Analysis of Case Studies and Hypotheses Testing

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4.0 Introduction

While evaluating various ICT case studies we will make use of a mix of theoretical frameworks. We would be evaluating the case studies on not just the basis of Sen's and Brown's evaluation frameworks (detailed later) but also on the basis of sustainability and scalability of the project. For, a program may touch marginalized sections and/or add maximum value but at the same time, it is important to ensure that the project is not transitory and is sustainable. For a project to be sustainable there has to be a purposeful mission attached to it such that it serves the cause of the state. It should have a strong business model attached to it such that it is a self-sustaining profitable venture.

Second generation reforms are needed for a faster economic growth trajectory while ensuring quality and sustainability on long term basis. E-Governance projects need to be evaluated on a similar basis. Reforms, particularly in the area of the right institutions, administrative, legal and regulatory functions of the state coupled with restructuring of the incentives and actions that are required for greater participation of private sector in developmental activities has become imperative.

Thus, the participation of the private sector would be an all important step in making a success out of most e-Governance projects. The project should be such that the private sector could be the initiator. At the same time, the possibility of public sector involvement is left open.

One of the parameters of evaluation is that the information that ICT provides should not be of simply notional value but should be of realizable value. Though co-operatives can include the marginalized sections and self-help groups can be formed to help the neglected sections of society, this is not entirely forthcoming. In some cases, ICT makes possible the bypassing of co-operatives and self-help

groups. It brings to the forefront a new development paradigm where everyone can participate in the development process without a reorganization of the social structure. It doesn't envisage a complete change of the existing operational mechanism. This is imperative for the scalability and the sustainability of the project. Neither does it envisage the replacement of middlemen because in an area, which is not sufficiently endowed with the right kind of infrastructure, it is the middlemen that add value to the process. An approach of this kind also reduces transaction costs thus making it viable, while improving the efficiency of the entire system.

Development requires the removal of major sources of unfreedom: poverty as well as tyranny, poor economic opportunities as well as systematic social deprivation, neglect of public facilities as well as intolerance. One of the important ways of evaluating the role of IT would be to view its role in 'Capability Enhancement'. The evolution of the Prof. Amartya Sen's 'Capability approach' has it roots in the development discourse that has been and is the hub of ever-changing ideas. The indirect role works through the contribution of capability expansion in enhancing productivity, raising economic growth, broadening development priorities, and bringing demographic changes more within reasoned control. The direct importance of human capability expansion lies in its intrinsic value and its constitutive role in human freedom, well being and quality of life. It treats human beings as goals/ends in themselves and not just as a means to higher income and growth. Development, in this view, is the process of expanding human freedoms, and the assessment of development has to be informed by this consideration.

Thus, what is extremely important while judging policies or programs is the ultimate impact on human capabilities and not just the impact on economic growth. This is essentially the policy implication of the Capability Approach as one would gather. It is suggested that the holistic view of development provided by Sen's capability approach justifies its adoption for the current analysis.

CHAPTER 3

Drivers of IT Penetration in Indian States

In the chapter on ranking all Indian states according to their e-preparedness, we considered various variables, which are indicative of the e-readiness of each state. Now efforts with regard to e-readiness in general lead to certain outcomes. These outcomes in turn have been caused by some policy initiatives. The distinction between outcome variables and their drivers is blurred in our earlier analysis as we were more concerned about whether the variables indicate e-readiness or an effort in that direction. In this chapter, we distinguish between outcome variables and their causes. Two outcome variables, one showing business outcome and the other individual outcome are considered for analysis. We try to find out the main drivers of these outcomes.

Building a model, which involves a cause-effect relationship, gives rise to certain queries about the validity of the postulated relationships. Assessing causal effects require a strong theoretical framework specifying a particular causal channel in a particular context, which provides a theoretical basis for specifying determining factors, which can be credibly argued to be exogenous to the outcomes of interest. The modern formulation of the problem of causal analysis is based on the fundamental notion of counterfactual for an individual, state, country, or other unit. For example, in our case a state 'i' may witness a certain outcome (Y_{i0}) if it takes a particular policy and a different outcome (Y_{i1}) if it does not. The difference between these two outcomes gives the causal effect of the policy. But we have data for only one of these outcomes and hence the other outcome-counterfactual is missing. Thus causal effects cannot be estimated without some type of assumption or restrictions arising out of inherent unobservability of the counterfactual.

Cross-sectional data from our surveys last year and this year for thirty-five states and union territories have been used for this analysis. This has been supplemented by appropriate data from secondary sources like Statistical Abstract of India, Handbook of Statistics on Indian Economy etc. A cross-sectional regression coefficient on any policy or other variables is estimated comparing values of outcome variable for different states, which have differing values of the explanatory variables and not by comparing different values of outcome variable that would occur if the explanatory variable were to vary for a single state. So when we run a cross-sectional regression in this context, the assumption is that the counterfactual for a particular state can be accurately estimated from values of outcome variable of other states.

More than the causal nature of the relationship our endeavor is to find those policies that effect the outcome variables significantly. The framework of analysis that we use is to consider an outcome variable from this years survey and try to find out how it is affected by policy variables from last year's survey data. The assumption we are making in the process is that it takes atleast one year for policy variables to have some effect on the outcome variables. Thus this years policy variables have been excluded from the analysis. Such an assumption has more to do with non-availability of data beyond last year than any other reason. All the explanatory variables are policy dummies, which take the value of one for policy taken, or zero otherwise. The model can be understood from the following equation:

$$Y_i = \alpha_i + \beta_i D_i + \varepsilon_i$$

i = 1 to 35, various states and union territories
D_i = 1 when the answer to whether a policy is taken is 'yes'
  = 0 if the answer is 'no'
Y_i = outcome variable

We have used the ratio of IT exports to Total exports across the states as the business outcome variable. The policy variables that have been considered for the analysis are presented in the Table 3.1.

Table 3.1: Variables considered for analysis of business outcome	
Dependent Variable Share of IT exports in total exports of the state	**Independent Variables** Has the issue of IPR been addressed? Have sales Tax concessions been given to IT firms? Is there a dedicated infrastructure for IT? Is there a provision for deferred taxes for IT firms? Do cyber laws exist? Are subsidized utilities available for IT firms?

The results of running a least square regression model are shown in the following table. As can be seen, among the policy variables, whether subsidized utilities have been provided to the IT firms have the greatest impact on the outcome variable. This result is significant at 10% level. Thus states who have provided land, electricity, roads and other such utilities at a cheaper rate to the IT firms have recorded the highest increase in share of IT exports in total exports. The other coefficients though positive are not significant. This may be due to paucity of data.

Table 3.2 : Regression results of business outcome	
Explanatory variables	**Co-efficient**
Has the issue of IPR been addressed?	0.051
Have sales Tax concessions been given to IT firms?	0.047
Is there a dedicated infrastructure for IT?	0.053
Is there a provision for deferred taxes for IT firms?	0.027
Do cyber laws exist?	0.029
Are subsidized utilities available for IT firms?	0.107*
* Significant at 10 per cent level.	

We have run a cross-sectional regression model; thus, checking for robustness is necessary. Robust variance estimator has been used to re-run the above model, resulting in the estimates having consistent standard errors.

Internet connections per thousand households have been used as an outcome variable for the individuals. Any policy, which is geared towards e-preparedness, must affect individual readiness. It is also important to find out the main drivers of this outcome. For individuals unlike policies specifically catering to the IT companies a broad spectrum of variables affect preparedness. These are not directly the policy variables but are outcomes of some broader policy initiatives. The following table presents the variables used to find out the drivers of individual outcome.

Table 3.3: Variables considered for analysis of individual outcome	
Dependent Variable Internet connections per thousand households	**Independent Variables** Per Capita Net State Domestic Product Share of schools having internet connections to total schools Literacy rate Price range of internet connections.

The data on internet connections per thousand households have been taken from our in-house survey data MISH. Per capita income and literacy data have been taken from Statistical Abstract of India and the remaining two variables have been taken from last year's e-preparedness survey. The choice of variables is based on the standard theoretical premises. Here, the explanatory variables are not dummies as in the previous analysis. Results of regression are presented in Table 3.4.

Table 3.4: Regression results of individual outcome	
Independent Variables	**Co-efficients**
Per Capita Net State Domestic Product	0.001*
Share of schools having internet connections to total schools	1.89*
Literacy rate	0.143*
Price range of internet connections	-0.082
* Significant at 10 per cent level.	

The coefficient on internet connection in schools is of very high magnitude and significance. Thus its importance in this context needs no further emphasis. Literacy-rate and per capita net state domestic product have significant positive effect on internet connections at the household level. Hence, affordability and ability to comprehend are also important drivers of individual outcome. These are, to some extent, dependent on policies taken at the state level to generate growth of income and enhance literacy through various programmes. As expected, the coefficient on price is negative though is not significant. Here, we re-run the model using robust variance estimators to make standard error of estimates consistent. For both the regression model we have checked for multicollinearity in data which was found to be absent.

This chapter considered two important outcome variables and their main drivers. The purpose was to find out the important policies for driving IT developments at the state level. The states still lagging behind in terms of e-readiness can initiate such policies to accelerate IT development.

In addition, Brown's (1991) 'Information-Based Evaluation Methodology', which is sensitive to context-specificity, is also deemed appropriate for this purpose.

Key areas for measurement in evaluation:
- *Measures of coverage* : volume of information sources/ their diversity and range
- *Measures of linkage* : networking processes, feedback mechanisms
- *Measures of direction* : permeability within population in question, origins of information flows; political aspects of access and information flow

Additionally, the "sustainability" aspect of the e-governance project is examined by examining whether the initially attractive user charges are sufficient to earn Internal Rate of Return (IIR) on deployed funds equivalent to the cost of subsidised capital inputs. When the user density increases or matches the threshold level, user charges become an attractive proposition to attract private sector participants.

Table 4.1: The Complete Framework for Evaluation of ICT Case Studies

Approach	Criteria of Evaluation
Sen's Capability Approach	**Indirect measures** • Increased productivity • Increased growth • Demographic influences **Direct measures** • Human development
Brown's Information Based Evaluation Methodology	• Measures of linkage • Measures of coverage • Measures of direction
Sustainability/ Scalability/ Profitability	• Sustainability : Weighted cost of funds for operation of schemes subsidised by the government can be met by even very attractive user charges • Scalability: would be seen by how far the program can be expanded region-wise/stakeholders wise such that IRR meets the subsidised weighted cost of funds. • Profitable when user charges and user profile reach a threshold level and cost recovery yields IRR that exceeds weighted cost of capital at non-subsidised rates.

While studying these e-Governance instances, we did not go in for a field survey to identify the attitudes and perceptions of the people participating in the process. It was not within the scope of the report to verify these studies through the means of primary data. We looked at various initiatives and identified outliers and why they were so. For example, the selection of the e-Choupal case study was determined by the fact that it provoked much opposition from the government although it got support from the farmers. It was ultimately accepted due its unique business model especially in the context of second-generation reforms.

E-Choupal: A unique blend of ICT and Second-Generation Reforms

E-Choupal – The Innovation

The e-Choupals, information centers linked to the Internet, represent an approach to seamlessly connect subsistence farmers with global markets. It has helped link the largest labor force with the mandis, the international markets as well as the final consumer at much reduced transaction costs. ICT facilitates disintermediation through the creation of an alternative development paradigm that skips the formation of co-operatives and self-help groups and replaces then with the network society. It exemplifies the fact ICT could be and is an enabler in developmental goals. The e-Choupal project thus brings out the concept of profitable rural development.

