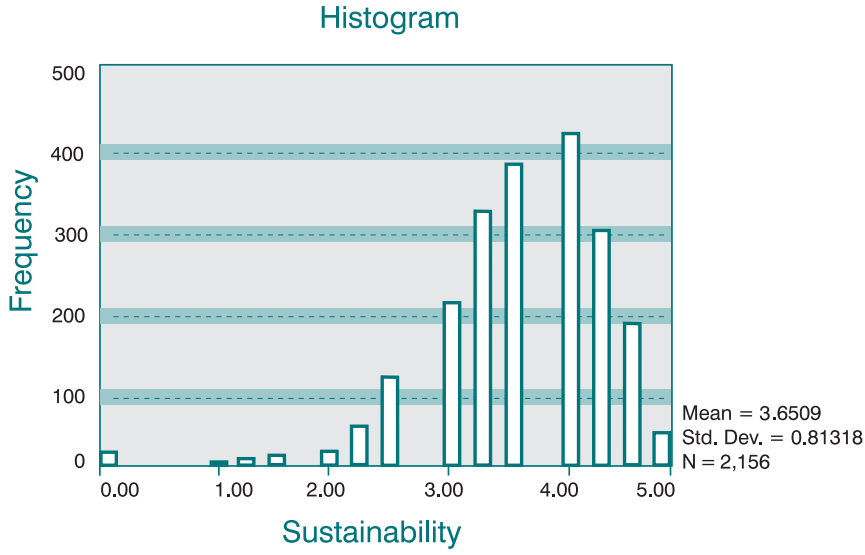
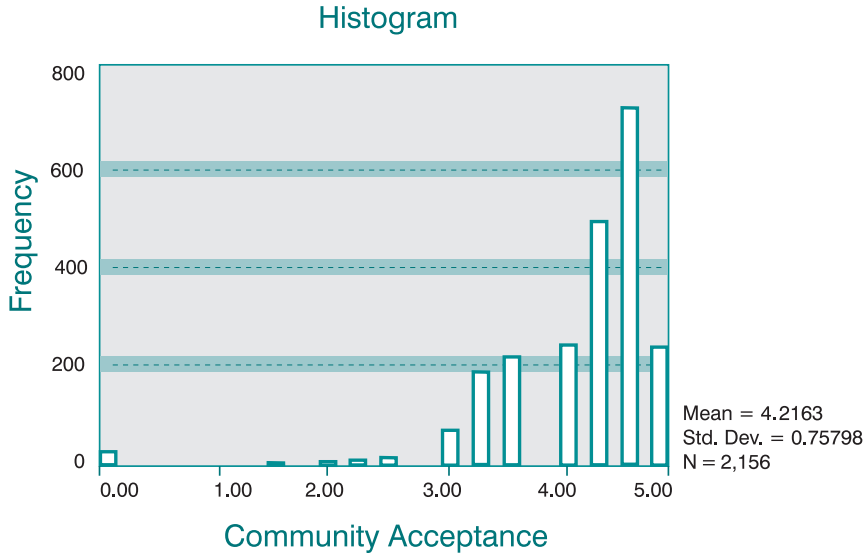
600
400
200
0
0.00
1.00
2.00
3.00
4.00
5.00
Equality in Benefits
Mean = 2.859
Std. Dev. = 1.22978
N = 2,156


Histogram
800
600
400
200
0
Frequency
0.00
1.00
2.00
3.00
4.00
5.00
Influence on Project Management
Mean = 2.3789
Std. Dev. = 1.14097
N = 2,156


Histogram
700
600
500
400
300
200
100
0
Frequency
0.00
2.00
4.00
Usefulness
Mean = 4.2034
Std. Dev. = 0.87172
N = 2,156


Histogram
Frequency
500
400
300
200
100
0
0.00
1.00
2.00
3.00
4.00
5.00
Sustainability
Mean = 3.6509
Std. Dev. = 0.81318
N = 2,156


