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**Financial Sustainability of E-Governance Embedded Rural
Telecentres (EGERT) in India**

Gopal Naik

Professor

Economics & Social Science

Indian Institute of Management Bangalore

Bannerghatta Road, Bangalore – 560076

Ph: 080-26993266

gopalan@iimb.ernet.in

Basavarajppa K P

Indian Institute of Management Bangalore

Bannerghatta Road, Bangalore – 560076

bas@iimb.ernet.in

Siddharth Joshi

Indian Institute of Management Bangalore

Bannerghatta Road, Bangalore – 560076

siddharth.joshi09@iimb.ernet.in

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ABSTRACT

In the recent years, two significant changes have taken place in an effort to address the rural poor: Businesses have started recognizing the potential of rural markets and governments have started using telecentres for providing government-to-citizen G2C services to rural citizens. In India, the national and sub-national governments have supported businesses to establish telecentres in rural areas to provide information technology-enabled services. However, the focus so far has been mostly on B2C services and financial viability of the common service centres (CSCs) is being questioned. We argue conceptually and show through preliminary evidence that designing these telecentres with embedded G2C services would not only enhance sustainability of these centres but also improve the effectiveness of the delivery of the government services and strengthen their information system. Considering that the poor can benefit substantially from government programmes and services, improvements in the effectiveness of their delivery would invariably foster inclusive growth and help bridge digital divide.

KEY WORDS: E-governance, telecentres, public private partnerships, information and communication technology (ICT).

1. INTRODUCTION

Recent discourse on development through markets and private sector with emphasis on a development-through-entrepreneurship model has been popularized by the concept of reaching the bottom of the pyramid (London & Hart, 2004; Prahalad & Hammond, 2002; Prahalad & Hart, 2002). The core argument is that private sector should target the vast, growing and largely untapped rural markets in developing countries with low-cost services and appropriate business models. According to the advocates of this approach, increasing the well-being of the poor while enlarging the opportunity for the private sector provides a win–

win proposition for both. In the recent decade, developing countries have experienced a marked increase in the number of projects that use information and communication technologies (ICTs) for social, economic and political development (Toyama, Kiri, Maithreyi, Nileshwar, Vedashree & MacGregor, 2004). A large number of these projects aim at bringing the benefits of ICTs to communities where individual ownership of computers is low and use of the Internet is infrequent (Best & Kumar, 2008). This trend illustrates the high and ever-increasing expectations placed on ICT in terms of bringing about improvement in quality of life, empowerment and economic development for the rural communities (Hosman & Fife, 2008). Telecentres are the prevalent method of reaching out to rural areas in these projects (Heeks, 2008). They provide shared public access, often intermediated by an operator, to ICTs and services via computers and the Internet; Initial efforts in setting up these telecentres or common service centres (CSCs)¹ in India are based on a variety of models ranging from fully public projects such as Gyandoot by Government of Madhya Pradesh, India, to wholly private projects such as ITC's E-Choupal.

Recently, the Government of India (GOI) has envisaged the National E-Governance Plan (NeGP) to set up 2, 50,000 telecentres or CSCs in rural areas with the following objectives (Chauhan, 2009):

- a) making all government services accessible to the citizen in his/her locality, through common service delivery outlets;
- b) ensuring efficiency, transparency and reliability of such services at affordable costs to realize the basic needs of the citizen.

The CSC scheme is envisaged to be a bottom-up model for delivery of content, services, information and knowledge, that can allow like-minded public and private enterprises,

¹ The terms telecentre, rural kiosk and CSC are used interchangeably from here onwards in the paper.

through a collaborative framework, to integrate their goals of achieving social objectives and earning profit into a sustainable business model for achieving rapid socio-economic change in rural India (GOI, 2010). The sub-national (state) governments while implementing the NeGP have invited private service providers with terms and conditions mainly aimed at providing B2C services. The experience of the 23 states implementing the initial phase of the plan with 90,000 CSCs has not been encouraging with many of them closing down (GOI, 2010). Many telecentres have been providing only peripheral services such as mobile phone recharge and music download – not considered critical in fostering development. The experience of Karnataka state in India provides useful insights in this regard. In 2007, Department of Revenue, Government of Karnataka (GoK) set up 764 *Nemmadi*² centres in rural areas throughout the state to provide G2C services through a public private partnership (PPP) model at *Hobli*³ level. The government provides access to its database and authenticates the certificates issued, whereas the private partner provides the logistics for issuing certificates. Now, GoK has decided to establish CSCs at *gram panchayat*⁴ level in part to fulfil the requirement of NeGP. However, given the fact that many *Nemmadi* centres at *Hobli* level are not financially viable, taking them closer to people (from one telecentre for a population say 80,000 to one for a population of 10,000) with the same set of services would certainly make these centres financial unviable. Literature on the financial sustainability of such telecentres has drawn attention towards the need for ways of stimulating demand for services among the local community with the argument often being made that this demand should be reflected in the community's willingness to pay for the services (Whyte, 2000; Roman & Colle, 2002; Harris, Kumar & Balaji, 2003). We argue that along with stimulating demand for those services for which the citizen would be willing to pay, the service basket of telecentres has to

² *Nemmadi* means 'deriving happiness by being hassle free' in the local language Kannada.

³ *Hobli* is an administrative unit comprising of 45–50 villages with total population of around 80000.

⁴ Village *panchayat* or *gram panchayat* is the smallest local government unit in rural areas in India comprising 5–7 villages with total population of approximately 8000–10,000.

be expanded by embedding all government programmes and services (both G2C and G2G⁵), so as to take advantage of economies of scope, improve efficiency of government programme/service delivery as well as strengthening management information system for the government. Government being the sole/major provider of many services in the rural area particularly to the poor, any improvement in the delivery of these services would foster inclusive growth. We argue that taking services closer to people creates/expands markets by enhancing access to the poor and women. Therefore, telecentres capable of delivery of a cluster of B2C, G2C and G2G complete services in an integrated way are likely to be financially sustainable. The rest of the paper is organized as follows. Section 2 describes our methodology which includes a conceptual framework for financial sustainability of telecentres through which we show that as telecentres cater to smaller and smaller populations, provision of a cluster of complete and integrated services becomes critical for their financial sustainability and that G2C and G2G services play a vital role. We discuss how market creation can take place in rural areas via telecentres. Section 3 discusses the impact of service delivery through telecentres on the functioning of the government at local levels. The empirical section provides evidence of market creation based on an action research project initiated to explore the financial sustainability of CSCs located at *gram panchayat* level, supplemented by evidence from *Akshaya* project in Kerala State in India. Finally, Section 5 concludes the paper.

2. METHODOLOGY

We develop a conceptual spatial revenue model to understand variables that influence financial sustainability of telecentres. We also show how market creation is facilitated as the telecentre is taken closer to a remote habitat and is able to deliver a cluster of complete and

⁵ G2G services are defined as the transactions between governments at various levels or various departments or agencies or bureaus of the government. A list of G2C and G2G services that can be offered through telecentres in Karnataka are given in appendix 1.

integrated services. We provide indicative empirical evidence to the conceptual model using data from two locations. First set of data is from *Gubbi taluka*⁶ of *Tumkur* district in Karnataka, where the researchers are involved in an action research project consisting of 15 telecentres at *gram panchayat* level and the second is the data from *Akshaya* project in Kerala. The data on the pilot project was collected since the beginning of the project in December 2010 to June 2011. Female students in secondary schools in three *gram panchayat* areas were interviewed and data was collected from these schools on the gender-wise break-up of students attending private tuitions. The data for two *Akshaya* centres in Trivandrum district was collected during field visits made in July 2011.