1.0 Introduction

Sustainable commercial engagement in rural India is a channel that can serve as a foundation for the greater social agenda. It can bring global resources, practices and opportunities to the Indian villages while better compensating the farmer and helping alleviate him from his subsistent myopia. Pioneering engagements can also create a commercial environment conducive to private sector participation. It was in this context that the concept of e-Choupal was launched.

E- Choupal is an ICT initiative started by one of India's leading private companies – ITC. The US$ 155 million International Business Division (IBD) of ITC's Agri Business segment was created to market India's agricultural produce internationally. This division also sources agricultural raw material for its domestic Fast Moving Consumer Goods (FMCG) business. Aiming to integrate more closely with its rural suppliers, while also developing new markets for its own and third-party goods, ITC began deploying its e-Choupal network in early 2000 through its International Business Division. Today, there are 3300 Choupals in 5 states of India covering 20,000 villages servicing 1.8 million farmers. In the year 2003-04, the total transactions were valued at US$ 100 million.

The vision for the project is to make 20,000 choupals in 15 states covering 100,000 villages and servicing 25 million farmers (by 2010). The projected transactions by the year 2010 are valued at US$ 2.5 billion.

2.0 The Model before the E-Choupal

There are three commercial channels for agricultural products in rural areas of Dahod in Madhya Pradesh, where the first e-Choupal was set up. The mandis, the traders for eventual resale to crushers and the producer run co-operative societies for crushing in co-operative mills. The farmers traditionally kept a small amount for their personal consumption and got the produce processed in a small-scale job shop crushing plant.

The Mandi was central to the functioning of the marketing channel. It acted as a delivery point where farmers brought produce for sale to traders. Buying and selling transactions were conducted by commission agents and were based upon verbal agreements and mutual understanding alone. This lack of professional competition combined with the communal stranglehold on rural trading made commission agents extremely wealthy.

2.1 Sources of Inefficiency in the Old Model

The inefficiencies of the traditional system adversely impacted the farmer. The farmer did not have the resources to analyze or exploit price trends, since prices were set dynamically in the mandis. The farmers thus did not have any information on local pricing levels and trends. The timing of the sale was thus more often than not sub-optimal. The selection of mandi was based upon often dated and unreliable information as opposed to quoted prices and by the time the farmer got his price it was too late to change the selection of mandis.

Also, at the time of inspection, since there is no formal method of grading the produce and inspection is done by sight only, the evaluation tends to favour the informed and wealthy buyer and not the poor farmer. The farmer therefore did not have any incentive to improve the quality of the produce. Also, the farmer's produce was auctioned off at variable prices, though the margins of commission agents were ensured irrespective of the price that the farmer got. The agents colluded in establishing the practices of the trade and these practices uniformly exploited the farmer's situation. Also, at the time of weighing and bagging the product, the farmer's produce was consistently underweighed. Given this obvious bias, the farmer had a largely negative opinion of the auction for non-financial reasons too. They felt a systematic loss of dignity in the auctioning process. Also, since the farmer could not refuse the sale at the auctioned price, he ended up losing as much as 60 per cent to 70 per cent of the potential value of the crop.

At the time of the auction, the farmer was never paid in full at once for his produce and his payments were stretched over time. Repeating the trips to the mandis cost him time and money.

3.0 ITC's initiative

ITC took the initiative to re-engineer the entire existing value chain. The mandi was not an optimal procurement channel and the market was created, manipulated and managed by the agents. The e-Choupal is an ideal vehicle to communicate directly with the farmer and thereby bypass the inefficiencies arising out of the agent's intermediation and collusion.

The e-Choupal network was thus conceived to achieve *'virtual vertical integration'* by extending ITC's engagement all the way to the farmer in the field. It provides a unique opportunity of blending shareholder value creation with social development. The social impact of the e-Choupal as envisioned by ITC ranges from the short-term provision of Internet access to the long-term development of rural India as a competitive supplier and buyer of a range of goods and services to the global economy. The model with its extensive usage of Information Technology makes it possible to bundle information, knowledge and transactions from independent participants in a collaborative business model to deliver unique value to the farmer and the business enterprise simultaneously.

3.1 How is the e-Choupal Different?

- The e-Choupal model is not subsidized. ITC shareholder looks for a competitive return, like all shareholders do and there is no government money involved. Latent value is extracted from the unevolved markets and emerging economy. Elimination of non-value adding activity and creation of new value forms the crux of this project.

- Public Institutions and Private Companies participate in a collaborative yet competitive space to deliver the benefits of a near perfect market to the disadvantaged, in an otherwise incomplete market

3.2 ITC e-Choupal Proposition

Step 1: Leveraging information technology for empowered access to markets (inputs and outputs)

Step 2: Economic viability of IT infrastructure investments through Win-Win Business Models

Step 3: Customer responsive IT infrastructure in the villages facilitate access to supplementary education, health and e-governance services.

3.3 Business Model

The business model of the e-Choupal centers on the deployment of a network of Internet-connected kiosks, known as e-Choupals, throughout agricultural areas in India with the help of VSATs (Very Small Aperture Terminals). An e-Choupal is an electronic version of the traditional 'choupal', where farmers are provided with the latest weather reports, local and international produce prices, and farming best practices. Costing US$ 3,000 - 6,000 each to set up, they also serve as procurement and purchase points, allowing farmers not only to sell their produce to ITC but also to buy agricultural inputs and consumer goods for daily household use.

Some of the guiding management principles when transforming the current model into a viable business model were:

- *Re-engineering as opposed to reconstructing:* Identification of what was good with the current system and therefore what could be used as a base to build on. This not only kept

efficient providers within the system but also created roles for some inefficient providers from the previous system. The benefits of this philosophy is that it avoids reinventing the wheel and it co-opts members of rural areas thereby making their expertise available.

- *Address a whole not just a part:* Rural development efforts thus far have focussed only on individual pieces rather than entire needs, for instance, co-operatives have tried to provide agricultural inputs, rural banks have tried to provide credit and mandis have tried to create a better marketing channel. These efforts cannot compete against a bundled offer that provides all these in one package. A viable procurement alternative requires one to eventually address the gamut of needs, not just marketing. Thus, all ITC transactions comprised the 'one - stop - shop' feature of the e-Choupal.

- *An IT Driven Solution:* An IT centric solution is fundamental to optimizing effectiveness, scalability and cost. IT is 20 per cent of all the effort of the business model, but it is deemed the most crucial 20 per cent. The two goals envisioned for IT were:

  - Delivery of real time information with the PC seen as a medium of delivering all rates prior to the trip, hence allowing the farmer an empowered choice.

  - Facilitate collaboration between the many parties required working toward providing the farmer with the entire gamut of services.

Information Technology not only uses the one to one interactive ability of the Internet, it also helps decouple the source of knowledge with delivery of knowledge to be able to simultaneously specialize and contextualize. These two abilities together (notwithstanding fragmentation and geographical dispersion) lead to delivery of customized information and knowledge, which improve market linkages and enhance quality and productivity of even small farmers.

A unique feature of the e-Choupal model vis-à-vis the traditional model is that it requires significant capital outlays. The day-to-day operating costs, which consist primarily of electricity and Internet connection charges, are covered by the e-Choupal Sanchalak − a respected and trusted farmer who oversees the e-Choupal. These costs vary depending on usage, and are at an average of about US$ 160 per year. The equipment costs, covered by ITC stand at about US$ 60 per year. Miscellaneous travel and equipment maintenance costs add another US$ 20 in yearly fixed costs. ITC, for its part, spends an average of US$ 100 annually on each kiosk, which goes toward training and infrastructure management. Such activities include maintaining a helpdesk, addressing equipment and software complaints, and repairing or replacing broken equipment. ITC reports that it recovered its equipment costs from an e-Choupal in the first year of operation and that the venture as a whole is profitable.

The concept of the '*Low Cost Last Mile*' is that with the infrastructure cost recovered through procurement, the channel is available for distribution at only the incremental marginal cost. The fixed cost overhead applied to the distributed commodities is therefore very low. The information atmosphere of the e-Choupal drives demand for inputs.

3.4   The e-Choupal

3.4.1   The New Model

The model is centered on a network of 'e-Choupals' which are information centers armed with a computer connected to the Internet. The name is derived from the Hindi word 'choupal' meaning a 'traditional village gathering place'. The e-Choupals are meant to act as an e-commerce hub as well as a social gathering place.

ITC's goal is to set up enough number of e-Choupals such that a farmer has to travel no more than five kilometers to get to an e-Choupal. ITC expects each e-Choupal to serve five to seven villages in this 5-km radius. It reaches out to more than a million farmers in nearly 11,000 villages through 2,000 kiosks across 4 states (Madhya Pradesh, Karnataka, Andhra Pradesh and Uttar Pradesh). The average number of farmers with access to a single e-Choupal is approximately 1,000.

The e-Choupal is managed entirely by the sanchalak who is trained on basic business skills, quality inspection and pricing. The Sanchalaks are useful in that they help overcome the literacy barrier, keep the costs low (since no additional infrastructure is

required) and help manage the relationships in the villages (since they have the most information about villagers).

Virtual vertical integration can only work if there is a continuous flow of information between the e-Choupal and ITC. Maintaining continuous commercial flows keep the sanchalak motivated to spend time and money in calling the ITC representatives to find out about new products, convey village demands and provide local updates. ITC maintains commercial volumes and therefore commission checks flowing through e-Choupal by intelligently sequencing procurement and sales all year round.

3.4.2 Selective Disintermediation – The Commission Agents

ITC recognized the fact that complete disintermediation would result in the loss of an essential service especially in the rural context. The goal was selective disintermediation so that agent would participate, but only as providers of essential services, not as principals in a trading transaction. Another of the important reasons for keeping the commission agents as part of the new value chain was that these agents knew village dynamics. They knew who grew what product, what their financial situation was etc. There is no other source of such information for rural India and this information can make or break the model.

Thus, by creatively organizing the roles of traditional intermediaries who deliver critical value in tasks like logistic management at very low costs in a weak infrastructure economy, the e-Choupal ploughs back a larger share of consumer price to the farmer.

3.4.3 Re-engineered Value Chain

The re-engineered value chain is different from the traditional value chain in the following aspects:

- *Price Setting*: The benchmark price is static for a given day. Information on prices is communicated to the Sanchalaks through the e-Choupal portal. The commission agents are responsible for feeding daily mandi prices to e-Choupal. Also, the price quoted to the farmer is conditional and the farmer has the option to refuse the sale.

- *Quality tests*: These are performed right in front of the farmer and any deductions are rationalized to the farmer. Also, the entire process is more scientific for instance, weighing is done by means of electronic machines and instruments like moisture meters are used to measure moisture content.

One of the greatest benefits of this re-engineered supply chain is that the farmer collects his payment in full at the cash counter before returning to the village. This saves the farmer multiple trips to the mandi and hence saves time and cost. The farmer is also re-imbursed for his freight expenses at the time of depositing his produce at the mandi.

Besides providing an alternative marketing channel, this value chain engenders efficiency in the functioning of mandis through competition and serves to conserve public resources that would otherwise be needed to upgrade the mandi infrastructure. There are logistics cost savings between the farm and the factory where non-value added activities have been eliminated. Infact, marketing and distribution to 60 per cent of India's workforce living in rural areas might be the real growth engine for ITC.

