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Making E-Governance Centers Financially Sustainable in Rural India: A Conceptual Design for Action Research

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Making E-Governance Centers Financially Sustainable in Rural India: A Conceptual Design for Action Research

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Abstract - Large-scale failure of telecenters in rural areas has subdued initial high expectations with regard to ICT bringing about developmental changes and given rise to skepticism about the long-term financial sustainability of such telecenters. The experience in many Indian states, including Karnataka, indicates that taking telecenters closer to people in rural areas is fraught with difficulty in terms of making them financially sustainable. Our analysis of the problem identifies the limited range of services provided by these telecenters as the primary cause for their failure. As a remedy, we suggest a three-pronged approach: first, use of these centers for public service delivery as well as public data collection by the government; second, providing a cluster of complete and integrated services to cater to a wider customer base, thus substantially improving value for the rural customers; and third, providing information and other services to businesses with significantly large operations in rural areas. This approach has the dual advantage of making telecenters viable and therefore meeting the requirements of the rural poor as well as helping the government deliver its services more efficiently and effectively in rural areas.

1. Introduction

During the last decade, there has been a marked increase in the number of projects in developing countries attempting to use information and communication technologies (ICTs) for social, economic, and political development. A number of these projects aim at bringing the benefits of ICTs to communities in which individual ownership of computers is low and use of the Internet is infrequent [1]. This trend reflects the high and ever-increasing expectations placed on ICT for improving quality of life, empowerment, and economic development [2]. In these projects, the typical method of reaching out to rural areas has been through telecenters [3], which provide shared public access, often intermediated by an operator, to information and communication technologies and services via computers and the Internet. These telecenters, rural kiosks, or Common Service Centres (CSCs)[4] are provided on the basis of various models, ranging from fully public projects, like Gyandoot by the Government of Madhya Pradesh, India, to wholly private projects, like ITC's E-Choupal. From among these models, Public-Private Partnerships (PPPs)[5] are currently considered most effective for ICT solutions to development challenges. The PPP models enjoy broad support and are promoted by governments, international organizations, non-governmental organizations (NGOs), and private firms alike. Advantages of the PPP model for the governments are improvements in operational efficiency; greater access to financial resources, human capital, markets, and technology; and risk sharing and the ability to scale up projects [2]. Government functionaries at the implementation level generally lack a comprehensive understanding of the potential of ICT for development, due to excessive compartmentalization of functions, lack of adequate qualified manpower, and difficulties in

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[4] The terms "telecenter," "rural kiosk," and "CSC" have been used interchangeably in the paper.
[5] "PPP" here refers to voluntary collaborations that build on the respective strengths of each partner, optimize the allocation of resources, and achieve mutually beneficial results over a sustained period.

delivering technically complex solutions. There is also, within government agencies, often little or no appreciation of the role that information can play in facilitating development. The private sector, on the other hand, due mainly to its profit motive, puts in the required efforts and resources and innovates to make complex projects viable. Also, citizens' increasing demands for quality public services, coupled with government's inability to gear itself toward meeting this need, point to the likelihood of more PPPs being created in the future, particularly in developing countries [2]. A majority of these PPP projects are e-governance[6] initiatives, which, at a minimum, deliver public services like issuance of birth and death certificates, payment of utility bills, payment of old age pensions etc. Although there is evidence to show that these initiatives deliver value to citizens in terms of cost and time savings, reduced corruption by elimination of the middleman, easier access to public services [4][5], evidence of long-term sustainability of these initiatives when taken to smaller geographical areas is dismally lacking [6].