Histogram
Frequency
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400
200
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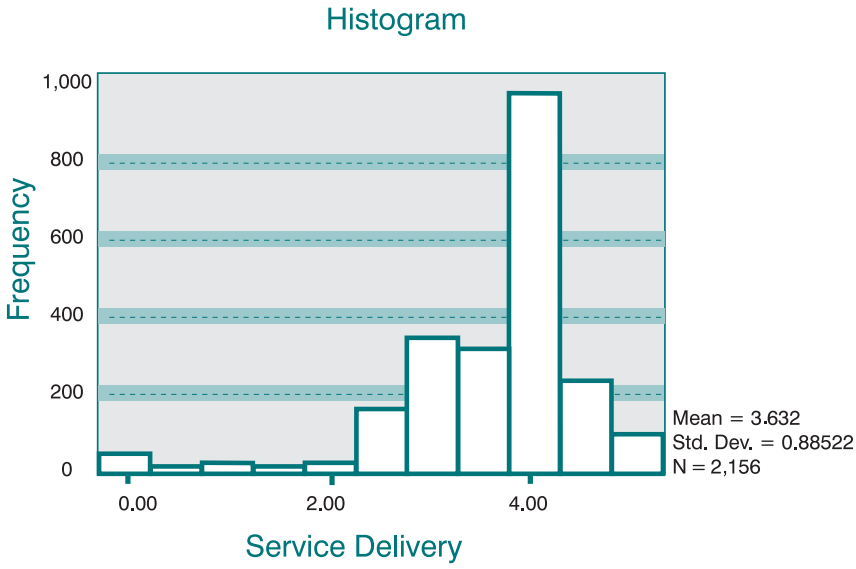
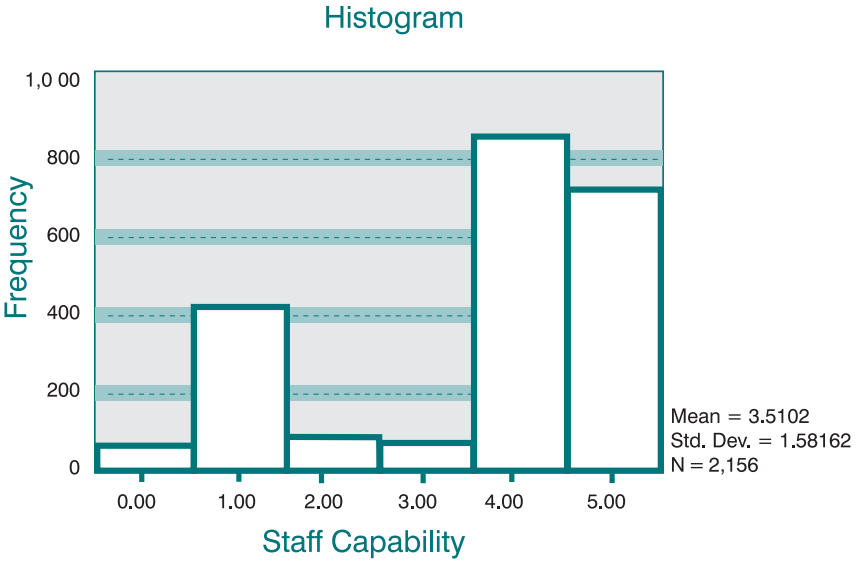
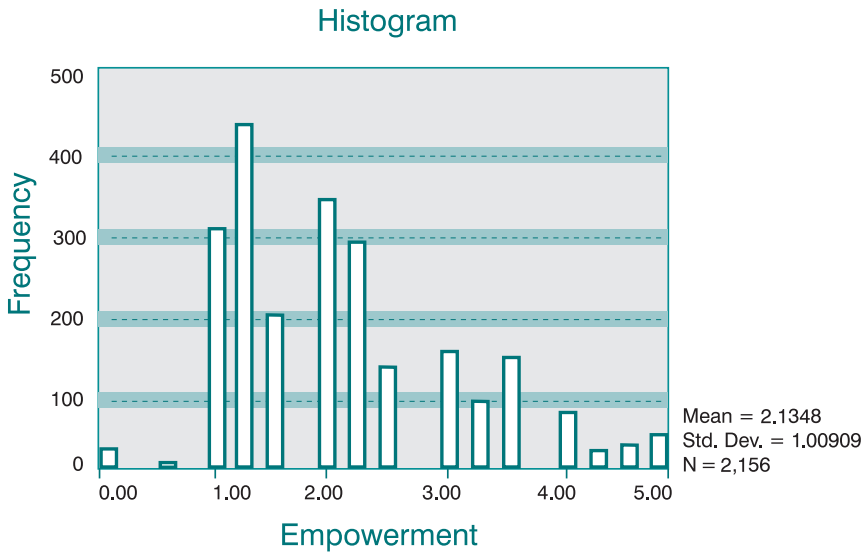
2.00
3.00
4.00
5.00
Community Acceptance
Mean = 4.2163
Std. Dev. = 0.75798
N = 2,156


Histogram
1,000
800
600
400
200
0
Frequency
0.00
2.00
4.00
Service Delivery
Mean = 3.632
Std. Dev. = 0.88522
N = 2,156