Transaction Costs in the Mandi Chain (in Rs. Per Metric Ton)	
Farmer Incurs:	
Trolly freight to Mandi	= 120
Labour	= 50
Kachcha Adat	= 150
Handling Losses	= 50
Total incurred	= 370
Processor Incurs:	
Commission to the agent	= 100
Cost of gunny bags	= 75
Freight to factory	= 120
Handling at Mandi	= 40
Total incurred	= 335
Total cost incurred in the old process	**= 705**

Transaction Costs in the e-Choupal Model	
(in Rs. Per Metric Ton)	
Farmer Incurs:	
Trolley Freight to ITC hub	= 120 (reimbursed)
Processor Incurs:	
Commission to Sanchalak	= 50 (down from 100)
Cost of gunny bags	= 75
Storage and handling at Hub	= 40
Cash disbursement costs	= 50
Total cost incurred in the re-engineered model = 335	

3.4.4 Gain to the Farmer

Better Information Content: Prior to the e-Choupal the farmer's information was incomplete or inaccurate. Now the e-Choupal allows farmers access to prices at several nearby outlets. Infact, now the farmers can even access external pricing indicators such as prices on the Chicago Board of Trade website to track global trends and determine the optimum timing of their sale. This gives the farmer the empowered choice to sell or not sell his product.

Transaction Losses: Most farmers have to travel long distances to come to the mandi and incur costs of overnight stays or multiple trips. The sale to ITC takes no more than a few hours. This means lower logistic costs for the farmer. ITC's electronic weighing scales are accurate and impartial as compared to the mandi's manual scales. This helps eliminate pilfering and loss of produce.

Professionalism: The ITC procurement center is a well maintained professionally run operation where the farmer is treated with respect and actually serviced as a customer.

These factors work to provide a better price for his crop, reduce transaction losses and give the farmers a sense of dignity. Also, there is an increased bottom line for the farmer in way of increased yields, improved quality of produce and reduced transaction costs.

3.4.5 Gain to ITC

Disintermediation Savings: The commission paid to the agents were not excessive but the true cost of intermediation, including the rent seeking was between 2.5 per cent and 3 per cent of procurement cost. A 0.5 per cent commission to the Sanchalak has replaced this.

Freight Costs: Direct reimbursement of transport costs to the farmer is estimated to be half of what ITC used to pay the commission agents for transport to their factory.

Control on Quality: Removal of intermediary manipulation of quality and the ability to directly educate and reward quality in the customer base results in higher levels of quality in e-Choupal procurement.

Risk Management: The e-Choupal allows ITC to develop long term supplier relationships with its farmers and attain some modicum of social security over time. Risk is also managed in the e-Choupal by far stronger information infrastructure.

3.4.6 Sources of Efficiency in the New Model

Pull based Marketing: This channel is different from the traditional channel in that where agricultural inputs were sold mainly by pushing it to the end customer through dealers, now farmers educated in best practices understand exactly what inputs they need and why they need it. This eliminates the need to spend time and money in advertising.

Demand Aggregation leading to Scale Economies: In the rural environment, physical infrastructure is inadequate. The scale economies allowed by aggregation are crucial for keeping down logistics costs.

e-Choupals ensure quality in delivering products and services through several product/service specific partnerships with the leaders in the respective fields. ITC gives the participating company direct access to the customer through e-Choupal in return for a commission.

e-Choupals also impact the future of the villages in which they operate. They aid in the following activities:
-   Children use computers for schoolwork and games

- Sanchalaks chat extensively about the status of operations and agriculture in their villages

- Villagers access global resources to learn about agriculture in different parts of the world so as to compete, not just at the local mandis but also elsewhere in the world

4.0 Social Impact of e-Choupal

The e-Choupal model profitably provides an inaccessible village with a window to the world. E-Choupal brings with it higher remuneration and appreciation of the professional transaction, which is causing several shifts in the social fabric.

Bridging the information gap, cheaper and smarter agricultural inputs and farmer as a source of innovation – all these factors together contribute to better agriculture, higher quality of produce and consequently better lifestyles. E-Choupal leverages technology to reach out to a wide base of farmers wherein the sanchalak ensures that the practices actually make their way from the website to the field. The services offered by the e-Choupal include:

- *Weather* – This is a very popular section on the Web site because it provides localized weather information at the district level. E-Choupal's weather information is intelligently coupled with advice on the activities in the agricultural lifecycle. The availability of accurate rain information has cut losses due to weather by more than half.

- *Agricultural Best Practices* – Scientific practices organized by crop type are available on the Website. Additional questions are answered through FAQs (frequently asked questions) and access to experts who respond to emails from the villages.

- *Customized Quality Solutions* – After sale of a crop is completed ITC performs laboratory testing of the sample collected. Based on these results, farmers are given customized feedback on how they can improve crop quality and yield.

- *Intelligent Product Deployment* – Inputs such as fertilizers and pesticides are not generic in their application and are relative to the soil type and crop. Determining these parameters requires services such as soil testing. ITC's 'full-service' approach provides this advise by coupling the input sale to the information on the Web site and

services such as soil testing. At the same time ITC benefits from net procurement costs that are about 2.5 per cent lower (it saves the commission fee and part of the transport costs it would otherwise pay to traders who serve as its buying agents at the mandi). The system provides direct access to the farmer and to information about conditions on the ground, improving planning and building relationships that increase its security of supply.

The global resources, practices and remuneration the e-Choupal brings to the farmer has helped bring out their ideas as regards innovations and given then an avenue to see these realized. This fits in perfectly with the ITC vision of using the e-Choupal as the *'intelligent first mile'*.

Having set up a streamlined process for bringing products out of rural India, ITC can leverage that to take products into rural India. The Sanchalaks can pick up market signals and consumer information first and transmit them back to the distribution channel.

5.0 Financial Institutions

ITC has also tied up with banks such as ICICI and designed products tailored to rural India. These include:

- Non cash loans for farm inputs: Banks purchase inputs on behalf of the farmer and the farmer is expected to pay back the loan to the financial institution

- Loans are given to Sanchalaks instead of directly to the farmer. The Sanchalak can manage credit risk much better since they have better access to the farmer

- Direct loans are given to the farmers based on Sanchalak recommendation

- Products are designed to deal with rural cash cycles such that payments that cannot be made in bad years, can be corrected for in later years

6.0 Intangible Benefits brought in by e-Choupal

E-Choupal has greatly helped in expanding people's freedom of choice and action and enhancing their capabilities to shape their own lives.

Economic Empowerment

- Connecting people to markets
- Policy for investment climate
- Property rights
- Quality Infrastructure

Social Empowerment

- Access to assets and basic services (health, education)
- Downward accountability

Political Empowerment

- Access to Government
- Regulation with minimum corruption

7.0 Drawbacks

- The revenues of commission agents are lesser than they were before the system of e-Choupal.
- The workers in the mandis who were employed to bag and weigh products have lost their jobs because of use of machines for these purposes
- Mandis have lost taxes that contribute to maintaining their infrastructure since there has been a diversion of tax revenues to the mandis located near the procurement hubs
- Villages are stratified and not everyone can access the e-Choupal at the Sanchalak's home. Income level differentials are large and the female population does not have access to the computer. The gender barrier has thus not yet been impacted. Engagement with the female population may be possible through the active distribution through e-Choupal, of products tailored especially for them.

8.0 Key Success Factors

- Insights into the agricultural value chain, rural India, and the distribution business is essential in order to figure out the value addition as a result of Information Technology
- Entrepreneurial capacity of the rural community and building this capacity in way of training
- Retention of the more important aspects of the existing system
- Tie-ups with local partners

On the whole though, the e-Choupal has largely been a success. With its model ITC has succeeded in creating barriers to competitive entry in way of scale of operations and rural know-how. The e-Choupal model demonstrates that private partnership can play a major role in recognizing markets and increasing the efficiency of an agricultural system, while doing so in ways that benefit farmers and rural communities as well as shareholders. The case also shows the key role of information technology— in this case provided and maintained by a corporation, but used by local farmers—in helping bring about transparency, increased access to information, and rural transformation. Critical factors in the apparent success of the venture are ITC's extensive knowledge of agriculture, the effort ITC has made to retain many aspects of the existing production system, including maintenance of local partners, the company's commitment to transparency, and the respect and fairness with which both farmers and local partners are treated.

9.0 Framework of evaluation for E-Choupal

Approach	Criteria of Evaluation
Sen's Capability Approach	**Indirect measures** • Increased productivity-Reduction in transaction costs and total time consumed. All buying and selling transactions are more professional. Access to information on best practices, high yielding variety etc has resulted in greater productivity. • Increased Growth- Prior information on weather and best practices has enabled the farmers to improve production. **Direct measures** • Human development-The ITC procurement centres is a professionally run operation where the farmer is treated with respect and actually serviced as a customer. ITC has helped in the development of entrepreneurship by training the farmers in basic business skills.
Brown's Information Based Evaluation Methodology	• **Measures of coverage**-The kiosks have help link the rural society to not only other parts of India but also with the Chicago Board of Trade. In addition to this the farmers have access to international prices. ITC helps provide the entire gamut of services to the farmer instead of addressing individual areas only. • **Measures of linkage**- Access to prices has enabled the farmers to sell their produce at the right time and in the right place. • **Measures of direction**- Information kiosks provide a two-way flow of information where farmers and other citizens can pose queries and these are addressed within a day or two by the relevant authorities. This has helped closed the gap between the citizen and administration.
Sustainability/ Scalability/ Profitability	The e-choupal model is already sustainable and profitable and is being replicated all over. The e-Choupal model is not subsidized. ITC shareholder looks for a competitive return, like all shareholders do and there is no government money involved. ITC took the initiative to re-engineer the entire existing value chain and this has resulted in reduced transaction costs and better prices to farmers thus ensuring its sustainability by providing a service to farmers that is valuable.

Case Study 2

E-Seva: Public Delivery System at its Best

eSeva: The Pioneer of Citizen Services

eSeva was created with citizen service as the motto, the word 'seva' meaning service in Sanskrit language. Started in December 1999 (ahead of the Kerala government project FRIENDS, which got piloted in June 2000) eSeva is a major e-governance initiative which provides 132 G2C and 15 B2C citizen-friendly services from 16 departments and 10 business firms including online transaction processing of payments, issue of certificates, permits, licenses and many other services.

1.0 The Seva Concept

Wouldn't it be nice if all that a citizen wants from government can be obtained at a single place without having to go to so many offices and without enormous delays, complicated procedures, tension, vexation and harassment? When it was conceptualized, eSeva of Andhra Pradesh was the first of its kind in the country, with citizens being able to pay government dues and take licenses and certificates from any counter at any of the Integrated Citizen Service Centres (eSeva centres) built under the project, or through internet at the eSeva website, www.esevaonline.com thereby rescuing the citizens from a situation in which they had to experience vexation, face harassment and spend considerable amounts of time to accomplish such mundane tasks as paying utility bills, getting a driving license etc. For instance, small traders had to deal with a large number of government agencies to obtain a trade license which is now dispensed by eSeva, thereby saving a lot of their time, effort and money.

It covers various departments like APTRANSCO, BSNL, HMWS&SB, RPO, MCH, APSRTC, Registration & Stamps, Commercial Taxes, Small Savings, Transport, Tourism, Medical & Health, etc. under one roof. The project achieved single window integration of all services, facilitated real-time, online transactions and introduced an electronic queuing system to reduce waiting times.

2.0 Project History

The project started off as TWINS (TWincities Integrated Network Services) in December, 1999, as a pilot in only one ward in Banjara Hills area. The overwhelming response from the citizens led to the decision to roll it out across the entire State. TWINS was renamed in August 2001 as eSeva with the launch of 10 more centers in the twin cities of Hyderabad and Secunderabad. Presently, there are 43 eSeva centers in the city and 42 eSeva centers in various municipalities in the districts and 2 Bank branches each of Andhra Bank, SBH, and SBI respectively and these eSeva services are also available through 81 ATMs of Andhra Bank serving nearly 30,000 citizens per day.