2.1 CONCEPTUAL FRAMEWORK

Using a spatial revenue model similar to the one used by Naik, Basavaraj and Joshi (2010), we can represent the financial sustainability problem as recovering adequate contribution towards fixed cost. That is, denoting N as the number of households in an area, S the number of services offered by a telecentre or a CSC, p_i and c_i the per unit price and variable cost, respectively, of providing a particular service of type i to household j , and C as the amortized fixed cost, the financial sustainability of the CSC requires

$$\sum_{j=1}^N \sum_{i=1}^S d_{ij}(p_i - c_i) \geq C,$$

where $d_{ij} = f(p_i, z_{ij})$ is the quantity of services demanded at the telecentres and is dependent on price and other household specific factors (z_{ij}), such as per capita income, literacy levels, etc. and

$$\frac{\partial d_i}{\partial p_i} < 0; \frac{\partial d_i}{\partial z_i} < 0 \text{ or } \frac{\partial d_i}{\partial z_i} > 0 \text{ depending on what } z_i \text{ represents.}$$

⁶ A *taluk* is an administrative unit smaller than a district but larger than a village.

As we take telecentres closer to people, the geographical area served will reduce, the number of households (N) decreases and therefore the revenue loss has to be compensated for, with an increase in either S (number of services), d_i (demand for service i), or p_i (price of service i). Increase in p_i is difficult as it has a negative effect on the demand d_i , especially when the demand for services is elastic, as is the case for many services offered by CSCs, and factors influencing demand other than price are external to CSCs. Therefore, the above equation makes it clear that as telecentres are rolled out in a remote geographical area, the options available to the telecentres to improve financial sustainability are: increasing the number of services to be provided (S) or stimulating the demand by each household, d_i , or both. The number of services that can potentially be delivered through a CSC depends on the nature of service, technical feasibility of delivering those services in rural areas and needs of the various stakeholders – citizen, government and business. The volume of services demanded would depend on the price of the service and the quality of the service which includes how *integrated* and *complete* these services are. For example, farmer would value highly the services that are integrated, that is, services that address input procurement, crop production as well as marketing the produce (figure 1). Farmers would also value services that are complete. For example, for availing a loan, it may not be sufficient to give information about where the loan is available or what the interest rates are, but should have complete information on the terms and conditions, how to apply, documents needed, availability of application, assistance to complete applications, submission of completed applications, follow-up on the application, delivery of loan granted and guidance on repayment, etc. (table 1). Citizens would also prefer a cluster of services that cater to various aspects of living and livelihood such as education, health, agriculture, entrepreneurial, communication, bill payment, government certificates, entertainment, etc. (figure 2) in one place so that the telecentre acts as a one-stop-shop for various services reducing transaction cost for the citizen

in availing each service. This would also increase the footfalls for the telecentres which promote cross-selling of services resulting in larger volume being delivered for each service by the telecentre.

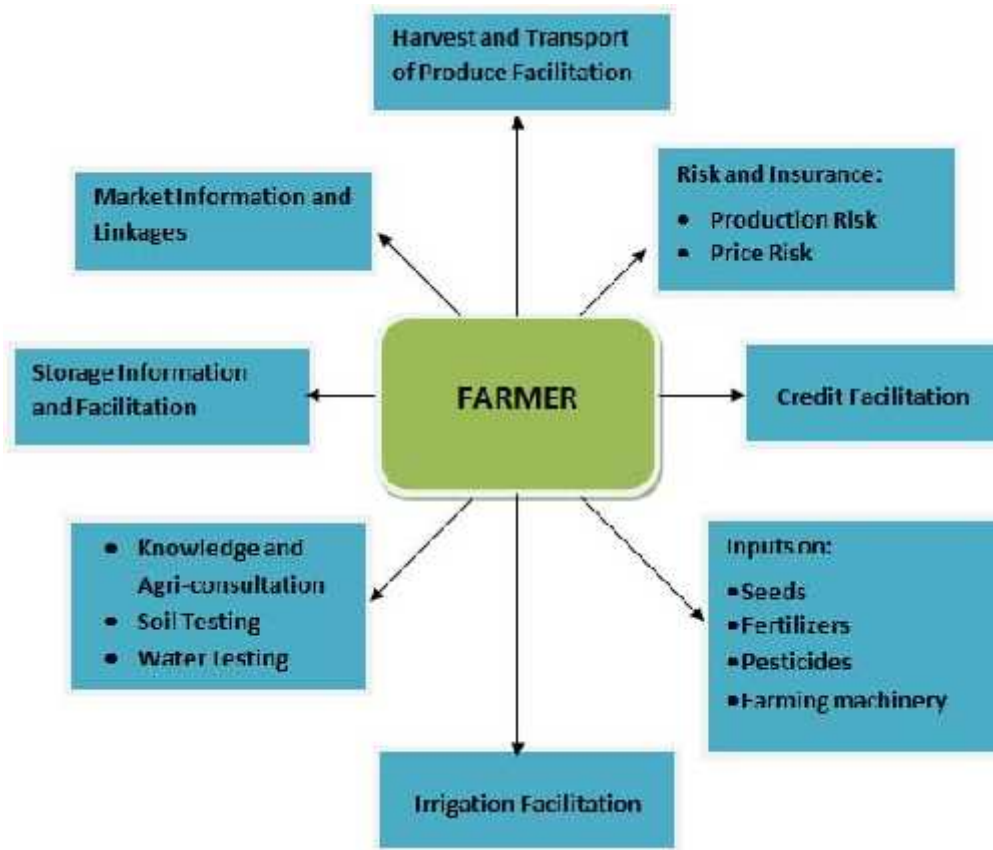


Figure 1: Integration of Services Related to Crop Production

Table 1: Illustration of Completeness of a Banking Service

Level → Service ↓	L1 Select & Provide	L2 Search & Provide	L3 Connect and Provide	L4 Organize and Provide	L5 Net work and Provide
Agriculture	Information on agri inputs (seed, fertilizers)	Information on source and availability	Establishing contact	Ordering and payment	Feedback

Bank facilitator/Bank correspondent	Information on loan	Information on various loans and banks from where the loan can be availed.	Information, access to loan application, filling up of loan application. Connect to the bank	Collect the loan application, forward it to the bank and process it.	Disbursement of loan, collection of EMI, opening of bank account, advice on insurance, facilitation for repayment of the loan.
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Therefore, by providing a *cluster of complete* set of services in an *integrated* manner, the demand for services can be stimulated, and can help create market for various services in rural areas.