Histogram
1,0 00
800
600
400
200
0
Frequency
0.00
1.00
2.00
3.00
4.00
5.00
Staff Capability
Mean = 3.5102
Std. Dev. = 1.58162
N = 2,156


Histogram
Frequency
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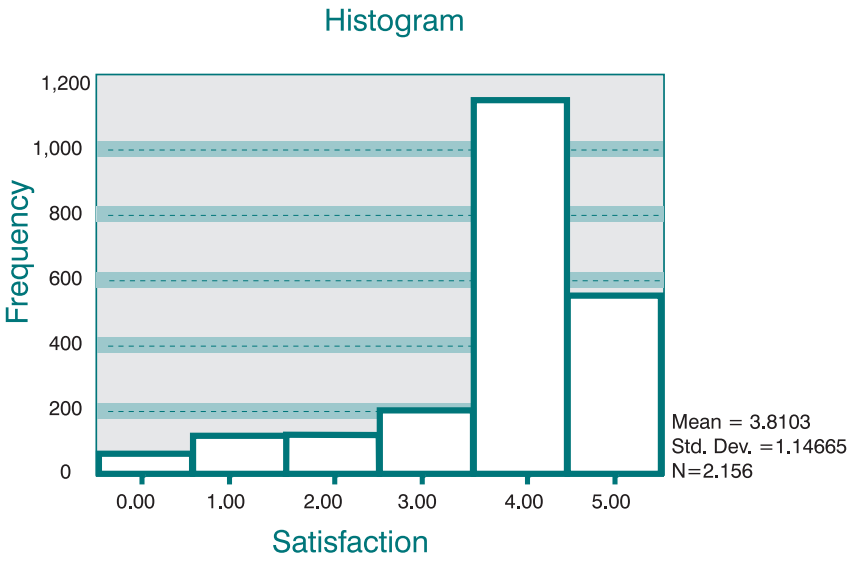
400
300
200
100
0
0.00
1.00
2.00
3.00
4.00
5.00
Empowerment
Mean = 2.1348
Std. Dev. = 1.00909
N = 2,156


Histogram
Frequency
1,200
1,000
800
600
400
200
0
0.00
1.00
2.00
3.00
4.00
5.00
Satisfaction
Mean = 3.8103
Std. Dev. =1.14665
N=2.156

Correlations

The study data was examined to quantify the strength of association between the indicators, using Spearman's Correlation Coefficient. The value of the correlation indicates the strength of the linear relationship; the extent to which one indicator varies as another varies. A value of 1 indicates a perfect relationship, 0 indicates none. Positive values indicate variations in the same direction; negative values indicate variations in the opposite direction. The correlations are shown in Table 15.

Interpreting correlations begins with an assessment of the strength of the association followed by an assessment of its statistical significance, or its reliability. Strengths of association are generally interpreted as follows:

- -1.0 to -0.7, strong negative association.
- -0.7 to -0.3, moderate negative association.
- -0.3 to +0.3, little or no association.
- +0.3 to +0.7, moderate positive association.
- +0.7 to +1.0, strong positive association.

The statistical significance of the correlation represents the probability that the observed relationship in the sample occurred by chance and that no such relationship exists in the population from which the sample was drawn. The value of the statistical significance represents a decreasing index of the reliability of the result; the higher the value, the less it is possible to infer that the observed relationship between the variables in the study sample is a reliable indicator of the relationship between the respective variables in the whole population.

A two-tailed test of significance is used to detect a difference in means regardless of the direction of difference. Typically, results that generate statistical significance of $\leq$05 are regarded as borderline statistically as this level of significance involves a fairly high probability of error of 5 percent. Results that are significant at the p $\leq$01 level are commonly regarded as statistically significant, and at $\leq$005 or $\leq$001 levels as "highly" significant. Table 16 summarizes the statistically significant relationships.

Interpreting Correlations

It is important to note that it is not possible to infer causality from correlations. We cannot deduce from the observed relationships that a change in the value of one indicator causes a change in another. Causality can be argued, however, provided three issues are accounted for:

- Logic.

The relationship can reasonably be argued to be causal, in the supposed direction.

- Intervening influences.

Relationships between two variables may be caused by many variables other than the two being compared.

- Temporal difference.

The causing influence should be present at a time before the variable it is argued to influence.