3.0 Private Partnership

This is achieved through public private partnership marrying the strengths of public and private domains. The project is being implemented on a turnkey basis by the Andhra Pradesh government and its private partner Ram Informatics.

4.0 The Challenge

The eSeva concept could be novel even in the context of a developed country because integration of federal, provincial and local services and their delivery through a single counter has not been attempted anywhere. Departments have for long been working independently to meet their own goals instead of together to co-ordinate citizen interfaces and services. The project attempts to breach this "silo" thinking. The transactions being on-line and real time cause the administrative departments to computerize their work and quite often reengineer processes. In the process the government hopes to reward its citizens with better service and itself with lower costs by becoming more demand-driven and citizen-centric.

Getting all the relevant data matched within and between agencies and eSeva is paramount. It's

essential to get agencies setting standards, integrating their systems, sharing information, and giving access to eSeva to the latest information. The information must be consistent, accurate, and up-to-date. One of the most common problems identified by both the users and the eSeva center heads was the delay in updating the information by the various client departments. The single biggest hurdle faced by eSeva is coordinating all the information sources ensuring consistency of data, information, decisions and service. Excellent information management is required – input, retrieval, documentation – to ensure consistency.

Though there is a sophisticated network system in place, there is an urgent need to integrate the legacy systems of the various government departments with the latest technology. It's important to develop technology and data standards, agreed ways of working and agreed information and service protocols. Many other issues must be considered beyond how processes can be brought online. How can security be ensured? How can we maintain current information from agency to agency? What needs to be changed, and what must be preserved? And without cooperation and collaboration in and between agencies, eSeva concept will not yield the desired benefits. Successful governments worldwide focused their customer service improvement efforts on re-engineering business processes - far more so than on automation or staffing and are now in a better position to serve their citizens.

5.0   Features

The goal of e-Seva is to establish a SMART (Simple, Moral, Accountable, Responsive and Transparent) government. Therefore the e-Seva centres are located within reasonable proximity of all citizens and act as a one-stop-shop which provides to the citizens services and information of departments and agencies of State and Central Governments and local bodies in an efficient, reliable, transparent and integrated manner with a view to ultimately eliminate face-to-face interaction between the government and the citizen

which has many drawbacks. There are no jurisdiction limits – any citizen in the twin cities can avail the services at any of the eSeva centers. Services can be availed on holidays also. eSeva accepts all forms of money and payments can be made through cheque, Demand Draft, cash or Credit Card at all eSeva counters. Payments can be made over the Internet also. The online services include e-forms, e-filing of property tax and e-payments. Citizens are not charged for any utility payments.

Since eSeva data centers communicate with the servers of the client departments, on an online, real-time mode, payment particulars get updated on the department servers spontaneously in real time. Hence bills paid at eSeva for utilities will ensure that the utility services are not disconnected. Moreover, payment receipt issued by eSeva will be treated as conclusive proof of payment.

6.0   Revenue Model

The initial business plan was to earn revenue for the project from three sources, viz, transaction-based service charges on citizen-to-government transactions, similar service charges on transactions for other businesses and revenue from advertisements on receipts and on the Internet transaction portal. Of these only the first is currently operational.

7.0   Commendations

eSeva hopes to leverage on the Internet technology to eliminate barriers to enterprise information management and provide citizens with richer self-service over the Web, 24 hours a day, 365 days a year. The uniqueness of eSeva has also been acknowledged by the World Bank and has cited eSeva as one of the best eGovernance practices in the "Government World". The project is cited as a best practice by agencies, corporates and leaders worldwide. The Project is the recipient of the prestigious CAPAM Certificate of Achievement, Computer World Honors Medallion and has received the ISO 9001: 2000 Accreditation.

8.0 Services Available (132)

List of Department-wise Services Offering Through eSeva in Twin Cities and RR Dist. (132)

Sl. No	Department	Service
	G2C Services (117)	
1	APCPDCL (1)	Payment of electricity bills
2	HMWS&SB (2)	Payment of Water bill
		Reservation of Water Tanker
3	Municipal Services (16)	Payment of Property Tax of MCH
		Payment of Property Tax of LB Nagar
		Payment of Property Tax of Qutbullapur
		Payment of Property Tax Gaddiannaram
		Payment of Property Tax Kukatpally
		Payment of Property Tax Uppal
		Payment of Property Tax Kapra
		Payment of Property Tax Malkajigiri
		Registration of Birth Certificates
		Issue of Birth Certificates
		Registration of Death Certificates
		Issue of Death Certificates
		Renewal of Trade Licenses
		Registration of New Trade Licenses
		Issue of Prepaid Parking Tickets
		Payment of Property Tax of commercial establishments
4	BSNL (2)	Payment of telephone bills
		Sale of ITC Cards
5	APSRTC (1)	Reservation of APSRTC Tickets
6	RPO (2)	Sale of Passport applications
		Filing of Passport applications
7	CTD (5)	Filing of A1/A2/AA9 Returns of APGST
		Filing of C6 Returns of APCST
		Payment of RD Cess
		Payment of Entertainment Tax
		Maha Bill
8	R&S (1)	Sale of Non-Judicial Stamps
9	RTA (2)	Payment of vehicle tax for non-transport vehicles
		Payment of quarterly tax for transport vehicles
10	Income Tax (1)	Filing of IT Returns
11	Education (9)	Payment of Examination fee of Board of Intermediate Colleges
		Sale of EAMCET applications
		Results of Intermediate Final Examinations

Sl. No	Department	Service
		Results of Intermediate 1st Year Examinations
		sale of ICET application
		Sale of ECET applications
		Sale of LAWCET applications
		Sale of DIETCET applications
		Sale of applications for eligibility test for Open University
12	APPSC (3)	Sale of applications for APPSC Information
		Results of Group II Recruitment
		Issue of duplicate hall tickets for Group I examination
13	Police (67)	Payment of Inquest/Panchanama fees
		Payment for First Information Report
		Payment for Inquest/Panchanama fees
		Payment for Post Mortem Report
		Payment for charge sheet
		Payment for Missing of Passport
		Payment for Missing of Cell Phone
		Payment for Missing of Certificate/Documents
		Payment for Barath Pocession
		Charges for shifting vehicle from A.P.to other states
		Payment for Police Clearance Certificate
		Payment for Cycle Stand (Vehicle Parking)
		Payment for Missing of Registration Certificate/Driving Licence etc.,
		Visa Fee: Upto 1 Year
		Visa Fee: Upto 3 Years
		Penal Fee
		Visa Fee: Upto 5 Years
		Charges for Inspector/Reserve Inspector (Day)
		Charges for Heand Constable (Day)
		Charges for Police Constable (Day)
		Charges for Police Constable (Night)
		Charges for Head Constable (Night)
		Charges for Sub Inspector/Reserve Sub Inspector (Night)
		Charges for Inspector/Reserve Inspector (Night)
	Police (67)	Charges for Sub Inspector/Reserve Sub Inspector (Day)
		Charges for Category 1 (Initial Fee)
		Charges for Category 3 (Ordinary) (Initial Fee)
		Charges for Restaurants (Initial Fee)
		Charges for Tea Stalls (Initial fee)
		Charges for Tea Stalls (Renewal fee)
		Charges for Restaurants (Renewal Fee)

Sl. No	Department	Service
		Charges for Category 3 (Ordinary) (Renewal Fee)
		Charges for Category 2 (3 Star) (Renewal Fee)
		Charges for Category 1 (5 Star) (Renewal Fee)
		Charges for Category 2 (3 Star) (Initial Fee)
		Charges for One Band Type Loud Speaker (Per Day)
		Charges for Cultural Programmes (Per Day)
		Charges for Off Course betting center (Renewals)
		Charges for Off Course betting center (Licence Fee)
		Charges for Hyderabad Race Club (Per Day)
		Charges for Hyderabad Race Club (Application Form)
		Charges for Permission for Film Shooting/T.V. Shooting
		Charges for Permission for Show/Benefits Shows
		Charges for Cultural Programmes (Application Form)
		Charges for Band Music and Dance in Hotels/Restaurants etc., (Per Annum)
		Charges for Band Music and Dance in Hotels/Restaurants etc., (Per Annum) (Renewal)
		Charges for Exhibition, Cultural Programmes, Fashion Show, Personality Contest (Application Form)
		Charges for Exhibition, Cultural Programmes, Fashion Show, Personality Contest (Per Day)
		Charges for Blasting Permission (15 Days)
		Charges for Blasting Permission (30 Days)
		Charges for M.L.Gun(Meizzle Loading Gun) (Renewal Fee)
		Charges for M.L.Gun(Meizzle Loading Gun) (Initial Fee)
		Charges for B.L. Guns (Meizzle Loading Gun) (Renewal Fee)
		Charges for B.L. Guns (Initial Fee)
		Charges for B.L. Guns (Renewal Fee)
		Charges for 22 Rifle (Renewal Fee)
		Charges for 22 Rifle (Initial Fee)
		Charges for Revolver, Pistol Rifle (Renewal Fee)
		Charges for Form XI : License to Repair, Test Sell or Transfer (Initial Fee)
		Charges for Form XVI : Import Licence (For More than one weapon & Ammunition)
		Charges for Form XX : Transport License (For More than one weapon & of Ammunition)
		Charges for Form XX: Transport License (single weapon)
		Charges for Form XVI:Import License (single weapon)
		Charges for Form XII : Licence to sell transfer or test (Initial Fee)
		Charges for Form XII : Licence to sell transfer or test (Renewal Fee)
		Charges for Form XIII : License to sell transfer or test and keep for sale, transfer or test (Renewal Fee)

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Sl. No	Department	Service
		Charges for Form XIII : License to sell transfer or test and keep for sale, transfer or test (Initial Fee) Charges for Form XI : License to Repair, Test Sell or Transfer Renewal Fee)
14	SAAP (1)	Sale of Tickets for Games/Events
15	HUDA (1)	Sale of HUDA Plan Books
16	Labour Department (3)	Renewal of Trade Licenses Registration of New Trade Licenses Change of numbers
B2C Services (15)		
1	Tata Teleservices Ltd.(1)	Payment of TTL Telephone bills
2	Reliance (2)	Filing of applications for Reliance CDMA Mobile Phones Payment of Reliance telephone bills
3	Airtel (3)	Sale of Magic Cards Sale of new kits of Airtel Mobile Phones Payment of Airtel Bills
4	Western Union Money Transfer	Transfer of money using Western Union Company
5	Appolo Services	Teleconsultancy
6	Pioneer Online	Sale of cards
7	Movie tickets	Sale of movie tickets
8	Idea	Sale of chit chat cards
9	India times	Sale of cricket t - shirts
10	First Flight Courier Ltd.	Booking of Courier Sending Emotional Bonds Delivery of Certificates to Citizens

9.0 The Technology

The provision of integrated services is being achieved through the use of three-tier technology with an Application Server acting as a bridge between :

- The databases of the departments located in different parts of twin cities, and
- The clients at the counters in the ICSCs are thin clients with only a browser loaded.

9.1   Hardware & Software at each eSeva center

- 2 'Sun' make, E250 model Servers with 100 per cent redundancy and 2 Compaq make, ML 530 model database servers with 100 per cent redundancy.

- Oracle 9iAS – Application Server running on Sun Solaris 8 Operating System.
- Oracle 8i Release 3 Database Server running on MS Windows 2000 Operating System.
- One Firewall Server
- One Web Application Server for Portal
- One Network Monitoring System (NMS) running Cisco works on MS Windows 2000 Operating System.
- Java based front-ends
- Oracle database backend at all Departmental Servers.
- 10 KVA UPS for all the clients in Khairatabad center with one-hour backup & 5 KVA UPS for all the Servers in the data center with 45-minute backup.