Figure 2: Cluster of Services

2.2 MARKET CREATION BY TELECENTRES

The world over, the percentage of poor that reside in rural areas is high and the rural poor frequently live in remote areas with sparse populations (Kenny, 2002). This implies that access to quality services for the rural poor is constrained by distance and high opportunity

cost involved in travelling to urban centres to avail them. In this section, we argue that CSCs are particularly well placed to stimulate demand for services in rural areas and make them affordable. Demand can be created or increased by bringing the following characteristics to service delivery by the CSCs.

- **Role of distance and convenience:** Currently, rural citizens are required to travel long distances to avail certain services such as tuition, English language coaching, etc. For example, the average distance between a village and taluka in Karnataka is 18 km, whereas the average distance between village and *gram panchayat* is only 3 km. The provision of these services at village level would not only reduce cost for the rural citizens, but will also be more convenient. More importantly, the girl child cannot avail these services if the place is far off and/or timings are late in the evening, whereas telecentres can provide access to these services to the girl child closer to her home.
- **Reliability:** As the services and information are provided at the village/community level and not by a private company agent or salesman located elsewhere, people will trust the information and consider it reliable. The permanency of the centre would also instill confidence in people as they can follow up any problem related to the services delivered that arise later on with these centres. For instance, a contract farming agreement through the CSC would be preferred by farmers to a direct contract with the company located in a distant place.
- **Affordable cost:** Presence of telecentres in rural areas will enormously reduce set-up cost for potential providers of services in rural areas. Once a service is considered valuable and profitable, more private players would offer to provide these services. For example, once the educational service is considered valuable to people and profitable to providers, many players offering educational services will enter the rural area market creating

competition among the service providers. This will enhance quality and reduce the cost of these services.

- **Adequate information:** Certain services will encounter a fillip because of availability of greater information. For example, exporters can, through the CSCs, get information about the crops sown by farmers in a particular area and enter into a forward contract with them. CSCs would thus create a market by acting as an intermediary.

As the demand increases, the PPP model providing such services would become viable and more private players will enter the market enlarging the basket of services that can be provided through telecentres. The following examples illustrate how the above process of market creation would take place in specific sectors.

2.2.1 Market Creation in Education

Traditionally, a girl child has always been treated differently in most states in India. Where a boy is perceived to be a bread earner, it makes more sense to invest in his studies; a girl is assumed to take care of household chores and education does not matter much in her life. However, the scenario has changed in the recent years with parents realizing the importance of education. With different educational and promotional schemes launched by both state and central governments, enrolment of girls in schools has increased (GOI, 2011).

However, there are hindrances to availing better education for the girl child in rural areas. Distance and cost are two of the most important factors that affect education of a girl child. As long as education is easily accessible at reasonable rates, parents are willing to send girls to school. In rural areas, school fees are negligible particularly in government schools, but the quality of education is very poor. Richer households send their wards to English medium private schools or send them to private tuitions which are located mostly at *taluka* level. For cultural as well as security reasons, a girl is usually not allowed to stay out of house during

after-hours in most of rural India. Thus, the girl child is often denied tuitions or English medium education because of the distance required to travel and inconvenient timings of these services, apart from the cost. Telecentres can organize tele-education where good quality education is made available at an affordable rate at convenient timings closer to their residence. This will enhance access to services in an equitable manner creating market for the service and in the process, fostering inclusive growth.

2.2.2 Market Creation in Insurance

Insurance has low penetration in rural India. One of the impediments in providing insurance to people in rural areas is the accentuated moral hazard and adverse selection problem caused by lack of reliable information about people and their practices in these areas. The cost of obtaining information about agricultural practices in case of crop insurance or living practices, medical history, etc. in case of life insurance, is very high. Now, consider the case when CSCs function as agents of the insurance company; the cost of obtaining this information is reduced considerably because the CSCs are much closer to the people being insured. At the same time, since these services are provided by CSCs which have a permanent presence in the village, people perceive them to be more reliable and can follow up easily on problems related to insurance claims. The problems of moral hazard are reduced because insurance companies can now monitor the practices of farmers, etc. more closely and regularly by having a local telecentre as the agent. The problem of adverse selection is mitigated because village communities being close-knit, information about risk in providing insurance to a person is known more accurately thus helping to create market for insurance.

2.2.3 Market Creation in Health

People in rural areas, especially doing manual labour, do not get proper treatment for many diseases such as skin diseases, eye-related infections and disorders, etc. because of absence of

specialists in these areas and inconvenience in travelling to the nearest health centre which is costly and time-consuming. Setting up of a telemedicine centre at the CSC would solve these problems of access by providing affordable care, saving time and making it convenient. Thus, a market can successfully be created for certain health services.

2.2.4 Market Creation in Agriculture

A farmer engaged in agricultural activity requires many services at various stages of crop production process. At the beginning of the season, the farmer needs crop advisory services related to seeds, fertilizers, type of crop, soil testing, etc. Given the dependence of agriculture in India on rainfall and the inherent uncertainty involved because of this dependence, farmers need crop insurance as well. Farmers also have many training needs regarding farming, harvest and post-harvest technologies. All these services can be integrated and provided by the CSCs. The CSCs can also facilitate agribusiness companies in buying produce directly from farmers. An exporter for example, would be able to gather from the CSCs, information about the crop sown by farmers in a particular area, the condition of the crop and the total produce from that region. Seed companies would be able to know which seed would be in demand in the next season. CSCs can also facilitate contract farming. For example, certain special crops are not grown by farmers because their demand is very limited and uncertain. Retail houses can procure those items only by way of contract farming but because of the lack of trust among farmers and the uncertainty in prices of these crops, farmers are unwilling to grow such crops. CSCs can help bridge the trust deficit. Retail houses can interface with the CSCs to contract farmers for these special crops.

As these examples illustrate, CSCs by bridging the gap between businesses and rural population, can become the front-end and change the nature of service delivery. This will cause a rightward shift in the demand curve. Figure 3 demonstrates the comparative statics of

the market in the presence of telecentres. As the business model becomes viable and the cost to provide these services decreases, many private players will enter the market and the supply curve will shift rightward. The shift in the supply and demand curve will lead to change in equilibrium point from A (virtually no market with quantity q_1) to a point B, where both businesses and consumers are better off with quantity q_2 .