Scale Reliability

Scale reliability refers to how accurate, on average, an estimate of the true score is in the population of objects to be measured. It refers to the property of a measurement instrument that causes it to give similar results for similar inputs. When multiple indicators are used for scales, as in some in our study, then it becomes necessary to evaluate the reliability of those scales. One method assesses the internal consistency between the indicators; the extent to which they co-vary, on the basis that if they are actually measuring the same phenomenon, then they should vary more or less in synchronization. The output of this measure is called Cronbach's Alpha, which provides a coefficient for the average correlation of items within a scale. A value of 0.7 is normally accepted to indicate a reliable scale. Table 12 displays Cronbach's Alpha for the study indicators that were derived from the questionnaire.

Table 12. *Scale reliability; indicators*

Scale	Number of Items	Cronbach's Alpha
Usefulness	2	.603
Sustainability	3	.153
Usage	2	-.549
Community acceptance	3	.559
Service delivery	2	.110
Empowerment	3	.855

Three of these values for scale reliability are a lot less than desirable for highly rigorous research, falling short of the acceptable threshold of 0.7. In particular, the negative value for Usage, which is due to a negative average covariance among the two items used, violates reliability model assumptions. However, the negative covariance is weak -.215. Clearly, further development of the measurement instruments used in the survey questionnaire is indicated. Nevertheless, as the current research is ground-breaking in this field of enquiry, such findings are to be expected. The measurements were not pre-tested due to timing and logistical constrains. Accordingly, the examination of the statistical evidence continued, but interpretation of the results and conclusions should proceed with some caution due to these results.

Table 13. *Scale reliability; composite scales*		
Scale	**Number of Items**	**Cronbach's Alpha**
Project Design	4	.571
Community Participation	5	.620
Project Outcomes	5	.629
Political Economy	2	.719

In Table 13, we display the same set of scale reliability measures for the composite constructs that were created from the combinations of indicators described earlier.

These results are generally more satisfactory for experimental research, except for Project Design, which of course includes the problematic Usage scale.

Qualitative Measurements

Not all the variables of interest in the research model were approached via the questionnaire. The supposition was that the outcomes of projects in terms of their scaling potential would be heavily influenced by factors that would not directly relate to the response of project users and would also be outside the control or influence of project management and sponsors. Nevertheless, it was felt that these factors could and should be assessed. Accordingly, they made up part of the research design in the form of interviews with project managers and other stakeholders and on-site observations. In order to arrive at useable assessments, the factors were assigned a grade on an arbitrary scale of 1-10, as displayed in Table 14. As these were rated by the observers on a scale of 1-10, they have been halved in order to make them compatible with the scales on the questionnaire, which were rated from 1-5.

Testing the Research Model

The first step in arriving at an assessment of the hypothesized influences in the research model is to summarize our measurements, quantitative and qualitative, into a common format that will facilitate making comparisons between them, which is necessary as the qualitative measures were derived at the level of the project as opposed to the level of the user. To do this, the means for each of the variables derived from the questionnaire were calculated for each of the projects. To these were added the means of the variables in Table 14. Following that, the table of these mean values by project were cross-correlated as the first step in exposing the relationships between them. The results are displayed in Table 15.

Table 14. *Graded qualitative measures*

Project	Policy Environment	Social Environment	Policy Environment	Social Environment
	Original Ratings		Revised ratings used in the analysis	
Akshaya	4	8	2.00	4.00
Anand	7	10	3.50	5.00
Bhoomi	9	6	4.50	3.00
CARD	9	5	4.50	2.50
CIC	1	0	0.50	0.00
e-Choupal	7	4	3.50	2.00
e-Seva	10	8	5.00	4.00
FRIENDS	6	5	3.00	2.50
Gramdoot	1	1	0.50	0.50
Gyandoot	5	9	2.50	4.50
India Agriland	4	2	2.00	1.00
Janmitra	3	2	1.50	1.00
Mahitishakti	2	3	1.00	1.50
N-Logue	2	4	1.00	2.00
SEWA	2	7	1.00	3.50
TARAhaat	1	4	0.50	2.00
VISP	2	2	1.00	1.00
Warana	4	2	2.00	1.00