- 5 KVA UPS in all centers with 30-minute backup.
- About 10 clients and 10 printers, including a Laser printer and PVC card printer for printing driving licenses at each ICSC.

9.2   Connectivity

A combination of Leased Lines, ISDN lines and Asynchronous lines has been established to connect the e-Seva data center to all the departmental servers and to all the eSeva service centers.

10.0 Volume of Transactions

Month	No.of transactions	Value of collections (in crores)	Month	No.of transactions	Value of collections (in crores)
Aug-01	4764	0.43	Jan-03	748910	431.99
Sep-01	26965	2.9	Feb-03	730756	427.70
Oct-01	55076	6.8	Mar-03	750403	435.17
Nov-01	81113	9.7	Apr-03	800160	193.81
Dec-01	121169	13.6	May-03	800582	366.12
Jan-02	145577	16.2	June-03	750167	449.80
Feb-02	146542	18.3	July-03	1003028	263.48
Mar-02	196726	25.4	Aug-03	889358	250.49
Apr-02	188092	25.04	Sep-03	911155	250.87
May-02	264676	37.12	Oct-03	867093	269.48
Jun-02	249594	39.94	Nov-03	873232	248.10
Jul-02	431887	53.97	Dec-03	937762	251.45
Aug-02	465552	47.1	Jan-04	967471	270.85
Sep-02	490583	51.42	Feb-04	964097	254.15
Oct-02	643440	57.21	Mar-04	1111090	269.3
Nov-02	564889	129.51	Apr-04	1045829	257.32
Dec-02	700088	503.73	May-04	1124137	299.01
			Total	20051963	6227.46

Chapter 4: Analysis of Case Studies and Hypotheses Testing

11.0 Framework of evaluation for e-Seva

Approach	Criteria of Evaluation
Sen's Capability Approach	**Indirect measures** • Increased productivity-through reduced corruption/unproductive rent-seeking, reduction in transaction processing time. • Increased Growth-through possible benefit to traders with linkage of eSeva services with authorities responsible for granting trade licenses. **Direct measures** • Human development-improved medical and health facilities through this programme. May have impact on life expectancy in the long run.
Brown's Information Based Evaluation Methodology	• Measures of coverage-Improved information access and storage through use of ICT • Measures of linkage-No feedback mechanism yet incorporated. • Measure of direction-increased transparency in government has improved its image while at the same time effecting government procedures.
Sustainability/Scalability/Profitability	This is an excellent example of an initiative where the government provides utility services levying attractive user charges while at the same time being scalable. Such efforts would in the long run lead to a reduction in the fiscal deficit reducing infructuous expenditure by the state. An attempt has been made to sustain the eSeva project by marrying the strengths of public and private domains. The project is being implemented on a turnkey basis by the Andhra Pradesh government and its private partner Ram Informatics. The initial business plan was to earn revenue for the project from three sources, viz., transaction-based service charges on citizen-to-government transactions, similar service charges on transactions for other businesses and revenue from advertisements on receipts and on the Internet transaction portal. Of these only the first is currently operational but when other options become operational the project will also become sustainable and scalable.

12.0 Conclusion

However, low awareness/computer literacy of the majority of the population may prove to be a major obstacle to the achievement of total coverage. Still it was decided to roll out eSeva services to all 117 Municipalities of the state covering 85 per cent of the population of the state. Of these 42 centers in various municipalities covering eight districts are already operational.

The runaway success of the project is reflected in the tremendous goodwill it has garnered from the citizens within a short span of just one-year. As a sample, one user department alone, the Municipal Corporation of Hyderabad could collect taxes to the tune Rs. 7.81 crores from 31,683 citizens within a month through e-Seva.

Case Study 3

RASI: Rural Access to Services through Internet

RASI: Rural Access to Services through Internet

RASI is essentially the integration of rural society by means of the Internet – connecting people and leveraging the network effect. The concept of Network Society is thus made viable and capacity building is a key outcome.

1.0   Introduction

To bridge the Digital divide, Government has taken an initiative called Sustainable Access in Rural India (SARI) and a pilot project was launched in Melur, Madurai District to build up the necessary rural infrastructure. The Sustainable Access in Rural India project (SARI) seeks to show that viable markets exist for information and communication services in rural areas by inventing and deploying innovative technologies, assessments, and business models. The ultimate goal is to link these activities to sustainable human development objectives.

Aimed at building connectivity infrastructure for the benefit of rural citizens, it started as a new concept, as a research and development initiative to test a locally developed wireless technology by the Telecommunication & Networking (TeNet) Group, Indian Institute of Technology Madras, with assistance from MIT Media Lab Asia and the Center for International Development (CID), Harvard University.

Through the development and introduction of appropriate and enabling technologies and applications, SARI will foster economic development and improve health and learning. It will do so in a financially sustainable way, even as it reaches into the poorest and most disadvantaged communities. SARI's diverse partnership of universities, non-profit organizations and the private sector has helped implement a unique project that will begin by wiring approximately one thousand neighbouring rural villages in each of two Indian districts.

After the successful implementation of this pilot project, the Government scaled up the project as e-Governance delivery centers throughout Tamil Nadu through the Rural Access to Services through Internet (RASI) project. Why connect so many villages?

SARI's magnitude is essential because it will allow us to benefit from the *Network Effect*, which will be far more empowering than a few connections placed only in more urban areas. The large number of users helps support financial viability by aggregating demand and developing richer content and community by integrating people, thus allowing Internet access to be financially self-sustaining or profitable while reaching the rural poor.

The RASI Project is dedicated to demonstrating that the creation, deployment, and delivery of information and communication services and technologies in poor rural areas leads to improvements in health, empowerment, learning, and economic development in these communities - and very importantly - that such services can be realized in an economically sustainable fashion.

2.0   Focus Areas of the RASI Project

2.1   Inventing and deploying innovative and context-appropriate technologies, applications, and highly localized content that lead to economic and social development;

2.2   Conducting social and economic impact assessment research of these technologies;

2.3   Testing and generating business models that lead to profit generation and allow the services and technologies to be self sustaining;

2.4   Benefiting from the Network Effect that comes from connecting up a large number of communities and users, aggregating demand and integrating markets.

3.0 Services

3.1 Information

A Kiosk will be connected to the website containing information relating to details of all schemes, copies of application forms for all certificates that can be downloaded, both in English and Tamil, as well as details about how to use each form.

3.2 Forms

Online applications and registration.

3.3 Data

Data relating to rural development available online. The Kiosks have come in handy for compiling databases of villages, for specific uses, and for dissemination of information on health and government announcements using local radio.

3.4 Education

Online educational content for schools is provided – test papers for Class 10 and 12 Board examinations, tutorials for English, Mathematics and Science,

special tutorials in lessons that are particularly difficult for students and application forms of all educational institutions and entrance examination forms for all State-run competitive examinations.

3.5 Healthcare

Online consultancy such as getting an Out Patient Department (OPD) registration number or scheduling tests at laboratories is provided by connecting block and district level hospitals. In fact, the audio and video streaming services at Kiosks are used to send out important healthcare messages.

3.6 Agriculture

The Agriculture Department's online extension services include connectivity to the Tamil Nadu Agricultural University and Agricultural Extension Officers in each block, availability of market prices, training programmes for farmers and even providing soil test reports by connecting the Soil Sciences Lab via the Internet. The Animal Husbandry Department provides similar facilities as well.

4.0 Sustainability of the RASI Project: The Business Model

4.1 Revenue Model

The revenue model for a project like RASI would typically look like the one given below:

Capital Costs	Current Revenues (Income producing applications)
• Wiring, furniture Rs 15,000 • Kiosk equipment 50,000 • Other 15,000	• Training (Windows, Office) • Cybercafe applications (e-mail, surfing) • E-government services (caste, income, birth death certification, pension schemes) • Entertainment applications (Tamil movies, astrology, video games) • VoIP
Recurring Costs (monthly)	**Break Even Revenue**
• Rent, electricity, maintenance 1,316 • Internet 700 • Interest and depreciation 1,600	• Break-even revenue 3,500 (per month) 120 (per day) If equipment costs double 170 (per day)

Today all but one village kiosk reports over Rs. 100 per day income (roughly breaking even).

4.2   Economic Gains

If equipment, connections, rent and salaries, are the *economic pains* needed to offer rural Internet services, then user fees for applications and remote services, and income resulting from the aggregation of many users are the *economic gains*. Given that the technology components and public access business model is essentially a platform capable of facilitating a wide range of activities, more applications and content will allow revenue generation from a greater variety of sources and effectively lower the level of income necessary for the sustainability of each unique application. There will also be associated benefits arising from the wider and deeper integration of the telecenters and ICT within the community.

User fees, however, yield other benefits besides the generation of financial support; they also ensure economical use of the infrastructure and offer a market incentive and feedback for content, applications, and services that are appropriate to the users in that community.

There are two main classes of revenue production for rural Internet services:

1. First is *fee-for-services* such as core communications, education, commerce, government applications, entertainment, training, and so forth. Since the fees charged for these services are minimal compared to the costs incurred in the traditional system (transportation costs, time, middlemen) people are more than willing to pay for the services. Also, cross subsidization of services due to the involvement of the private sector and other such institutions helps provide services that cannot be offered otherwise, healthcare for instance.

2. Secondly, the *aggregation* of services and users provide opportunities for revenue. This is explained by the Metcalfe Law given below.

The *Metcalfe Effect* (or "law" [Gilder 2000]) argues that the value of any complete network such as the Internet grows with the square of the number of users, as opposed to a simple linear growth. Put simply, the Metcalfe Effect tells us two things. One is that the value of the Internet grows very quickly with the number of users, but, conversely, the value of the network is quite small when there are a small number of users connected. The Metcalfe Effect

suggests that the value to users, and thus self-sustaining demand for the network, will only be substantial when a sufficient number of interrelated groups are connected.

The upcoming expansion of the RASI project to cover more than 10 villages across Tamil Nadu is a step in this direction. It will ensure not just sustainability in general but economic sustainability in particular. One of the strengths of the community computer center model is that it easily allows for such Rural Internet services, clearly enjoying certain economies of scale and scope: significant numbers of users lower production and distribution costs, and awareness and breadth of use results in making the connection with overall human development.

4.3   Technology

Current network technology is based on the corDECT system that was jointly developed by the TeNet group at IIT Madras, Analog Devices Inc, and Midas Communication Technologies Pvt. Ltd., Chennai, India. corDECT provides cost-effective, simultaneous high-quality voice and data connectivity in both urban and rural areas. A corDECT access center is located roughly 25 kilometers from the kiosks. Optional relay base stations are located approximately 10 kilometers from kiosk village information centers or 15km from the Access Center.

The village information centers (TeleKiosks) are fixed wireless stations. For terrestrial systems, economies of scale are enjoyed as the number of subscribers increase per radio access tower erected, or copper or fiber cable laid. The corDECT system, a Wireless Local Loop (WLL) technology manufactured by the Midas Corporation, is an example that demonstrates these scale economies.

For all this, implementation of a massive project such as RASI has not been easy. There were various technical and financial considerations that had to be weighed before its commencement. The wireless technology (CorDECT) adopted for providing rural connectivity was specifically chosen to match the best available in urban infrastructure, as well as for its sustainability and capacity to keep abreast of constant changes in such technology. It was not adopted merely as a short-term research project but as a long-term solution.