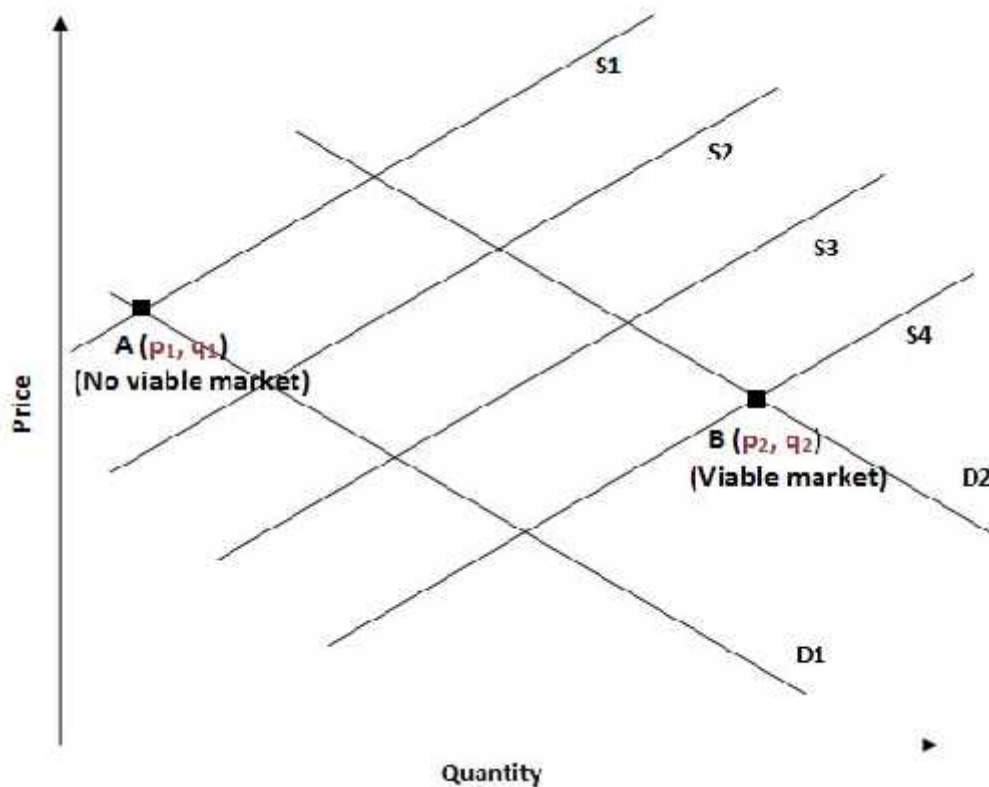


Figure 3: Process of Market Creation (Naik, Basavaraj and Joshi, 2010)⁷

However, people need proper assurance about the service quality, convenient location and facility of getting grievances addressed locally, for creation of such a market. For example, reliability of telemedicine services will be more if the service point is located in a primary health centre or *gram panchayat* (village level, local government body) premises. This can

⁷ Figure to be reproduced in colour on the Web and in black-and-white in print.

happen only when the government services are also embedded in the CSC services. As part of such an arrangement, CSCs can be located at the *gram panchayat* and government services related to agriculture, education, health, social security, etc. are delivered through them.

As the government is a major provider of several important services in rural areas such as health, education, agriculture, drinking water, women and child welfare, etc.; *clustering, integrating* and ensuring *completeness* of services in telecentres necessitates embedding of services provided by the government. Such e-Governance Embedded Rural Telecentres (EGERT) can, by functioning as information networks, providing transactional and transformational services; facilitate improved flow of information between government, business and citizens leading to substantial dual gains. First, providing both private and government services enables telecentres to provide integrated and complete services, increases the trust of the citizens in the telecentres (Kurian & Ray, 2009) and increases the footfalls enabling cross-selling of services. Second, these telecentres can provide government services more effectively utilizing efficiency of the private sector and thereby strengthen last-mile governance.

Clustering of services will also help to take advantage of economies of scope. Delivery of many services need common equipments and skill requirements such as in the case of tuition for students and farmers' training, various bill payments, etc. and therefore amenable to cost reduction for each service. Computer, projector and the screen used for tuition for students can be utilized for farmers training on agricultural practices. If a cluster of such related services are delivered, the cost of delivery per service can be reduced. That is, if $C(S_1)$ is the cost of delivery of tele-education service to students and $C(S_2)$ is the cost of delivery of farmers training, if they are delivered separately, and $C(S_1, S_2)$ is the cost of delivery of both these services together, there will be economies of scope if $C(S_1) + C(S_2) > C(S_1, S_2)$. Considering high fixed cost component and their potential multiple uses, the CSC services

would yield high economies of scope. Thus, a sustainable design of telecentres needs to embed government services in order to increase the scope of rural service delivery for better financial viability as well as to improve effectiveness of their delivery for fostering inclusive growth. Providing a wide of services also helps in bridging digital divide.

3. IMPLICATIONS OF E-GOVERNANCE EMBEDDED RURAL TELECENTRES ON LOCAL GOVERNANCE

Information can play a crucial role in improving the interaction between government and rural citizens. The advantages from availability of information accrue not only to citizens but can also help in substantially improving the following aspects of public service delivery.

- 1) **Planning:** With more accurate and timely data available at each delivery point, government programmes and services can be planned better. For example, with accurate data about usage of health services, the stock of drugs required at a Primary Health Centre (PHC) can be managed more efficiently.
- 2) **Execution:** With more frequent data at the delivery points, services delivery can be executed better by reducing the time between realizing the need for action and its execution. For example, with weekly data on stocks of food grains at the school for mid-day-meal scheme for children, the stock can be replenished whenever it goes below a desired level.
- 3) **Monitoring:** Availability of accurate and frequent data can help in fine tuning or course correction required for government programmes. Detailed data about health and nutritional indicators of a village can help in evaluating the effectiveness of government interventions.
- 4) **Evaluation:** With more accurate and detailed data, the evaluation of a programme can be more appropriately conducted. For example, with more accurate information on the individual asset created under National Rural Employment Guarantee Schemes

(NREGS)⁸, the total asset creation through the employment programme can be more accurately assessed and the benefit from the money spent in the programme would be more accurately known.

Figure 4 illustrates the effect of access to quality information for government on various aspects of service delivery.

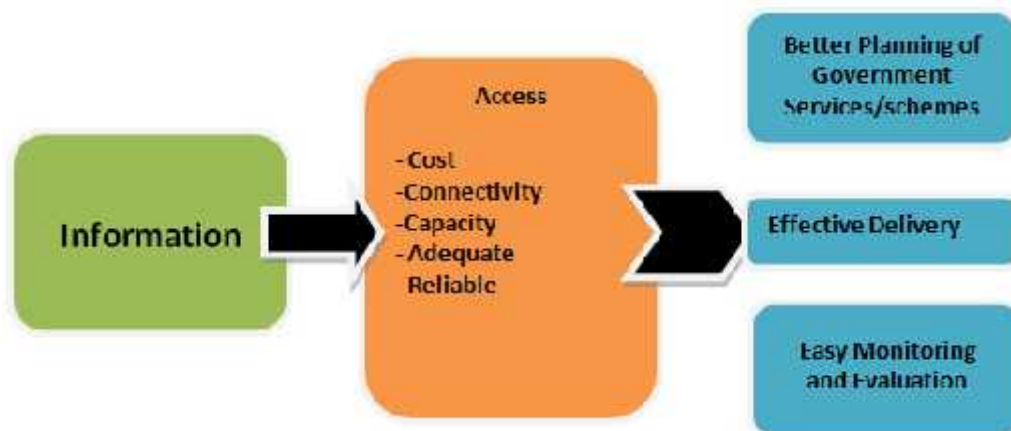


Figure 4: Role of Information for Government⁹

3.1 Local Governance

Government agencies at local levels have to collect, collate and pass on information which is then used by various agencies of the government for purposes of planning, execution, monitoring and evaluation of government programmes. In India, the task of data collection, entry and maintenance is performed by local government employees and issues such as same data collected by multiple offices or same data collected multiple times by the same office leading to data redundancy are routinely observed. Most of this information is maintained in hand-written form and not stored electronically and hence sharing data across multiple departments becomes very difficult and time consuming. Resultantly, these data-related tasks

⁸ NREGS is a GOI programme which guarantees employment to one member of every household for minimum of 100 days in a year.