Table 15. *Correlations of means across projects*

Spearman's Correlation N=19		Usage	Technology awareness	Management of expectations	Equality in decision-making	Leadership development	Equality in benefits	Influence on project management	Usefulness	Sustainability	Community acceptance	Service delivery	Staff Capability	Empowerment	Satisfaction	Policy environment	Social environment
Usage	Correlation	1.000															
	Sig. 2-tailed	.															
Technology awareness	Correlation	.257	1.000														
	Sig. 2-tailed	.288	.														
Management of expectations	Correlation	.183	.440	1.000													
	Sig. 2-tailed	.454	.059	.													
Equality in decision-making	Correlation	.415	.215	.340	1.000												
	Sig. 2-tailed	.077	.376	.154	.												
Leadership development	Correlation	.276	.086	.293	.731**	1.000											
	Sig. 2-tailed	.253	.726	.224	.000	.											
Equality in benefits	Correlation	-.097	.605**	.474*	.103	.197	1.000										
	Sig. 2-tailed	.691	.006	.040	.676	.419	.										
Influence on project management	Correlation	.371	.315	.473*	.345	.155	.456*	1.000									
	Sig. 2-tailed	.117	.189	.041	.148	.527	.050	.									
Usefulness	Correlation	-.034	-.113	-.451	-.173	-.127	.252	-.112	1.000								
	Sig. 2-tailed	.889	.644	.052	.479	.606	.298	.650	.								
Sustainability	Correlation	-.038	-.134	-.346	-.231	-.065	.215	.003	.522*	1.000							
	Sig. 2-tailed	.878	.584	.147	.342	.791	.376	.991	.022	.							
Community acceptance	Correlation	-.363	-.015	.031	-.206	-.322	.173	.032	.120	.480*	1.000						
	Sig. 2-tailed	.127	.952	.901	.397	.179	.479	.895	.624	.037	.						
Service delivery	Correlation	-.271	.124	.235	.164	-.081	.329	.082	.161	.087	.442	1.000					
	Sig. 2-tailed	.105	.772	.530	.112	.269	.511	.043	.702	.448	.003	.					
Staff capability	Correlation	-.129	.152	-.118	-.038	-.220	.326	-.043	.352	.338	.489*	.745**	1.000				
	Sig. 2-tailed	.598	.535	.631	.878	.366	.174	.861	.139	.157	.034	.000	.				
Empowerment	Correlation	.735**	.498*	.334	.405	.297	.270	.507*	.068	.138	-.320	-.180	-.103	1.000			
	Sig. 2-tailed	.000	.030	.163	.086	.217	.264	.027	.783	.574	.181	.461	.676	.			
Satisfaction	Correlation	-.062	.464*	.530*	-.066	-.070	.629**	.263	-.062	.241	.505*	.519*	.610**	.171	1.000		
	Sig. 2-tailed	.800	.045	.020	.789	.775	.004	.278	.800	.319	.027	.023	.006	.483	.		
Financial viability	Correlation	.244	.505*	-.069	.321	-.029	.306	.186	.388	.212	.191	-.013	.392	.436	.213		
	Sig. 2-tailed	.313	.027	.778	.180	.905	.202	.446	.100	.385	.432	.959	.097	.062	.380		
Policy environment	Correlation	-.180	.111	.005	.068	-.235	-.080	.170	-.025	.111	.550*	-.257	.204	.013	.109	1.000	
	Sig. 2-tailed	.461	.652	.983	.782	.333	.743	.486	.918	.652	.015	.289	.402	.958	.657	.	
Social environment	Correlation	-.323	-.296	-.043	-.144	-.325	-.263	-.151	.129	.218	.563*	-.352	.148	-.230	.001	.623**	1.000
	Sig. 2-tailed	.177	.219	.861	.558	.175	.276	.538	.598	.370	.012	.140	.545	.345	.997	.004	.

Table 16. *Statistically significant relationships*

Relationship		Correlation
Management of expectations	Satisfaction	.530
	Influence on project management	.473
Leadership development	Equality in decision-making	.731
Equality in benefits	Technology awareness	.605
	Management of expectations	.474
	Influence on project management	.456
Sustainability	Usefulness	.522
	Community acceptance	.480
Service delivery	Staff capability	.745
	Community acceptance	.442
	Satisfaction	.519
Staff capability	Community acceptance	.489
Empowerment	Usage	.735
	Technology awareness	.498
	Influence on project management	.507
Satisfaction	Technology awareness	.464
	Equality in benefits	.629
	Community acceptance	.505
	Staff capability	.610
Policy environment	Community acceptance	.550
Social environment	Community acceptance	.563
	Policy environment	.623

Finally, we can test the postulated relationships in the research model by consolidating the variables into four antecedent constructs.

The following correlations between the constructs on the model were obtained.