4.4   Impact

4.4.1   Enhanced Economic Opportunities

Through the development and introduction of appropriate and enabling technologies and applications, SARI will foster economic development and improve health and learning. It will do so in a financially sustainable way, even as it reaches into the poorest and most disadvantaged communities. With RASI's efforts, it was found that the economic lives of people in rural areas became better. Market information such as demand and supply of local products helped villagers identify local skills and nurture them for pursuing better prospects in education and employment. This slowly led to a marked improvement in their lifestyles and standards of living. The wide range of services provided to the rural community enhances the opportunities to increase the trade activities of the small and medium enterprises operating the region through faster and cheaper communication.

4.4.2   Reduced Time and Cost

ICT services can substantially reduce the costs of distance and isolation borne by poor, especially rural, households, whose members must often travel long distances to communicate, and obtain vital information. Their isolation causes them to miss out on employment and other economic opportunities. Now empowered to access information and services, the rural folk are undergoing a process of social transformation. Since the villagers are now able to submit their petitions directly to the authorities concerned, remedies come faster. In fact, they are now able to submit their grievances even to the Chief Minister by e-mail and receive acknowledgement for the same, the best case really of rural empowerment.

Indeed, empowerment has reduced gender inequality and brought women to the forefront in a way.

4.4.3   Improved e-governance

ICT offer powerful tools to improve the efficiency, quality, and reach of public services that are important for poverty alleviation, such as education and health. ICT can also broaden political participation and increase the transparency of government. The e-governance services offered by these Information Kiosks that is one of the major benefits of this project.

4.4.4   Promoting Entrepreneurship

Based on the franchisee model this ICT project is promoting entrepreneurship. It provides ambitious members of the rural community, opportunity to take up Information Kiosk operation business moving away from old and traditional businesses and to prosper. This requires only a modest amount of capital investment. All technology and training is provided by the project. The project values local champions and entrepreneurs and encourages their leadership; cooperate with residents and existing organizations.

4.4.5   Connecting People

The RASI project has transformed the rural population of India and this has made their linkage with their relatives and friends outside the place stronger as they can now communicate quickly, cheaply and more often. This helps markets to work by wiring regions densely and creating a local Network Effect. Putting at least one connection in each village has promoted local/regional communication and information flows, while aggregating rural markets and attracting private sector interest.

4.4.6   Skill Development

From the very beginning of this ICT project, importance of personnel training and skill development was realized and a formal training program was scheduled for the Information Kiosk Operators. The local people with a minimum high school education and 3 - 12 months of computer education from ITI or a private institute were selected for being kiosk operators. They undertook an intensive training program preparing them for the task ahead.

5.0 Lessons

Indeed, several lessons relating to integrated rural development, the nodal role of the IT department, cooperation and coordination between departments has been learnt from the RASI exercise. Inputs from similar projects in other States have also proved useful. The RASI Project, it was felt, would work much better with the Central Government's support in favour of bringing IT to the masses. The service providers in rural connectivity like BSNL are also improving their infrastructure, wherever the throughput of data were minimal. Private initiative or a public-private partnership in this regard was found wanting; if the government supported private initiatives, infrastructure could be developed faster, it was learnt.

6.0 Framework of evaluation for RASI

Approach	Criteria of Evaluation
Sen's Capability Approach	**Indirect measures** • *Increased productivity* - The primary objective of RASI is to connect rural India and build the necessary rural infrastructure with a view to foster economic development, health and learning. This has helped enhance the opportunities to increase the trade activities of the small and medium enterprises operating the region through faster and cheaper communication. Moreover the project provides information on market prices, government programs, training programs for farmers - all of which are a factor that contribute to the productive capacity of rural society. • *Increased Growth* – The RASI project promises to increase employment and bring in new investment through its unique and diverse partnerships with universities, non-profit organizations and the private sector. The increased connectivity has helped integrate markets and co-ordinate demand and supply factors. This should lead to faster growth trajectory and consequent prosperity. • *Degree of empowerment* - The rural youth is trained to look after the centers making them confident and self-reliant, promoting entrepreneurship and helping the rural society move away from traditional forms of businesses. Also, remedies to grievances are provided almost immediately over the Internet – the best case really of rural empowerment. **Direct measures** • Human development - Literacy is an important component of the human development index and this project. Kiosks provide educational content and special tutorials to aid learning. In addition, it provides healthcare facilities to the rural poor by partnering with district and block level hospitals. Market information on demand and supply local products has helped villagers identify local skills and has provided them better prospects in education and employment. Already it has been found that the economic lives of people have become better.
Brown's Information Based Framework	• *Measures of Coverage* – The telecentres as they are today, provide multiple services including information about government schemes, prices of farm products, training programs for farmers, healthcare related announcements etc. It certainly increase the sources of information available to the people. With its wide rural connectivity - information coverage is probably the largest in India. Especially empowering the rural society. • *Measures of Linkage* - The success of the model depends on the density of linkages it creates with the users. This is the fundamental idea behind project RASI, which capitalizes on the Network Effect of the economy to make its project sustainable – connecting a large number of users, aggregating demand and integrating markets. • *Measures of Direction* - Participatory processes on their own increase the chances of information flow to be two-way. The RASI project provides for a strong two-way communication mechanism whereby queries may be addressed to the government and answers to the same are received within a days time.
Sustainability/ Scalability/ Profitability	• Today all but one village kiosk reports over Rs. 100 per day income (roughly breaking even). Given that the technology components and public access business model is essentially a platform capable of facilitating a wide range of activities, more applications and content will allow revenue generation from a greater variety of sources. However, this project is not at par with e-seva in terms of scalability, Bhoomi in terms of utility and e-choupal in terms of business model.

Akshaya – Leveraging the unique advantage of Kerala state

Akshaya - An IT Dissemination Project

The Akshaya project leverages the comparative advantages of the state of Kerala – its high rate of literacy and progressive social framework along with an already existing advanced telecom infrastructure. It thus hopes to create a network society of computer literates in order to leverage the social power of the state in a more meaningful way.

At the same time one questions the long-term sustainability of this project and whether involvement of the Panchayats can really be considered private participation for achieving developmental goals.

1.0   Introduction

Akshaya centers serve as full spectrum IT services delivery points. Akshaya's business model centers on providing access and infrastructure and creating entrepreneurship for sustainability. It is aimed at being a universal ICT program for imparting literacy. Delivery of Internet services to rural communities was one of the biggest challenges in bringing IT to the masses. Project Akshaya accepted this challenge head-on, and brought Internet services to the rural residents of Kerala. With a vast pool of educated unemployed youth, the state plans to exploit the possibilities of IT for employment and e-governance.

The motivation of the Akshaya project is that every household in the country should be exposed to the various possibilities thrown up by Information Technology. One person each from every family in the State will be given training in the basic use of computers and they would be empowered to access relevant e-content in the regional language.

The Akshaya project, a project implemented by IT Department, Government of Kerala with Private Sector Participation has been undertaken with the view to bridge the *digital divide* by the successful dissemination of benefits of Information Technology among people. It is expected to be the country's largest rural wireless network. It aims to improve public delivery of services by bringing the benefits of e-governance and utility services like basic connectivity to individual households in Kerala. As of now, there are 620 ICT centers, with each center servicing about 1000 families.

The factors that make Akshaya different from other projects of its kind are:

1. Unique partnership between the public and private community

2. Mass community mobilization based on earlier literacy campaign

3. Development of an organic relationship between the Akshaya center and its user

4. The scale of operations with spatial distribution as a key differentiating element

2.0   Akshaya – The Strategy

Akshaya follows a multi-pronged strategy that aims to:

1. Build an information highway
2. Create a user community
3. Offer IT based services

By leveraging Kerala's unique strengths

1. Active community organizations
2. Progressive social framework
3. Advanced telecom infrastructure
4. Wide- spread media penetration.

In order to create a new social and economic network for:

1. e-Governance
2. Education
3. Employment
4. Empowerment

3.0 The Akshaya project has three focus areas viz.

1. **Access:** Bringing the benefits of technology to the households in all sections and regions of the state

2. **Skillsets:** Facilitate the development of competence and skillsets and enable sufficient understanding of the world of Information Technology and how it can touch their lives

3. **Contents:** Provide ample Information base in local language relevant to citizens' lives.

3.1 Access

As the first step. Akshaya has set up information dissemination hubs named Akshaya e-Centers across Kerala. These centers ensure that every family in the State has easy access to the power of information Technology. Thus, they make available the power of networking and connectivity to the common man. Run by entrepreneurs, each center is envisioned as a self-sustaining unit with the proposed eLiteracy programme assuring baseline revenue.

Akshaya aims to provide a center within 2 km of every household with a total of 9000 centers. Each center would cater to an average of 1000 families and all centers would be networked over the Internet. They would be created and run by entrepreneurs chosen from within the society who have been trained for the task. The centers would also offer support facilities like web-cams, scanners, printers and fax machines.

3.2 Contents

In addition to opening up a wealth of data, Akshaya will also offer tailor made information for the citizens. Developed by industry experts, the content will cover every industry in Kerala- both traditional and new. The content is aimed at helping the user glean practical information with ease. Tools including customized software and CDs accessible at every Akshaya center will also be made available. A wide range of subjects including education, career development, agriculture, health, Information Technology, law and justice will be accessible over the Internet. Self-development and entrepreneurial modules covering spoken English, vocational training, personality development and career planning would be online. Since all the information would be available in

the local language, the acceptability and utility of such an initiative would be high.

3.3 Skillsets

One person each from every family in the State will be given training in the basic use of computer and they would be empowered to access relevant e-content in the regional language. The setting up of the centers itself is aimed at encouraging private entrepreneurs. Each center needs three to four trainers. Thus, the 552 centers would generate about 3,000 jobs for the citizens who would be trained and an investment worth Rs. 30 crores.

Though the center employs people who already have a fundamental background in IT, it also ensures hands-on skills in operating a computer, using the Internet in addition to entrepreneurial skills. It thus aids in catalyzing an unprecedented openness towards technology, thus guiding the common man towards leveraging the benefits of information technology. Extending the training initiative into a *service delivery mechanism* for the local citizen is one of the ways in which Akshaya will function. Once the people have been introduced to the immense possibilities of ICT, the next step envisaged is to make facilities available to them for exploiting the technology for everyday use. The focus here is to ensure a viable, sustainable service delivery mechanism for the citizens of the state through Akshaya Centres.

Malappuram was the first district in the state to embark on the project, in May 2003. Out of the 100 panchayats in the district, six have already become computer-literate; many more are in the process of doing so. Besides computer literacy, the programme also aims to encourage entrepreneurship in the IT sector and increase associated job opportunities.

As of now a total of 6.5 lakh citizens have been trained to work with PCs in these centers and about 8 million more will be trained in Software. These figures include as many as 68 per cent women.

4.0 Sustainability

One of the primary concerns of launching this project is that the business that was being set up continued to be profitable after the three month long Akshaya initiative. Continuity and continued sustainability have to be ensured if any programme of such scale has to succeed. Thus, it is not merely service delivery but

also capacity building which is given paramount importance. The State is doing something very interesting in this respect by committing itself to providing content in Malayalam. Teams of programmers and advisers are working to create useful content dealing with agriculture, health, education etc based on which a credible business model has been developed for the Akshaya centres to thrive.

4.1   Project Objectives

One of the primary differences between Akshaya and other projects is its scale of operations. It covers the 33 million population in Kerela, and aims at a making 6.5 million e-literate by the year 2005.