Various analytical models have been proposed for studying the success or failure of these initiatives. Heeks and Bhatnagar used the Critical Success Factor and Critical Failure Factor model, which identifies 10 critical factors - information, technology, people, management, process, cultural, structural, strategic, political and environmental factors – bringing about success or failure. Kumar and Best use the simpler Sustainability Failure Model to capture various factors leading to the failure of such e-governance projects. According to them, the five modes of sustainability failures are financial/economic, cultural/social, technological, political/institutional, and environmental sustainability [4]. Although long-term financial sustainability is only one of many factors, it is a very critical one. Financial sustainability is a necessary condition for successful delivery of services through projects using ICT [8]. Various case-based studies identify a lack of long-term financial sustainability from current revenue streams as the main cause for failure of telecenter-based e-governance initiatives in which private entrepreneurs are involved [1]. Since private players get involved in these projects with the hope of earning profits, the question of financial sustainability of these projects becomes even more important in determining the potential of PPP as a model for deploying ICT. The experience in the Karnataka state of India provides useful insights in this regard. Karnataka, the center of the software industry in India, has distinctively used ICT for e-governance. *Bhoomi*, an online land record system, and more recently, Bangalore One, a project to provide G2C services in cities, are prime examples. In 2007, the Department of Revenue under the Government of Karnataka (GoK) set up 764 *Nemmadi*[7] centres in rural areas throughout the state to provide G2C services via a PPP model at *hobli*[8] level. The government provides access to the relevant database and authenticates the certificates issued, while the private partner provides the logistics for issuing certificates. The financial data of these centers indicates that they are not viable even after three years of operation. Now, the GoK has decided to establish CSCs at *gram panchayat*[9] level, in part to fulfill the requirement to set-up 1, 00,000 CSCs across India, laid down in the National e-Governance Plan of the Government of India. A Request for Proposals issued by the GoK attracted only a few companies, and more importantly, companies that submitted proposals asked for substantial financial support to run these CSCs, which the GoK is unable to provide. Other states, where establishment of such centers was given to private partners, faced similar

[6] E-Governance here refers to the use of information and communication technologies (ICTs) in the public sector to improve operations and delivery of services.

[7] *Nemmadi* means "happiness from being hassle free" in the local language, Kannada.

[8] A *hobli* is an administrative unit comprising 15-20 villages with a total population of 20,000.

[9] The village *panchayat* or *gram panchayat* is the smallest local government unit in rural areas in India, comprising 3-5 villages with a total population of approximately 5000.

financial difficulties. This paper addresses the important question of making these CSCs financially viable, examining the reasons for failure of the existing projects and proposing approaches to make them financially sustainable.

2. Conceptual Model

The financial sustainability of telecenters is significantly affected by their spatial distribution. In this section, we present a spatial model for cost and revenue of a telecenter. ***N*** is the number of households in an area; ***S*** is the number of services offered by a telecenter or a CSC; p_i and c_i are the per unit price and variable cost, respectively, of providing a particular service of type ***i***; and C is the amortized fixed cost of running the CSC. Then, to at least break even, we require

$$\sum_{i=1}^{S} d_i(p_i - c_i) \geq C$$

where $d_i = f(p_i, N, z_i)$ is the quantity of services demanded at the telecenters and is dependent on price, number of households, and other factors (z_i), like per capita income, literacy levels, etc. and

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

As we reduce the geographical area served, the number of households (N) decreases and the revenue loss has to be compensated for with an increase in either **S** (number of services), ***di*** (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 ***di***, especially when the demand for services is elastic, as is the case for most of the services offered by CSCs, and factors influencing demand other than price are external to CSCs. It is important to note that per unit variable cost also decreases as ***di*** and **S** increase until full capacity is reached. As is clear from the above equation, as the number of households, N, decreases, the number of services to be provided, S, has to be increased for financial sustainability. Thus, for a given geographical area and level of utilization, there exists a set of services for which the CSC would be viable. The number of services that can potentially be sought from a CSC depends on the needs of the various stakeholders - citizen, government, and business. Figure 1 summarizes the needs of key stakeholders that can be served through CSCs. As the number of services required by various stakeholders increases and these services are provided by the CSC, the financial sustainability of the CSC improves.

3. Approaches for enhancing the financial sustainability of telecenters

The financial sustainability can therefore be improved if CSCs are able to increase the number of services provided that are required by stakeholders and at the same time increase the demand for these services. This may be broadly achieved using three approaches: provision of a cluster of integrated and complete services, provision of G2G[10] services, and provision of C2B[11] services to business.

[10] Defined as the transactions between governments at various levels, or various departments or agencies or bureaus of the government.

[11] Defined as services offered by individuals to business.