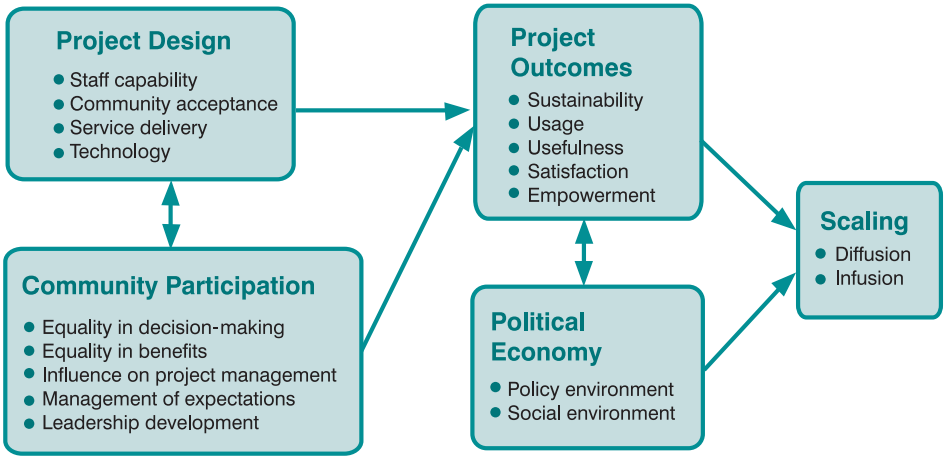


Table 17 shows that there is only one moderately related correlation when the variables are consolidated according to the predicted relationships in the model, that between Project Outcomes and Project Design.

Table 17. *Correlations between the Constructs*

Spearman's Correlation, N=18		Project Design	Community Participation	Project Outcomes	Political Economy
Project Design	Correlation Coefficient	1.000			
	Sig. (2-tailed)				
Community Participation	Correlation Coefficient	.151	1.000		
	Sig. (2-tailed)	.550			
Project Outcomes	Correlation Coefficient	.411*	.256	1.000	
	Sig. (2-tailed)	.090	.305		
Political Economy	Correlation Coefficient	.059	-.255	-.214	1.000
	Sig. (2-tailed)	.816	.307	.394	

Regression

Guided by the correlation analysis, where Project Outcomes and Project Design appear moderately correlated, we move to a regression analysis in order to determine whether Project Outcomes are important predictors of Project Design. The technique used linear regression analysis, which is a method for determining the association between a dependent variable and one or more independent variables. Our research model suggests Project Outcomes as a dependent variable, with Project Design and Community Participation as independent variables. We can test the association between these variables with the regression analysis model. The SPSS statistics are as follows:

Variables Entered/Removed(b)

Model	Variables Entered	Variables Removed	Method
1	Leadership development Staff capability Management of expectations Service delivery Equality in benefits Technology Community acceptance Influence on project management Equality in decision-making (a)		Enter

a All requested variables entered
b Dependent Variable: project

Model Summary (b)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.677(a)	.459	.456	.44248

a Predictors: (Constant), Leadership development, Staff capability, Management of expectations, Service delivery, Equality in benefits, Technology, Community acceptance, Influence on project management, Equality in decision-making

b Dependent Variable: project

ANOVA (b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	355.982	9	39.554	202.023	.000(a)
	Residual	420.160	2146	.196		
	Total	776.142	2155			

a Predictors: (Constant), Leadership development, Staff capability, Management of expectations, Service delivery, Equality in benefits, Technology, Community acceptance, Influence on project management, Equality in decision-making

b Dependent Variable: project

Coefficients (a)

		Unstandardized Coefficients			
Model		B	Std. Error	t	Sig.
1	(Constant)	.981	.064	15.379	.000
	Staff capability	.072	.007	10.133	.000
	Community acceptance	.301	.015	20.630	.000
	Service delivery	.100	.014	7.147	.000
	Technology	.075	.009	8.330	.000
	Equality in decision-making	-.007	.009	-.727	.467
	Equality in benefits	.058	.009	6.548	.000
	Influence on project management	.054	.010	5.488	.000
	Management of expectations	-.021	.009	-2.300	.022
	Leadership development	.081	.012	6.973	.000

a Dependent Variable: project

Residuals Statistics(a)