- To develop over 7500 numbers of networked Multi-purpose Community Information Centers (Akshaya Centers) to provide ICT access to the entire population of the state
- To make at least one person in each of 65 Lakh families in the state IT literate
- To enhance the quality of available IT infrastructure in the state
- To extend the IT infrastructure to the rural parts of the state
- To accelerate the development of local content relevant to the population

4.2   Expected/Anticipated Benefits

- Create and expand economic opportunities in the knowledge economy
- Empower individuals and communities through enhanced access to information
- Modernize and upgrade skill sets
- Integrate communities through creation of e-networks
- Create awareness of ICT tools and usage
- Generate content relevant and useful to the common man
- Generate content in local language
- Generate over 50,000 employment opportunities in 3 years
- Generate direct investment of over Rs. 500 crores in 3 years

The ultimate aim is to set up 9,000 Akshaya e-centers networking 300 lakh people across 60 lakh households. It is expected to create over 50,000 job

opportunities and attract investments worth Rs. 5 crores.

5.0   Public-Private-Partnership

The Akshaya project is conceived as a public-private partnership (PPP). But the local bodies (Panchayati Raj Institutions) will be extensively involved in the implementation of the project.

Currently, there are 630 Centers and approximately 1,000 -1,500 households access each of these centers. Each center has about 5-10 PCs in addition to a scanner and a webcam for video conferencing. The total investment in the project is at Rs.2-3.5 Lakhs per center by a private entrepreneur. The capital required for setting up the facilities provided by each of the centers will be borne by the private entrepreneurs. The initial cost of setting up the wireless infrastructure (broadband connectivity) would be shared by the entrepreneurs and the state in a 50:50 ratio. In addition, each entrepreneur would pay a monthly rent of around Rs.1000 for using the infrastructure. These centers will also be run by private entrepreneurs selected by the project managers.

5.1   Involvement of Local Self-government Institutions

In Kerala, Local Self-Government Institutions have been meaningfully empowered through massive transfer of resources as well as administrative powers. Coupled with a grassroot level approach of Participatory Planning whereby developmental programmes are identified and implemented through Gram Sabhas, the LSGIs have emerged as effective agencies for the implementation of developmental programmes. The major advantage of the LSGIs is that it involves the total participation of the local community on addressing its felt needs, priorities and development perceptions. These local bodies are thus, the best source of information of rural Kerela. Many of then have also conducted detailed objective assessment of the natural and human resources of the locality in order to develop a perspective for local level development that would make optimal use of the resources. The Gram Panchayats have ensured the active participation of all sections of the society irrespective of social, cultural or income groupings in the overall development of the state.

The Akshaya team took the needs of the people into consideration while designing the e-literacy programme. Malappuram has a population of around 350,000 most of them men who work abroad. The people behind the Akshaya programme realized that the Internet would offer people a cheaper, more accessible means of communicating with their family members working abroad.

5.2   Selection of Locations

The selection of location is based on multiple parameters at the District Panchayat and Grama Panchayat level. Easy access to the center is a major consideration, with a broad guideline that a center should be available to any family within a maximum distance of 2 Kilometers. While identifying new locations, existing computer centres too may be considered for conversion to Akshaya centres based on suitability of location.

The selection of location also involves checking the availability of power and telephone connections. As power costs are likely to vary depending on voltage levels and the need for using uninterrupted power supply systems, it is important that adequate data is available for the entrepreneur for making the selection of center location. In addition to the need for checking voltage levels over the day, the types of telephone exchanges serving each location and whether they are digital in nature is also studied.

5.3   Selection of Entrepreneurs

Prior entrepreneurial and IT experience and familiarity with the local region are the main considerations for selection of entrepreneurs to run the Akshaya project. The aptitude of the person to provide quality service and the ability to form a bonding with the local community are other considerations. Also, the ability to invest the requisite capital for the venture is also ascertained. In addition to financial strength, the entrepreneur's commitment to the project including his/her ability to be involved full-time in the project is another criterion.

Entrepreneurship is the cornerstone of the success of grassroot initiative, take the case of micro-credit and any other grass-root developmental initiatives. Selection of entrepreneurs is done by the local bodies based on a rating scale by conducting interviews. The

selected candidates undergo a training programme that acquaints them with the objectives and methodologies of running the center.

Entrepreneurship development programme is also planned for the entrepreneurs to motivate the entrepreneurs and to sensitize them to the dynamic market environment so that their chance of business success improves. The business model of the center is explained and the entrepreneurs have to run a commercially viable center. For such training, each Akshaya center was to get Rs.140 per trainee. The trainee is to pay Rs.20 to the Akshaya center. The rest of the money (Rs.120) came from gram panchayat, block panchayat and district panchayat.

Over 50 per cent of the entrepreneurs are graduates or trained in computers or having engineering education or are postgraduates. Over 80 per cent of the Akshaya centers have been established by new entrepreneurs themselves. The project thus aims to build entrepreneurial capacity and train the students on these lines. 11.7 per cent of the entrepreneurs are woman. Akshaya thus overcomes the gender barrier.

6.0   Nature of technology used

Major factors deciding connectivity are type of business/applications, price to performance ratio, budget constraints, reliability and scalability of the technology and service support available. Connectivity includes customer premise equipment (CPE), network and backbone, network center, the software, Internet access and management.

Minimum Internet bandwidth requirement of each of the Akshaya centers was fixed at Maximum Information rate (MIR) of 64kbps and Committed Information Rate (CIR) of 16kbps with Free download limit per month: Minimum of 500 MB per Akshaya center. Provisions for Enhancement of bandwidth and/ or download limit on request were also fixed. The Technology solutions needed to be proven in environments similar to Malappuram district, in scales similar to Akshaya project such that they are scalable to higher bandwidth (backbone as well as access) and larger number of locations on a larger area which is supported by obsolescence management plan.

7.0   Services

Akshaya centers have been set up to help citizens guide and support e-governance initiatives, intervene in community development, buy and sell online and to get relevant information.

The Akshaya project allows the state government to provide a range of e-governance and utility services to citizens. The project also allows citizens to use a service called 'Friends'. This is a single window distribution point for 35 services like payment of electricity bills, tax bills, and university fees. It is expected that around one million Keralites will access these services. Further, the state plans to use this wireless infrastructure for connecting all police stations, land records, the state forest department and the health centers. Over time Akshaya also hopes to provide services like online rural banking, online technology resource centers, e-enabled education centers, call centers, assisted health care and e-post.

In effect Akshaya hopes to be the precursor for a potential information highway.

8.0   Connectivity

As the locations of these centres are strategically planned and spatially distributed to cater to the people in all parts of the State, they will form a powerful network to guide and support the e-governance initiatives, community development interventions, e-commerce and information dissemination.

Internet connectivity is very fundamental to the success of the Akshaya Project in delivering the planned services and administering interventions in various sectors. The proposed rural Internet connectivity to be implemented through the Akshaya Project is expected about significant socio-economic

changes in the State. It would make possible timely and effective communication between the rural population and government departments and agencies, in ways that were previously not possible. Internet connectivity plays an important role in the democratic processes too. The government and other organizations will be able to obtain statistical information electronically and this would consequently improve the quality and timeliness of decision-making and delivery of services. On the economic development front, rural connectivity would mean more information on distant markets, market and consumption trends and future markets. Detailed information regarding best practices and techniques can be made available to the advantage of agriculture, fisheries and cottage handicraft industries. Internet connectivity would enable the citizens to carry out all sorts of transactions electronically. These would especially include financial transactions (e.g., making remittances, paying bills etc) and information-type transactions (e.g., arranging to obtain licenses). Educational opportunities would be greatly expanded by tele-education, or distance learning techniques. Telemedicine is an active and expanding field. Connectivity hopes to provide good quality data service capability which is essential in order transmit files accurately without data loss and to store medical reading and records.

For Akshaya Centres, it is thus of vital important that it fully meets the Internet connectivity needs of the citizens, communities as well as of small enterprises such that it is accepted and used by the community as a valuable community resource.

It still remains to be seen if the pilot would be sustainable in the long term, and if so how. Also, is involvement of the Panchayats equivalent to private participation? Also since the project is just out of its pilot phase, the actual impact of the project is still to be seen.

9.0 Framework of evaluation for Akshaya

Approach	Criteria of Evaluation
Sen's Capability Approach	**Indirect measures** • *Increased productivity* – The linkages between literacy and improved economic and social performance are well known and documented. The Akshaya project when implemented would, through the same channel exercise a positive influence on productivity. Moreover as the project matures it may also provide information on market prices, government programs, all of which would improve the productive capacity of rural society. • *Increased Growth* - The Akshaya project promises to increase employment and bring in new investment through its unique public-private partnership model. This should lead to faster growth trajectory and consequent prosperity. • *Degree of empowerment* - The rural youth is trained to look after the centres making them confident and self-reliant. In addition it can be observed that 11.7 per cent of the entrepreneurs are women. Empowerment of women is an important outcome of this project. **Direct measures** • *Human development* - Literacy is an important component of the human development index and this project, if successful in increasing the level of e-literacy by using ICTs would contribute directly to the human development of the populace in Kerala.
Brown's Information Based Framework	• Measures of coverage - If the Akshaya project expands and diversifies into telecentres in its mature/advanced stage, providing multiple services including information about government schemes, prices of farm products, matrimonial information, information about sale of second hand and other goods, then it would certainly increase the sources of information available to the people. In this way the Akshaya project would improve information coverage. • Measures of linkage - Any successful business model requires sensitivity to customer/user requirement. Since the Akshaya project is to run as any other business model its success hinges on its responsiveness to customer needs and consequently on the density of linkages it creates with the users. • Measures of direction- Participatory processes on their own increase the chances of information flow to be two-way and since local self-government institutions are involved in the management of the these centres, it is hoped and expected that information from these centres will be freely accessible to all sections of society.
Sustainability/ Scalability/ Profitability	The total investment in the project is at Rs.2-3.5 Lakhs per center by a private entrepreneur. The capital required for setting up the facilities provided by each of the centers will be borne by the private entrepreneurs. The initial cost of setting up the wireless infrastructure (broadband connectivity) would be shared by the entrepreneurs and the state in a 50:50 ratio. In addition, each entrepreneur would pay a monthly rent of around Rs.1000 for using the infrastructure. These centers will also be run by private entrepreneurs selected by the project managers. Since the project is still in its implementation stage, it is only in due time will one get to know of the sustainability of the initiative. The scalability and profitability will depend upon the success of the pilot venture. Even the continued support of the state would not make it a viable model under this criterion.

Chapter 4: Analysis of Case Studies and Hypotheses Testing

Case Study 5

Bhoomi: Effective Governance for the marginalized sections

Bhoomi - Improved Public Delivery

BHOOMI is an e-governance project for the computerised delivery of 20 million rural land records to 6.7 million farmers through 177 Government owned kiosks in the Indian state of Karnataka which has eliminated red tape and corruption in the issue of land title records, and is fast becoming the backbone for credible IT-enabled Government services for the rural population, thus, bringing relief for the marginalised sections.

1.0   Background

Sixty six per cent of the population of the Karnataka State resides in rural villages where agriculture is the main occupation. About 6.7 million farmers own 20 million land holdings. The crucial document, which records various parameters and information pertaining to the land holding, is the Record of Right Tenancy and Cultivation (RTC). The RTC is required for land transaction, for obtaining crop loans, other loans and concessions linked to the size of the land holding. In the earlier manual system, these records were maintained by 9000 Village Accountants (Vas) who serviced farmers in about 27,000 villages. The manual system of maintaining RTCs was exploitative.

Requests to alter land records (upon sale or inheritance of a land parcel) had to be filed with the Village Accountant. However, for various reasons the Village Accountant could afford to ignore these "mutation" requests. Upon receiving a request, the Village Accountant is required to issue notices to the interested parties and also paste the notice at the village office. Often neither of these actions was carried out, and no record of the notices was maintained. Notices were rarely sent through post.