⁹ Figure to be reproduced in colour on the Web and in black-and-white in print.

consume most of the time of these personnel leaving little time for other important responsibilities entrusted to them.

The traditional flow of information from government to citizens (and vice versa) follows a hierarchical approach flowing from state government departments/agencies to the *gram panchayats*, which in turn interface with the citizens for provision of services and vice versa.

Figure 5 shows the traditional flow of information and services from government to citizens.

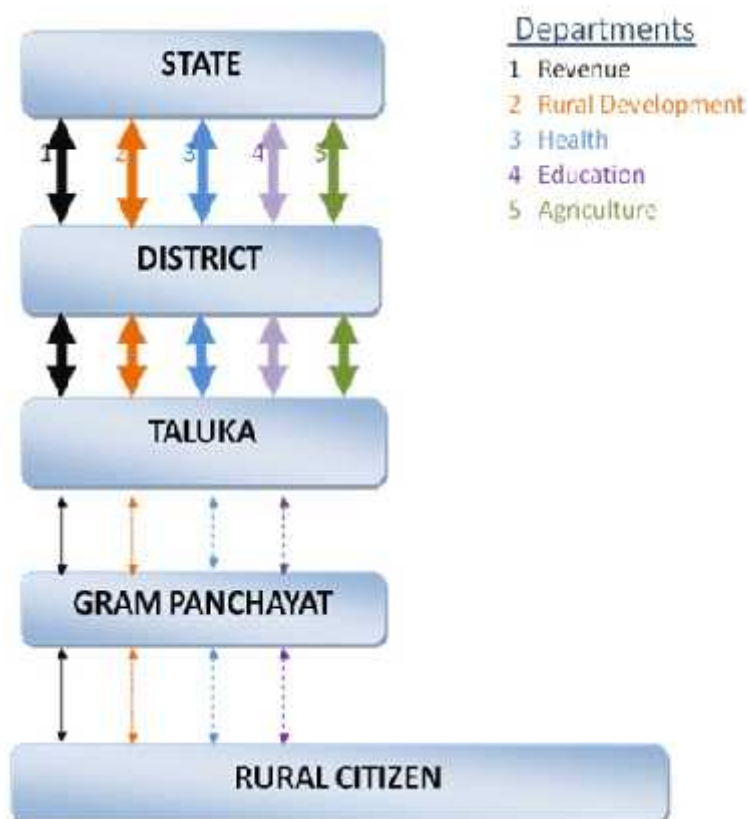


Figure 5: Traditional Flow of Government Information to a Rural Citizen¹⁰

This traditional process of service provision which uses hierarchical flow of information is time consuming and entails high administrative cost for the government. Information passes through too many levels of the government before reaching the rural citizen. Moreover, the

¹⁰ Figure to be reproduced in colour on the Web and in black-and-white in print.

linkages at lower government levels have gradually weakened because of lack of adequate manpower, both quantitatively and qualitatively. For example, in Karnataka, 43% of the field level jobs in agriculture department are vacant. Hence, while the linkages from the state to the district and district to the *taluka* level government are still strong, further linkages from *taluka* to village *panchayat* and village *panchayat* to the citizen are very weak leading to last-mile problems in service delivery.

3.2 Potential Role of Telecentres in Improving Governance at Local Levels

CSCs can be extended to provide G2G services by making them the front-end for collection of information. In the proposed PPP, the data collected by the CSCs at the village level can be uploaded, directly as well as through different levels of government, to a central database. Following are some of the examples of G2G services that can be integrated with telecentres.

- **National Rural Employment Guarantee Scheme:** In many village *panchayats*, the village *panchayat* secretary spends 6 hours a day in maintaining about 60 record books having enormous redundancies. This data can be collected by these CSCs more efficiently and uploaded regularly.
- **Anganwadi Worker:** The household health and nutrition data collected at the *Anganwadi* (child care centres) by *Anganwadi* workers can be collected by these CSCs.
- **Crop updation:** This activity is carried out by village accountants at present. The recorded crop area is mostly inaccurate and often arbitrary. This data can be recorded more accurately with the help of hand-held devices which can measure crop area and prepare a map as the person holding the device traverses through the boundary of each plot. Such a hand held device with global positioning system (GPS) and biometric

capability can authenticate the data collected. CSCs can make use of such devices to collect and record data accurately.

- **Public Distribution System:** Real-time data regarding the allotment and disbursement of food items through the public distribution system can be availed through these telecentres.
- **Sarva Shiksha Abhiyan¹¹:** As part of this programme, an officer at the *taluka/Hobli* level has to visit various schools to collect data on attendance, mid-day meal provisions, students' performance, availability of teacher, etc. CSCs can provide efficient ways of collecting this data.

The transfer of responsibility of these services from government to CSCs would change the way information flows through government hierarchy as illustrated in the next section.

3.3 Change in Flow of Information Facilitated by Telecentres

CSCs can collect data needed by the government, digitize and upload to a central database. This would change the nature of business processes involved in both service delivery and programme implementation, mitigating future risk for functioning of telecentres (Aichholzer,

¹¹ *Sarva Shiksha Abhiyan* (SSA) is a government programme providing free education to children.

2004). The flow of information in the presence of rural kiosks or CSCs is shown in figure 6.

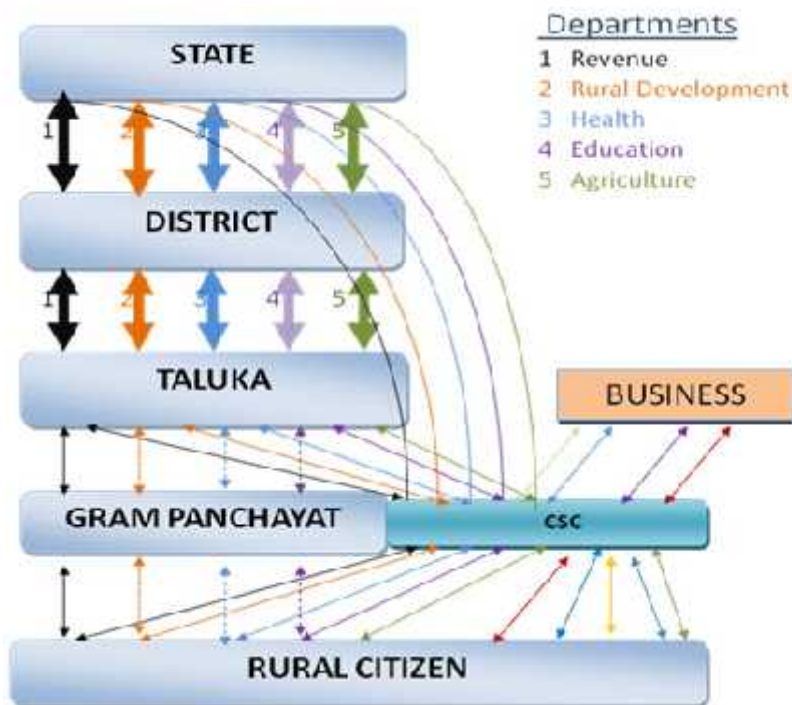


Figure 6: Flow of Information after the Provision of Common Service Centres¹²

The advantages in collection of information through telecentres are as follows.