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	.9809	4.2337	3.3635	.40643	2156
Residual	-1.49590	1.60632	.00000	.44155	2156
Std. Predicted Value	-5.862	2.141	.000	1.000	2156
Std. Residual	-3.381	3.630	.000	.998	2156

a Dependent Variable: project

Interpreting the Regression Model

In the model summary, R is the correlation between the between the observed and predicted values of the dependent variable. R-Square is the proportion of variance in the dependent variable (Project Outcomes) which can be predicted from the independent variables. This value indicates that 45.9 percent of the variance in Project Outcomes can be predicted from the variables leadership development, staff capability, management of expectations, service delivery, equality in benefits, technology, community acceptance, influence on project management, and equality in decision-making. Note that this is an overall measure of the strength of association, and does not reflect the extent to which any particular independent variable is associated with the dependent variable. R-Square is also called the coefficient of determination. As predictors are added to the model, each predictor will explain some of the variance in the dependent variable simply due to chance. One could continue to add predictors to the model which would continue to improve the ability of the predictors to explain the dependent variable, although some of this increase in R-Square would be simply due to chance variation in that particular sample. The adjusted R-Square attempts to yield a more honest value to estimate the R-Squared for the population. The value of R-Square was .459, while the value of Adjusted R-Square was .456. The standard error of the estimate, also called the root mean square error, is the standard deviation of the error term, and is the square root of the Mean Square Residual (or Error).

The ANOVA table first lists source of variance, Regression, Residual and Total. The Total variance is partitioned into the variance which can be explained by the independent variables (Regression) and the variance which is not explained by the independent variables (Residual, sometimes called Error). Note that the Sums of Squares for the Regression and Residual add up to the Total, reflecting the fact that the Total is partitioned into Regression and Residual variance. Next are the Sum of Squares associated with the three sources of variance, Total, Model and Residual, then the degrees of freedom associated with the sources of variance, the Mean Squares, which are the Sum of Squares divided by their respective df. These are computed to compute the F ratio, dividing the Mean Square Regression by the Mean Square Residual to test the significance of the predictors in the model. The significance level (0.000) associated with the F value (202.023) is very small. These values are used to determine if the independent variables reliably predict the dependent variable. The p-value is compared to the alpha level (typically 0.05) and, if smaller, it is possible to conclude that the independent variables reliably predict the dependent variable. Therefore, the group of variables; leadership development, staff capability, management of expectations, service delivery, equality in benefits, technology, community acceptance, influence on project management, and equality in decision-making can be used to reliably predict project outcomes (the dependent variable). Note that this is an overall significance test assessing whether the group of independent variables when used together reliably predict the dependent variable, and does not address the ability of any of the particular independent variables to predict the dependent variable. The ability of each individual independent variable to predict the dependent variable is addressed in the next table where each of the individual variables is listed.

In the Coefficients table, the first column shows the predictor variables. The first variable (constant) represents the constant, also referred to as the Y intercept, the height of the regression line when it crosses the Y axis. In other words, this is the predicted value of project outcomes when all other variables are 0. The other values are the values for the regression equation for predicting the dependent variable from the independent variable. These coefficients describe the relationship

between the independent variables and the dependent variable. They explain the amount of increase in project outcome scores that would be predicted by a 1 unit increase in the predictor. The standard errors associated with the coefficients are used for testing whether the parameter is significantly different from 0 by dividing the parameter estimate by the standard error to obtain a t-value. The t-value and p-value (significance) appear in the following columns. They are used in testing the null hypothesis that the coefficient is 0. With a 2 tailed test, comparing each p-value to a pre-selected value of 0.05 of alpha yields statistical significance. Therefore all the coefficients having p-values less than 0.05 are statistically significant. The coefficients for equality in decision making (-.007) and management of expectations (-.021) are not statistically significantly different from 0 because their p-values are definitely larger than 0.05. The regression equation then is stated as:

The predicted level of project outcome = .981+ (.072* Staff capability) + (.301* Community acceptance) + (.100* Service delivery) +. (075* Technology) + (-.007* Equality in decision-making) + (.058* Equality in benefits) + (.054* Influence on project management) + (-.021* Management of expectations) + (.081* Leadership development). Overall, the model explains 45.9 percent of the variance in project outcomes and it can be seen that independent variables with the largest influence on the dependent variable are those with the higher coefficients; community acceptance and service delivery.

Annex 3. The Study Questionnaire

Age	>20	21-30	31-40	41-50	51-60	51-60	61+
Gender	Male Female						
Caste	General		OC		BC		
Education	Never went to school		Primary school only		Lower secondary school		
	Upper secondary school		University				
Occupation	Farm worker		Farmer		Government employee		
	Private businessman		Private sector employee		Other (specify)		