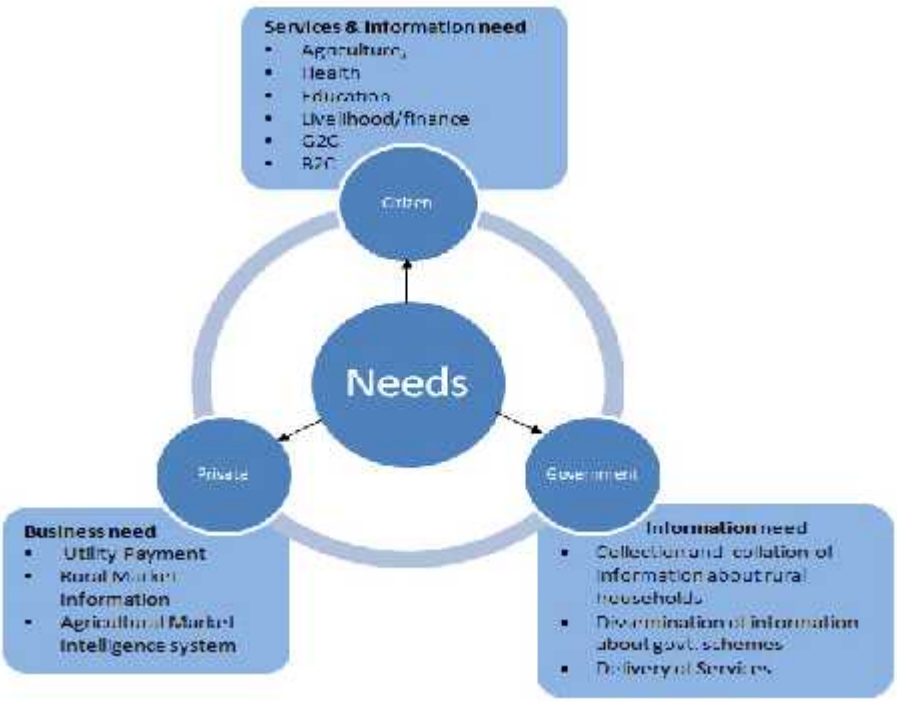

Figure 1: Needs of the three key stakeholders that can be served by CSCs

3.1 Provision of a cluster of integrated and complete services

The aim of having a cluster of services is to serve a wide range of customers, including farmers, patients seeking medical care, children or adults seeking education and information on jobs or skill development, in addition to providing various B2C services, like mobile phone recharge, application for colleges, etc., and G2C services, like issuance of certificates, utility bill payment, etc. The term "integrated service" implies that various inter-related services are provided at the same kiosk. For example, all services related to agriculture, including soil testing, inputs on crop cultivation and fertilizers, and information about market prices, storage facilities, crop insurance, etc. can be combined to provide an integrated service. The "completeness" of a service relates to the level of utility a particular service provides to the customer. For example, at the first level, a farmer can inquire about loans provided by banks; at the next level, he can apply for a bank loan; at a higher level, the monthly installments can be paid at the CSC itself. By providing integrated and complete services, demand for these services (d_i) can be increased, while provision of a cluster of such services would increase the number of services provided (S). This approach is in line with the robust best practice suggested by Aichholzer with regard to user-group and target-group oriented design of services, to mitigate future macro-economic risk [9]. Provision of a large number of services directly to rural households will particularly benefit the poor.

3.2 Provision of G2G services by the government through telecenters

Government agencies need to collect, collate, and pass on information that is then used by various arms of the government for planning, monitoring, evaluation, and execution of government programs. Examples of data collection from India include information related to the National Rural Employment Guarantee Scheme (NREGS)[12] and data on crop-updation

[12] NREGS is a Government of India program guaranteeing employment to one member of every household for a minimum of 100 days in a year.

collected by village accountants, etc. In countries like India, sub-national government machinery intended to reach rural households has become weak due to shortage of manpower and lack of alternate effective mechanisms at lower levels of government. Most of the *ad hoc* alternative mechanisms tried so far have turned out to be cost centers. CSCs can be extended to provide G2G services by making them the front end for collection of information. The data collected from CSCs at the village level can be uploaded, directly as well as through different levels of government, to a central database. Once this information is stored electronically in a single, centralized database, problems of data redundancy can be resolved, the overall cost for the government in collecting this data will be reduced, and there will be significant improvements in the quality of data. This will also enhance co-ordination and the process of data sharing between various government agencies. In addition, government departments will be able to build a strong network at the grassroots level to obtain accurate, detailed, and timely data from citizen on the programs being implemented, as well as develop a robust citizen database. The schematic and architecture of this system is illustrated in Figure 2.