- **Reduction in data redundancy:** Consider the example of Sarva Shiksha Abhiyan, where personnel spend a lot of time manually writing information regarding daily attendance, mid-day meal, student performance, etc. If data such as the names of students is collected using electronic systems redundancies can be reduced.
- **Faster:** In the above example, the attendance can be recorded using biometric systems and uploaded to the information system, which would make the process faster.

¹² Figure to be reproduced in colour on the Web and in black-and-white in print.

- **Facilitate data aggregation:** Continuing with the above example, if such information is uploaded daily in the information system for every school, district-wise, state-wise and country-wide attendance figures for each week or month can be produced easily.
- **Increase frequency of data collection:** If the process of data collection is electronic and thereby faster, data collection can be done more frequently giving a time series on health numbers or attendance in primary schools.
- **Cost-efficient:** The cost, if the government implements these systems in each department on their own, is very high and often these systems are not functional. By involving telecentres, the overall cost for these processes can be reduced.
- **Accurate and Reliable:** Data on crop area as well as programmes such as NREGS used to record asset creation is inaccurate and unreliable. Data of better quality can be obtained using GPS devices with time and date stamping and camera facility.
- **Enhanced data sharing and inter-government co-ordination:** Once this data is available in electronic format, data sharing among various government departments and agencies for policy implementation can be made possible, thereby enhancing co-ordination.
- **Strong networks at grassroots level:** Governmental departments will be able to build a strong network at the grassroots level to obtain accurate, detailed and timely data from citizen on the programmes being implemented as well as develop a robust citizen database.
- **Reduction of burden on government employees:** Once relieved of the laborious manual data collection procedures, government personnel can focus on their principal administrative responsibilities.

Figure 7 illustrates how the information can be collected, collated and transmitted to various levels of each government department.

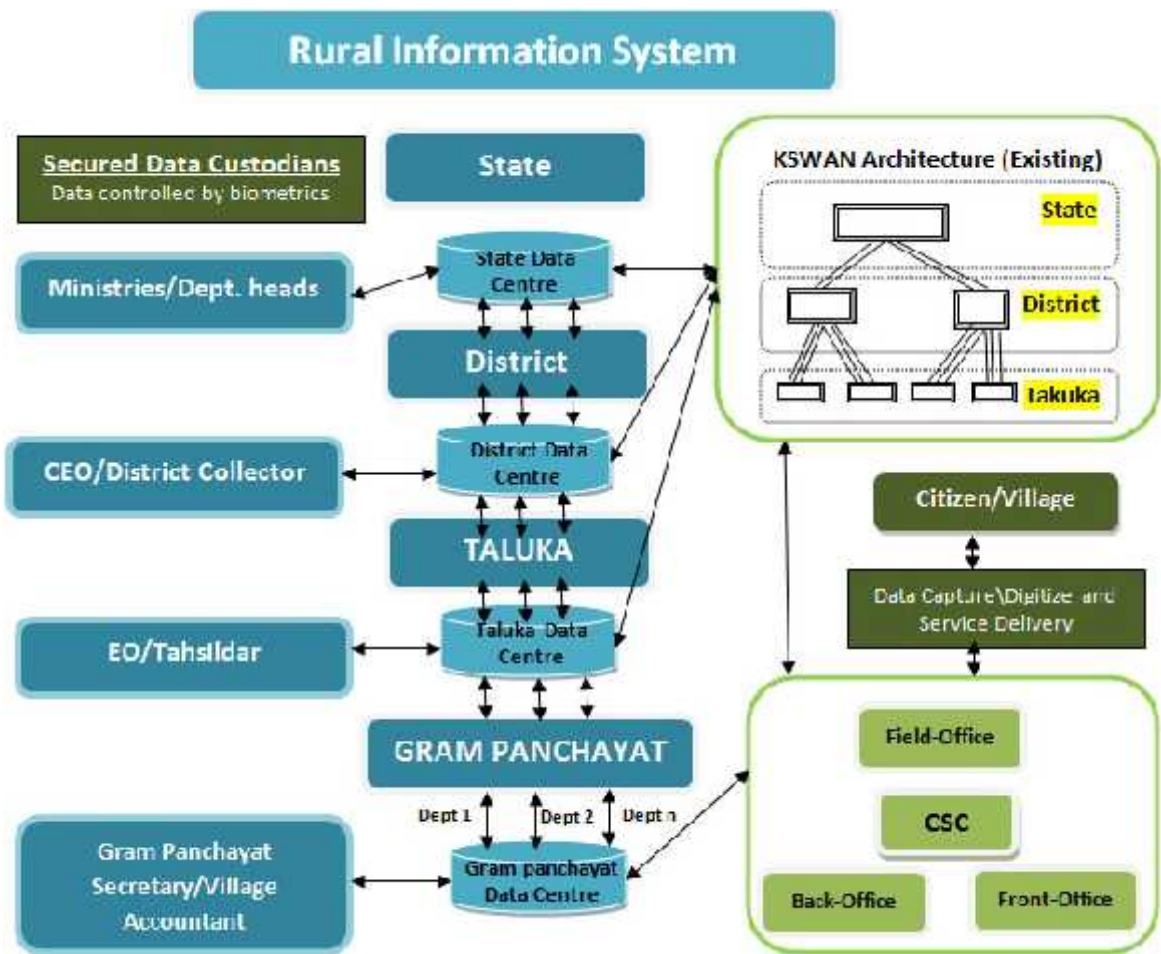


Figure 7: System Architecture and Information Flow¹³

Data collected from the telecentres at the *gram panchayat* level would be added directly to a central database. All other data captured at the *taluka*, district or the state level would be integrated into the central database. This architecture should be fine tuned for all departments depending on the nature of the programme and data requirement suiting the business processes involved.

4. EMPIRICAL FINDINGS

In this section, we present empirical findings from two E-governance projects – a pilot project in *Tumkur* district in Karnataka¹⁴ and *Akshaya* project in Kerala. The CSCs under the

¹³ Figure to be reproduced in colour on the Web and in black-and-white in print.

pilot project in Karnataka have been working for the last 4 months and offering a number services such as Record of Rights, Tenancy and Crops, 42 Rural Digitization Service (RDS), tele-education and *gram panchayat* administration and plan to offer many other services. Each CSC is located at *gram panchayat* level catering to a population of roughly 10,000. For the *Akshaya* project, data was collected from two *Akshaya* centres in Trivandrum district, each centre catering to a population of roughly 15,000 each.

4.1 Financial Sustainability

Table 2 provides data on average costs and revenues for 15 pilot CSCs being run as part of the aforementioned pilot project in Karnataka. The CSCs cluster various G2C and G2G services such as issuance of certificates, *panchayat* administration work, education programmes, etc. in addition to various B2C services.