Monthly income	up to Rs1,000	Rs 1,000-3,000	Rs 3,000-5,000	Rs 5,000-10,000	Rs 10,000 +
How does your household's income and standard of living compare with that of your neighbours and other households in the village?	Much lower	Lower	About the same	Higher	Much higher
How often have you used the centre?	<1	1-3	4-5	6-10	>10
How far do you live from the centre?	<1	1-2	2-5	5-10	>10
Do you consider yourself to be fully aware of the technology used in of the centre?	No idea	A vague idea	Reasonably aware	Well aware	Extremely aware
Do you consider yourself to be fully aware of the services of the centre?	No idea	A vague idea	Reasonably aware	Well aware	Extremely aware
Do you feel you are able to participate in meetings or discussions relating to the centre?	Not at all possible	Not really possible	It's quite possible	It's very possible	It's extremely possible
Do you feel you might be invited to undertake any role of responsibility in the operation of the centre?	Not at all possible	Not really possible	It's quite possible	It's very possible	It's extremely possible
Do you feel that women are well represented in discussions about the centre?	Definitely not represented	Not really represented	Reasonably well represented	Very well represented	Extremely well represented
Do you feel you are able to influence the management of the centre in its operations?	Definitely not able to influence	Not really able to influence	Reasonably well able to influence	Very well able to influence	Extremely able to influence
Is the centre useful to you and your household?	Not at all useful	Slightly useful	Quite useful	Very useful	Extremely useful

How has the telecentre helped your household? (Tick as many as appropriate.)	Has not helped Got better price information Improved farming practices Made useful business contacts Helped treat an illness Helped child (or myself) learn something new Helped find work outside village Enabled communication with others outside village Helped solve a problem Assisted with family problems Helped with school work Helped obtain important supplies Helped get taxes and bills paid Helped avail a government work done Other (please specify)				
How likely are you to use the centre in the future?	Not at all likely	Slightly likely	Quite likely	Very likely	Extremely likely
How frequently has someone from your household used the services of the centre?	Never	On occasion	Often	Very often	Extremely often
Do you think that such a project was required by the community in the first place?	Was not required	Maybe or maybe not	Something like it was required	Yes it was required	Definitely required
Who told you about the existence of the project?	Newspaper or television	Advertisements	Neighbours and relatives	Government officials	Nobody, I tried it myself
Is the operator manning the centre necessary?	Not at all	Maybe	Definitely required	More operators required	All services should be on touch screen or online
Do you feel hesitation to interact with the operator?	Not at all	Some	Moderate	A lot	I could not
Are you satisfied with the services of the operator?	Not at all satisfied	Lowly satisfied	Neither satisfied nor dissatisfied	Very satisfied	Highly satisfied
How much do you value the services of the centre?	Not value at all	Low value	Moderate value	High value	Very high value
Have you been able to increase your income or well being as a result of using the services of the centre?	Not increase at all	Slight increase	Reasonable increase	Considerable increase	Significant increase
Has the centre helped you voice your opinion to others?	Not helped at all	Slightly helped	Reasonably helped	Helped a lot	Helped enormously
Has the centre helped you make useful contacts?	Not helped at all	Slightly helped	Reasonably helped	Helped a lot	Helped enormously

Has the centre helped you to build helpful relationships with others?	Not helped at all	Slightly helped	Reasonably helped	Helped a lot	Helped enormously
Overall, are you satisfied with the centre services?	Not at all satisfied	Lowly satisfied	Neither satisfied nor dissatisfied	Very satisfied	Extremely satisfied
Do you think that more services should be made available at the centre?	No idea	Not required	Some may be added	A lot should be added	All government services should be provided from the centre
Do you think that services provided at the centre are worth the charges?	Not at all	User charges should be much more	User charges are reasonable	User charges are worth it	Worth every penny
Do you recommend such a centre in areas where they presently do not exist?	Not at all	Maybe or maybe not	Slightly recommended	Moderately recommended	Highly recommended

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All the above links were active at the time of the research

About the Authors

Roger HARRIS

Dr Roger Harris is a development consultant living in Hong Kong and specializing in ICTs for rural development in Asia. He has a PhD in Information Systems from the City University of Hong Kong. In 1997 he started working with rural communities in the developing world, helping them connect to the Internet and make good use of ICTs for their own development needs. He has since been involved with rural IT projects in many Asian countries, working for several United Nations agencies and the World Bank. He was the founding editor of the *Electronic Journal on Information Systems in Developing Countries*. The Roger Harris Associates website is at http://rogharris.org

Rajesh RAJORA

Dr Rajesh Rajora is a member of Indian Administrative Services. After completing a degree in Medical Sciences at All India Institute of Medical Sciences, New Delhi, India, he worked in different capacities for the Indian government as Project Administrator, Chief Executive Officer of Panchayats and District Collector. He has worked towards the development of the poor and marginalized communities in India in many ways. He is also the author of the book *Bridging the Digital Divide: Gyandoot – A Journey for Digital Empowerment*.

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