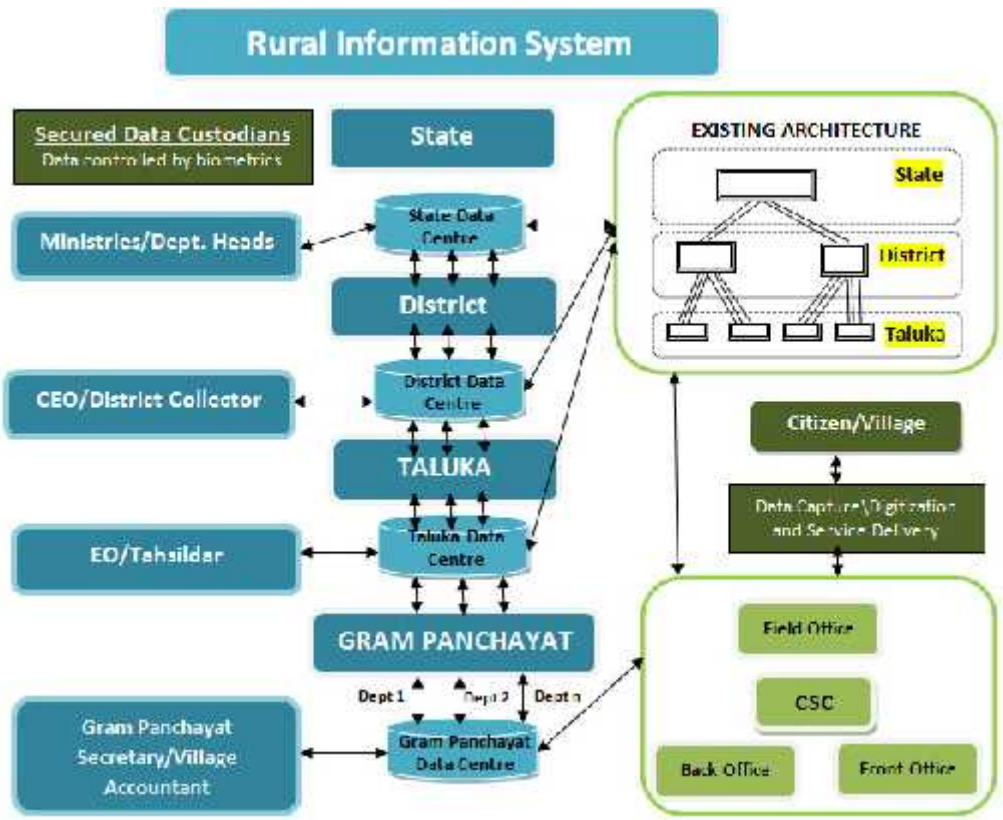

Figure 2: System architecture and information flow for government data collection in rural areas

3.3 Provision of C2B services

Businesses supplying products and services in rural areas need information on rural households. For example, seed companies need to know which crop seed will be in demand in the next season and an agricultural commodity exporter needs to know about the quality and quantity of commodities produced in a particular region. Such information can be easily collected and supplied by CSCs. Enhanced accuracy and timeliness of such information would benefit businesses and, in the long run, the farmers as well.

4. Financial Sustainability of Telecenters

In this section, we present a comparative analysis of the finances of the CSCs. Table 1 shows the costs and revenues of a typical existing *Nemmadi* centre in Karnataka, India. Data in Table 1 is calculated as the average for six such *Nemmadi* centers in the Chamrajnagar district of Karnataka, India. As the data illustrates, the level of investment and the costs involved are higher than the revenues generated by CSCs, making these projects financially unsustainable. The main sources of revenue are G2C transactions, and with only a moderate frequency of such transactions in rural areas, the revenues are not enough to break even.

Table 1: Monthly revenues and costs for a single kiosk as well as back office of a typical Nemmadi center; in Indian Rupees (INR); 1 USD = 41 INR

Costs			**Revenues**	
Items of expenditure	**Amount**		**Sources of revenue**	**Amount**
Personnel Expenditure	3357		Land records	294
Administrative Expenditure	1884		G2C services (42	563
Operating Expenditure	1742		Utility Payments	1235
Marketing & Corporate Expenditure	1248		SSA[#] Programme	587
Interest	1335		Issue of Food Coupons	315
Depreciation	2968			
Total costs	**12534**		**Total revenues**	**2994**
Revenue Gap			**- 9540**	

[#]*Sarva Shiksha Abhiyan* (SSA) is a government program providing free education to children.

Source: Naik et al (2009)

In Table 2 and Table 3, we present the estimated monthly revenues and costs based on the new design described above, using data from a group of villages and other sources of the Government of Karnataka, India.