Table 2: Monthly Average Expenses and Revenue for Pilot CSCs in Karnataka

Average Monthly Expenses per CSC (INR)		Monthly Revenue per CSC (INR)	
Equipment (laptop, printer, webcam, biometric and UPS) ^a	3050	RTC (G2C) ^e	860
Power	200	RDS(G2C) ^e	790
Connectivity (Standard schemes of BSNL ^b)	1100	Panchayat Admin (G2G) ^f	5000
Space ^c	500	NREGA(G2G) ^f	5000
Salary ^d	6000	Oxigen (B2C) ^g	500
Supervisory and related expenses	3750	Tele-Education (G2C) ^h	3200
Training of personnel (amortized)	120		
Stationary	600		
Total	15320		15350

¹⁴ Operated by a consortium led by Centre for Public Policy, Indian Institute of Management Bangalore and includes companies providing various IT-related services, with the objective of designing a sustainable CSC.

^aEMI calculated for a lifespan of 18 months and 12% interest rate on total cost of Rs. 50,000.

^bBSNL is a public sector telecom company having extensive network in rural areas.

^cRental value is imputed, as the local body is providing space free of cost.

^dRepresent salary of one well-qualified operator or two semi-qualified operators, both arrangements prevailing in the existing CSCs.

^eCalculated based on actual data for May and June 2011. CSCs share is 50% of the revenue from these services which are charged @Rs10/land record copy and @15/RDS service which is mainly a certificate.

^fGovernment has agreed to pay this amount for collection and digitization of data.

^gOxigen services are providing mobile phone recharge of various companies and collecting payment for television channels.

^hDistrict administration has agreed to pay Rs. 80 per student out of which Rs. 32 will be the CSC's share.

Table 2 shows that the monthly expenses are fully fixed costs indicating the need to fully utilize the facility to reduce costs per service. Service cost reduction is important in rural area as people are highly sensitive to prices. Also as the CSC operation is covering only a *gram panchayat* the potential volume of each service is limited. Hence increasing capacity utilization requires more services to be offered. We observe that most of the revenue for the telecentre (97%) comes from government (G2C and G2G) services. Therefore services from various departments of the state government and local government bodies have to be clustered for the telecentre to be financially sustainable. The data from *Akshaya* project in Kerala provides further evidence in this regard. Table 3 shows the average monthly expenses and revenues for *Akshaya* centres operating in rural areas. The monthly expenses in these centres are mainly fixed costs and most of the revenue (more than 85%) comes from government services.

Table 3: Monthly Average Expense and Revenue for *Akshaya* Centres in Trivandrum District, Kerala

Average Monthly Expenses per CSC (INR)		Monthly Revenue per CSC (INR)	
Equipment ((laptop, printer, webcam, biometric and UPS) ^a	6100	E-pay (G2C) ^d	1700
Electricity	1000	E-ticketing (G2C) ^d	7000
Connectivity	1000	Ration Card issuance (G2C) ^d	2500
Space ^b	1000	IGNOU (G2C) ^d	1000
Salary ^c	8000	Intel Learning Program (G2C) ^d	3500
Maintenance	500	B2C services such as printing, photocopying, etc. ^e	3000
Total	17600	Total	18700

^aEMI calculated for lifespan of 18 months and 12% interest rate on total cost of Rs 1,00,000.

^bRental value is imputed since the space is owned by the entrepreneur running the telecentre.

^cRepresents salaries paid to two operators.

^dFigures as reported to the District Office, *Akshaya* project.

^eFigures obtained from entrepreneurs during interviews conducted in July 2011.

The combination of services provided by both the centres differ widely but the government is the main source for these services. The figures provided above illustrate how clustering of multiple government services can make these centres financially sustainable. If only a subset of these services is provided, these centres do not break-even.

4.2 Market Creation for Educational and Training Services: *Akshaya* Centres in Kerala

The *Akshaya* project in Kerala is illustrative of how educational services can form a major source of revenue for the telecentres via market creation by tapping into latent demand.

Currently, *Akshaya* centres are delivering the following educational services, each of which caters to a latent demand for which markets have been hitherto absent.

- a) **Intel-Learning Program:** Intel-Learning Program (ILP) is a short-duration (15 days) group-based study program conducted for students of 6–16 years during summer vacations. In the absence of other educational opportunities during school vacations, this program provides an avenue for learning various skills to students.
- b) **E-vidya:** E-vidya is an advanced level e-literacy program providing computer training to adults.
- c) **Kudumbashree:** Kudumbashree is a training programme for women self-help groups.
- d) **Malayalam Computing (MC):** Malayalam Computing is a program for training people in word processing in the local language with an objective to bridge the language divide.
- e) **IGNOU courses:** Undergraduate, diploma and post-graduate courses from Indira Gandhi National Open University (IGNOU) are offered through *Akshaya* centres. Some of the *Akshaya* centres also function as study centres for these courses.
- f) **Medical Transcription:** A job-oriented training programme which trains graduates in medical transcription is provided.

Apart from meeting unfulfilled educational needs of rural citizen, these services also form a substantial source of revenues for the telecentres. Table 4 shows the revenue generated, at the state level, by these educational services from May 2010 to June 2011.

Table 4: Revenue from Educational Services

Revenue from E-learning for the year May 2010 to June 2011	
Particulars	Income (in INR)
ILP	9500000
E-vidya	3419870
Kudumbashree	3200000
Malyalam Computing	2000000
IGNOU Courses	1718676
Medical Transcription	800000

As shown in table educational services contribute more than 70% of the annual revenues of the telecentres. Table 5 presents data from schools in three *panchayat* areas in Tumkur district of Karnataka.

Table 5: Gender-wise Break-up of Students in Government Secondary School and Students Attending Tuition

<i>Panchayat</i> area	Students in Secondary School			Students Attending Tuition		
	Total	Boys	Girls	Total	Boys	Girls
Bidire	70	35	35	7	5	2
Hosakere	200	105	95	12	8	4
Alilughutta	137	73	67	21	18	3

We observe that compared to the ratio of boys to girls attending government schools the ratio of students attending private tuitions is highly skewed towards boys indicating additional constraints for girls to get additional educational inputs. . The main reasons that were cited by female students of these areas included the inaccessibility of coaching institutes and social constraints. The female students felt that tele-education could serve as an effective substitute for private coaching classes and could aid them in getting coached at the school itself. Trial tele-education done during Saturdays by the CSCs in these schools in the month of July 2011 showed that all the girl students who attended school on those days were able to attend tele-education classes, indicating potential for empowering girl child in rural areas. If educational services such as tuitions for board exams, English-speaking courses, etc. are provided at the community level by CSCs via e-learning courses; then they can attract enough students to make the service financially viable and in the process provide the much-needed help to the girl child. Educational services, in general, would be helpful to all children pursuing secondary or higher education since quantity, availability and quality of teachers at these levels in public schools often do not meet even minimum standards.

4.3 ILLUSTRATION OF VARIOUS GOVERNMENT SCHEMES

In this section, we provide specific examples of how CSCs can contribute towards improved implementation of various developmental programmes.