An update to the land records was to be carried out by a Revenue Inspector, if no objections were received within a 30-day period. In practice, however, it could *take 1–2 years for the records to be updated*.

Land owners find it *difficult to access the Village Accountant*, as his duties entail traveling. The time taken by Village Accountants to provide RTCs has ranged from 3 to 30 days depending upon the importance of the record for the farmer and the size of the bribe.

Over time, several inaccuracies crept into the old system through *improper manipulation by the Village Accountant*, particularly with respect to government land. Even where accountants were law-abiding, village maps could not remain accurate as land was parceled into very small lots over generations. The system of physical verification of records by deputy tehsildars (supervisors of Village Accountants) became weak as the number of records multiplied and these functionaries were burdened with a host of other regulatory and developmental work.

The Central and State Governments have been acutely aware of the need to reform the land record system with the following objectives.

- Facilitating easy maintenance and prompt updation of land records.
- Making land records tamper proof.
- Allowing farmers easy access to their records.
- Collating the information to construct database regarding land revenue, cropping pattern, land use etc.
- Utilising the data for planning and for formulating development programs.
- Enabling usage of this database by courts, banks, private organisations and ISPs.

Computerisation of land records in Karnataka was started in 1991 when a pilot was initiated by the Government of India. By 1996, projects for computerisation of land records were sanctioned for all districts in the State aimed at creating computer records from manual data. However, since no provision was made to install computers at sub-district level, where online updating was to be done, these projected failed without achieving the above objectives.

2.0 Bhoomi - A New Approach

The first e-governance project of the Govt. of Karnataka was the Land Records Computerization System "BHOOMI". This project has been sponsored by the Ministry of Rural Development, Government of India and implemented by Revenue Department, Government of Karnataka. It permits online updating of land records making it radically different from land records systems attempted elsewhere in India, which update databases in offline model making it less current and therefore of not much use. The required software has been designed and developed in-house by the National Information Centre, Karnataka State Unit Bangalore.

Under the scheme, computerized land record kiosks have been set up in 140 sub-district offices from where farmers can obtain RTC copies on-line. At these kiosks a second computer screen connected to the kiosk computer faces the clients so that they can see the transaction being performed. Any number of copies can be collected for any land parcel belonging to anybody by providing the name of the owner or the plot number.

When a change of ownership takes place through sale or inheritance, farmers can file online requests at these kiosks for initiating the mandatory process known as mutation for effecting necessary changes in the RTC. Each request is assigned a number by the computer, Notices are then generated from Bhoomi, which are served by Village Accountant on interested parties. After waiting for a statutory period of 30 days from the day of serving of notices, the Revenue Inspector (RI) passes the mutation order in a register maintained for this purpose. The mutation order passed by the RI is processed on Bhoomi and a new RTC is generated duly incorporating the details of the new owner. As a part of the process, the mutation order is also scanned to take care of non-repudiation. While the mutation records are pending for orders of the RI, farmers can trace the status of the application, using the computer number provided to them, on the Touch Screen Kiosks provided on a pilot basis in three of the computerized kiosks.

2.1 Physics/Technology

Bhoomi is unique in the manner that it utilizes the Bio-logon metrics system from Compaq, which authenticates all users of the software on the basis of their finger prints and, therefore, makes officers accountable for their decisions and actions. This is not prone to hacking as is the case with traditional password based authentication. A log is maintained of all the transactions carried out by the officers.

As an implementation strategy, manually written RTCs were declared invalid from the day on which the computerised system became operational in a sub-district. This has forced the department to completely rely on the new system.

Another unique aspect of the project has been the imposition of user charges for all transaction. Rs.15/- per copy is charged for land records and mutation extracts. By November 2001, Rs. 5 million has been collected as user fee from the distribution of 3 million RTCs from kiosks, which have been operational for periods varying from 3 – 12 months. It is estimated that every year Rs.30 – 35 million would be collected as user charge, which would be ploughed back to maintain and improve the Bhoomi programme.

3.0 Evaluation

If we concur with Sen's view of development, the Bhoomi project brings in wide ranging benefits which cannot be quantified in value terms. The table below illustrates how this ICT project promotes development. This project has improved the information database and information diffusion which is a sign of development according to Brown's Framework.

4.0 Framework of evaluation for Bhoomi

Approach	Criteria of Evaluation
Sen's Capability Approach	**Indirect measures** • Increased productivity-through less cumbersome access to farm credit, through reduction in corruption/bribes, reduction in litigation costs **Direct measures** • Human development-Lack of tampering with Land Records/better ownership rights would facilitate long term increase in income generating capacity
Brown's Information-Based Evaluation Methodology	Increased transparency in information • Measures of linkage-acts as an effective interface between the government and citizens. • Measures of coverage-Comprehensive database available for government planning, greater volume of information available to courts for litigation • Measures of direction-Kiosk used widely by all irrespective of caste-religion affiliations
Sustainability/ Scalability/ Profitability	This is an excellent example where critical mass has been built solely due to the utility of the program. This program is sustainable, scalable and even profitable at the state level but due to the sensitive nature of the operations private sector involvement is not desirable. An important aspect of the project is the imposition of user charges for all transactions. Rs.15/- per copy is charged for land records and mutation extracts. By November 2001, Rs. 5 million had already been collected as user fee from the distribution of 3 million RTCs from kiosks, which have been operational for periods varying from 3 – 12 months. It is estimated that every year Rs.30 – 35 million would be collected as user charge, which would be ploughed back to maintain and improve the Bhoomi programme.

Beneficiaries of the Bhoomi project are not only the farmers but also the administrators and others.

• **Farmers**

- Farmers can now get a copy of the RTC from the information kiosk at the sub-district headquarters without harassment.

- The farmer can file an application for effecting a mutation in the RTC and trace the status of the mutation application.

- Use of biometrics authentication system for updation of records have freed the farmers from the worry of probable manipulation of their records by unscrupulous officials.

- Before Bhoomi, the process of obtaining land use documents took weeks and required farmers to pay between Rs.100 and Rs.2,000 in bribes to officials. Now, the farmers get their record in less than 2 minutes by paying a charge of Rs 15.

- Access to farm credit would now be less cumbersome. Online connectivity to banks would ensure farm credit to farmers in less than 5 days as against 25-30 days in manual system.

- It would be easier for farmers to pursue land related litigation in the court.

• **Administrators**

- A comprehensive database is now available which can be used for planning for agriculture and development programs. For example – it is now possible to identify what percentage of the land holdings are held in the name of women.

- Accurate and timely preparation of annual records like land revenue etc.

- Monitoring of government lands and prevention of their encroachments. Lack of monitoring had costed a reported loss of Rs. 25 billion to state government by way of officials tampering with records.

- **Judicial Administration**
  - Courts would be able to make use of land record database for adjudicating various civil disputes related to ownership, possession and cultivation in various courts.

- **Financial institutions**
  - Online connectivity to financial institutions would help banks in planning for their farm credit related activities. In manual system they worked on 2 years old data or just guessed the farm sector requirement
  - Online connectivity would also helps banks to ensure that revenue administration is indicating bank's charge on land records of such farmers who have availed crop loans.
  - Facilitates creating change on land of those farmers who take crop loans

5.0 Challenges

Rolling out the application to 177 locations was a real challenge. In the first phase, the project was implemented on a pilot basis in a controlled environment in four sub-districts. After gaining experience in data entry operations and implementation of the software, the scheme was extended to one pilot sub district in each of the 27 districts. In the third phase, the project was rolled out to all the 177 sub districts simultaneously.

Records in the field were not up-to-date due to poor work culture and lack of training amongst the Revenue Staff. In addition, farmers often do not report transactions within the family, either because they are discouraged by the attitude of the Revenue staff or due to internal family problems. The maintenance of land records is not uniform across districts.

The data entry work was done in an offline mode through private data entry agencies. Many problems were encountered in off-line data entry. The process was slow and error prone due to poor work quality by data entry agencies. Technical guidance from officers

of the district informatics center was not easily available as they were overloaded with other work. Moreover, data entry agencies were unwilling to recruit more manpower as it required investment in training on a specialized data entry software, which would not be useful to them for other projects. Moreover, interruptions in electrical power in taluk headquarters and delay in maintenance of computers at taluk level by vendors are a problem.

Comprehensive software, which accommodated variations in manual records across districts, was developed. After the initial data entry, print outs were taken and validated by the VAs with reference to their original records. The entire software was developed in Kannada, the official language of Karnataka.

Intensive training was imparted for bringing about an attitudinal change amongst departmental staff. Twelve State level seminars were organised for 1200 senior and middle-level officers. Four divisional level workshops were organised to train 800 officials. More intensive training was imparted to the officials who handle the computers at the kiosks. To clarify various technical and administrative issues more than 150 circulars were issued and compiled into compendia. A "Bhoomi-Help Manual" was printed and distributed at the sub-district level. A computer-lab for training was set up.

The political executive was completed involved in the computerization project. The State Chief Minister and Revenue Minister highlighted the importance of the project in many public fora. The Chief Minister himself inaugurated many such kiosks and took several meetings to impress upon the team the need to commission this project in a time bound manner.

A participatory software development strategy was followed. Selected field level personnel were involved in the development of various modules of Bhoomi through a formal State Level Committee. Suggestions for improvement were elicited and where valid were incorporated in the software.

6.0 Lessons Learnt

Many reform efforts fail because they are undermined internally or have little support from current stakeholders whose buy-in is critical for success. In case of Bhoomi, minimizing resistance from staff by

harnessing political support was an important contributory factor. Extensive training coupled with a participatory style also helped to diminish resistance.

In Bhoomi significant benefits are delivered in issuing RTCs, but much of the old mutation process remains unaltered. As there is no change in the role of Revenue Inspector in passing the mutation order, corruption in the mutation process may not necessarily reduce. Bhoomi has reduced the discretion of public officials by introducing provisions for recording a mutation request online. Farmers can now access the database and are empowered to follow up. Reports on overdue mutations can point to errant behavior. Still, supervisors must examine the reports and take appropriate action. In remote areas, operators may turn away citizens by telling that the system offering online service is down. *Strict field supervision is needed (through empowered citizens committees and NGOs) to curb such behavior. Ultimately, the only recourse that a citizen has against such practices is to lodge a complaint. The process for lodging a complaint should be facilitated through the Web. The backend has to be geared up to handle complaints received electronically.*

As an implementation strategy, manually written RTCs were declared illegal from the day on which the computerized system became operational in a taluka. The notification was issued on a taluk-by-taluk basis as and when the scheme became operational there. This forced the department and the farmers to

completely rely on the new system. The strategy worked because the application design was robust and did not falter.

There was some concern in Karnataka about raising the user fee to Rs.15 from Rs.2 in the manual system. Often these fears about user fees are exaggerated, particularly if services have genuinely been improved. The response of the people at taluk level has been overwhelming. Queues can be seen at the kiosks in 140 taluk centers, and 330,000 people have paid the fee without grumbling.

7.0 Concluding Remarks

Bhoomi has successfully undertaken the task of computerising over 20 million land records. The existing database can generate reports on land ownership by size, type of soil, crops, and even demographic particulars. The government plans to use this information to use to develop programs for poverty alleviation, bank loan processing and for even solving legal disputes, besides providing a ready input for conducting further land reforms. *The lessons we have learnt in relation to deployment, roll out and maintenance can be used as a best practice guide that other states in the country can benefit from.* Additionally, the Department of Revenue also plans to web enable the system to truly permeate the administrative structures, and provide any time, anywhere access to the farmers.