Table 2: Costs for a model telecenter; in Indian Rupees (INR); 1 USD = 41 INR

	Monthly cost	**Units**	**Unit cost**	**Total**
Fixed	Personnel Expenditure			25250
	Salary of operators	5	4500	22500
	TA/DA for 1 operator			2750
	Administrative Expenditure			13600
	Supervisor (for 5 centers)	40000	0.2	8000
	Manager (for 5 centers)	10000	0.2	2000
	Accounts Manager	6000	0.2	1200
	Technical Manager	12000	0.2	2400
	Operating Expenditure			4500
	Electricity	1	1000	1000
	Communication + Bandwidth	1	0	1000
	Rental cost			2500
	Depreciation			12452
	Total			**55802**
Variable	Operating Expenditure			2740
	Administrative Expenditure			100
	Total			**2840**
	Total Cost per Month			**58642**

Inclusion of a wider range of services necessitates employing five operators (one each for NREGS, *gram panchayat* administration, G2C services, health services, and B2C services) and corresponding infrastructure. On the revenue side, the inclusion of education and health services as well as G2G services, like data collection for social sector program, increases the potential revenues for the CSCs.

Table 3: Revenue for a model telecenter; in Indian Rupees (INR); 1 USD = 41 INR

Revenue Source	Annual	Monthly
AGRICULTURE		
Crop updation (INR 7 per landholding per round) x (1000 landholdings) x (3 rounds per year)	21000	1750
Supply and demand estimation for seeds, fertilizers etc. (INR 7 per landholding per round) x (1000 land holdings) x (2 rounds per year)	14000	1167
Soil testing (INR 20 per test) x (500 landholdings tested once a year)	10000	833
G2C SERVICES		
42 services (INR 10 per transaction on average) x (500 transactions)	60000	5000
HEALTH		
Equipment and data management	24000	2000
Health consultation (INR 100 per visit per patient) x (5000 population) x (2 visits per year) x (0.20% as revenue for the CSC)	200000	16667
EDUCATION		
Tuition (INR 200 per student per month) x (50 students from class 9th and 10th) x (6 months in a year)	60000	1000
Collection of Sarva Shiksha Abhiyan (SSA) attendance data	42000	3500
SSA performance and retention measurement	30000	2500
Teacher training; skill upgradation	9000	750
Mahiti Sindhu[#]	120000	5000
PANCHAYATI RAJ & RURAL DEVELOPMENT		
Current data updation (INR 0.60 per record) x (1000 records)	600	50
Panchatantra[$]	120000	10000
NREGS	72000	6000
Job requests (INR 0.50 per request) x (300 times) x (3 times a year)	450	38
UTILITY PAYMENTS		
Electricity Bills (INR 3 per transaction) x (1000 transactions per month)	36000	3000
TOTAL	**819050**	**59255**
REVENUE SURPLUS PER MONTH		**613**

[#]Mahiti Sindhu is the education program of the Government of Karnataka, aimed at providing computer-aided learning in schools.

[$]Panchatantra is a newly developed *Gram Panchayat* administration software of the rural development department of the Government of Karnataka.

As the calculation indicates, if the new model for the CSCs is used, the revenues they generate will cover the total cost and with INR 3500 per month subsidy the Government of India is prepared to give to each center, it will provide adequate incentive for private players

to partner with governments. Hence the CSCs at *gram panchayat* level are viable if the service requirements of the government and businesses are brought into its scope. Based on this analysis, a consortium of citizens, government, academic institutions, and IT companies are initiating pilot projects in 15 *gram panchayats* in Gubbi *taluk,* Tumkur district, Karnataka state, in India to demonstrate the feasibility of this idea.

5. Conclusion and Policy Implications

The current research indicates that concerns about financial sustainability of telecenters can be addressed by following a three-pronged approach. First, the private partners in the PPPs need to offer a cluster of integrated and complete services so that they have a wider customer base. Depending only on G2C services as sources of revenue is not sufficient to make telecenters financially viable. Second, the government also needs to go beyond using telecenters to provide only G2C services. The possibility of making the telecenter a conduit for collecting information at the village level to facilitate better planning, monitoring, evaluation, and execution of programs is enormous. They can not only help the government to plan, monitor, and execute better, but more importantly, can achieve this without increasing the employee base of the government. For the private partners, this would be a steady source of revenues and would result in improvement of their finances. Third, specific needs of businesses can be effectively met through telecenters. This approach would increase the number of services provided at the telecenters and make them financially viable for even smaller geographical areas, such as a *gram panchayat*.

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