4.3.1 National Rural Employment Guarantee Scheme

NREGS is a public works programme of the GOI that guarantees 100 days of manual work at minimum wages to all households seeking such employment. The special character of the programme is that it is funded by the federal government and is implemented by state governments. State governments in turn depend on district administration for planning and monitoring of the scheme. *Gram panchayats* (village-level elected local bodies) are the final

government arms that interface with the rural citizens in implementing this programme. *Gram panchayats* are in-charge of issuing job cards, collecting applications from job card holder for work, selecting projects, allocating work to individuals, disbursing wages, etc. The programme involves large fiscal expenditures and a crucial question often raised is on the issues of proper accounting of completed work and assets created as part of the programme. Typical work undertaken under the programme includes building of roads, metal spreading, digging for irrigation, etc. The information on work measurement is collected by *gram panchayat* officials and is considered very inaccurate in nature. There is considerable leakage in the system because of inability to properly audit the completed work. A low-cost technology solution to the problem is the use of hand-held GPS system which can map out co-ordinates of a field and upload the data on a weekly basis providing highly accurate data on the size of the asset created. As of now, such capacity is unavailable at the *gram panchayat* level and creating this would be expensive and ineffective. The CSCs can effectively take up this task of work measurement and asset creation which will facilitate the planning, monitoring and execution of the programme at the district and state levels. This will also facilitate sharing of accurate information about the work undertaken under the scheme and the social audit of the programme at the same time providing the CSCs with a steady source of revenue stream.

4.3.2 Mango crop protection

Adoption of new technology of farming or a shift from one cropping pattern to another always requires support services which provide farmers with expert advice on all aspects of farming. In the absence of this, the risk of crop failures is very high. Over the years there has been a consistent decline in the capacity of agricultural extension services to provide adequate, useful and reliable advice on various aspects of farming such as which seeds to use, fertilizer application, crop protection, etc. This has opened up a gap for expert advice which

is usually filled in by fertilizer or pesticide vendors who often take advantage of this asymmetric information situation to boost their own sales leading to crop failures and indebtedness among farmers. Some of these gaps can be addressed through CSCs with the use of ICT. An example is the mango crop protection advisory service provided by CSC at Nallur Hatti village, Tumkur district. The data gathered from the installed weather station provides inputs on local weather conditions based on which forecast for potential adverse effects on the mango crop is made. Farmers are provided information about observable symptoms to look for, to check for the onset of such adverse conditions and remedial measures. Table 6 provides an example of one such advisory.

Table 6: Illustration of Crop Advisory Provided Based on Forecast of Weather

Conditions

Observed weather condition at Nallur Hatti village	Forecasting of disease or pest or physiological changes	Symptoms of observation	Control measures
1) Mild cloudy weather 2) Low temperature prevailing throughout the week.	1) Flowering and fruit set decreases when light intensity and duration of sunshine hours are less 2) Possibility of powdery mildew incidence	White powdery patches on the leaf petioles and panicles	Spraying of wettable sulphur-3g/L or hexacanazole 1.0 ml/L can prevent the occurrence of powdery mildew disease in mango

5. CONCLUSION

In the developing world, telecentres have become the preferred mode of providing services to rural citizens because of low e-literacy, low individual ownership of computer and internet penetration. However, the experience of operating telecentres in remote Indian villages, where they are required most, has been dismal. Execution of e-Governance plan often focuses only on B2C services ignoring G2C services making telecentres unviable at village level. At the same time, entrepreneurs have been testing various business models to provide various

services in rural areas. We argue that an e-governance embedded rural telecentre (EGERT) will be sustainable if a cluster of integrated and complete services are provided. If quality services are provided, market creation will take place for many other services. We have also argued that EGERTs will also foster inclusive growth through better access to various services particularly the government services. Providing a large bouquet of services in rural areas will help bridge digital divide. This also improves governance at the lowest levels of administration by substantially improving the process of collection and management of data related to various government programmes. The presence of telecentres can become a conduit in facilitating the provision of a wider range of services and can also improve planning, execution, monitoring and evaluation of programmes at the local levels in these areas. We show with the help of data from two states in India, a pilot project in Karnataka and *Akshaya* project in Kerala, how financial sustainability is achieved by providing a cluster of services. We also show how markets get created and gender equity can be facilitated through such telecentres. We have illustrated how e-governance embedded rural telecentres can help achieve multiple objectives of effective delivery of government service, sustainable rural telecentres and inclusive growth.

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Appendix 1: Potential Services of various Departments, Present Status of Technology, Readiness and Estimated Revenue per CSC.

Areas	Role of CSC	Readiness in Pilot Centres	Present Status	Estimated revenue/CSC (Rs./month)
Education				
Admission and progress report registers digitization (Class 1 to 10)	Data digitization and build central depository	HW/SW ^a is ready	Waiting for order from Dept (state govt)	Pricing is to be decided
Sarva Siksha Abhiyan & mid-day meal data	Data collection from the source and sink it into central server	HW/SW is ready	Waiting for order from Dept (central govt)	900 2000
Interactive class	Facilitate school and service provider by providing necessary technology and manpower	HW/SW is ready	Approved by local govt	3200
Health Tele-Medicine (state & central funding through Insurance)	Facilitate PHC and service provider by providing necessary technology and manpower	HW/SW is ready	Under trial (state govt)	
HMIS	Data collection from the source and sink it into Central Server	HW/SW yet finalize	Order given by Dept (central govt)	Pricing to be decided
MCTS	Data collection from the source and sink it into Central Server	HW/SW yet finalize	Order given by Dept (central govt)	Pricing to be decided
Integrated Child Development Scheme (relevant under education, health and SW)	Data collection from the source and sink it into central server	HW/SW is ready	Waiting for order from Dept (central govt)	Pricing is to be decided
Agriculture (state & central)				13000
Agriculture inputs inventory building & distribution	Data collection from the source and sink it into central server	HW/SW is ready	Order given by Dept	

Areas	Role of CSC	Readiness in Pilot Centres	Present Status	Estimated revenue/CSC (Rs./month)
Scheme management (application process and end-end service delivery)	Facilitate agri and allied dept by providing necessary front-office support using CSC	HW/SW yet to be finalized	Order given by Dept	
Extension, training and advisory	Facilitate farmer and service provider by providing necessary technology and manpower	HW/SW is ready	Order given by Dept	
Revenue Dept RTC ^b /RDS ^c	Facilitate front office services for RTC/RDS	HW/SW is ready	Working	1650
Crop data collection	Data collection from the source and sink it into central server	HW/SW is ready	Waiting for order from Dept (state govt)	
RDPR ^d : GP schemes, admin & NREGS data entry	BPO	HW/SW is ready	Some modules already working	16500

^aHW/SW: refers to hardware and software, respectively.

^bRTC: Record of Rights, Tenancy and Crops

^cRDS: Rural Digitization Service

^dRDPR: Rural Development and *Panchayat Raj*

Vitae

Gopal Naik is Professor at Centre for Public Policy, Indian Institute of Management, Bangalore, India. He is also the Chairperson, Centre for Excellence for Urban Development.

Siddharth Joshi is a Doctoral Student at Centre for Public Policy, Indian Institute of Management, Bangalore, India.

K.P. Basavaraj is a Research Fellow at Centre for Public Policy, Indian Institute of Management, Bangalore, India.