

# Impact and Sustainability of E-Government Services in Developing Countries: Lessons Learned from Tamil Nadu, India

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We find that the presence of village Internet facilities, offering government to citizen services, is positively associated with the rate at which the villagers obtain some of these services. In a study of a rural Internet project in India, we identify a positive correlation for two such Internet services: obtaining birth certificates for children and applications for old age pensions. Both these government services are of considerable social and economic value to the citizens. Villagers report that the Internet based services saved them time, money, and effort compared with obtaining the services directly from the government office. We also find that these services can reduce corruption in the delivery of these services. After over one year of successful operation, however, the e-government program was not able to maintain the necessary level of local political and administrative support to remain institutionally viable. As government officers shifted from the region, or grew to find the program a threat, the e-government services faltered. We argue that this failure was due to a variety of Critical Failure Factors. We end with a simple sustainability failure model. In summary, we propose that the e-government program failed to be politically and institutionally sustainable due to people, management, cultural, and structural factors.

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## INTRODUCTION

E-Government can be defined broadly as the use of information and communication technologies (ICTs) in the public sector to improve its operations and delivery of services. It is increasingly being seen as the answer to a plethora of problems that the governments or public agencies in general face in serving their constituencies effectively. This is especially so in developing countries, where generally the public agencies face resource constraints in improving their operations and delivering services to the citizens. In such cases, e-government has been touted as a means to save costs while at the same time improving quality, response times, and access to services (ADB, 2003). Some analysts have noted its role in improving the efficiency and effectiveness of public administration (Pacific-Council, 2002; UN-ECOSOC, 2003). It is also seen as a tool to increase transparency in administration, reduce corruption, and increase political participation (Seifert & Bonham, 2003). Its potential to make governments more competitive and to enable them to face the challenges of the information and communication age has also been noted (OECD, 2003; UNDP-APDIP, 2003).

Though considerable attention has been focused on how e-government can help public agencies improve their services, there are relatively few studies that focus on the impacts of these services on the government agencies or the citizens themselves, especially in developing countries (Grant, 2005; Heeks, 2003a; Norris, 2003). There are fewer studies that focus on long term sustainability of e-government initiatives (Aichholzer, 2004; Heeks, 2002, 2003a).

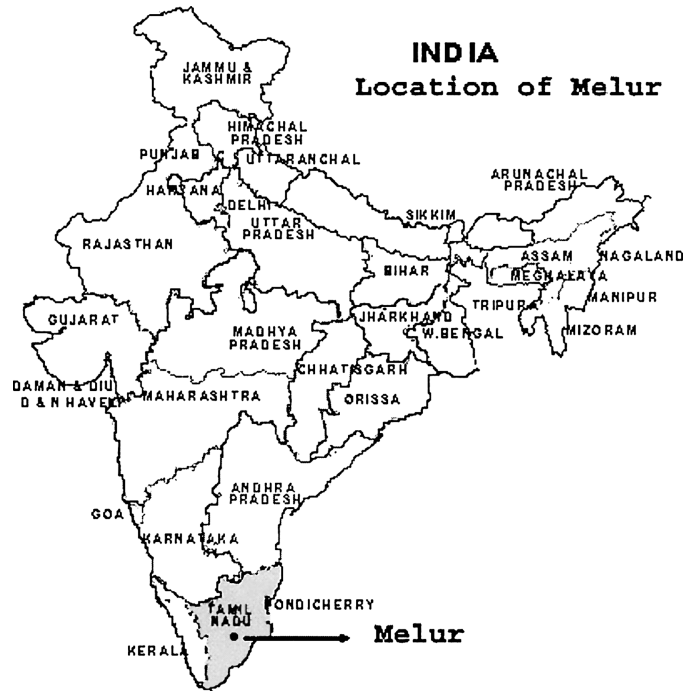
Some analysts have noted that e-government projects often fail either totally or partially in achieving their objectives despite initial successes (Heeks, 2003a). In a study of a rural e-government project in India, Cecchini and Raina (2003) found that though service satisfaction was high, usage over time was low, and the poorest people were not using the services. In another case, lack of regularly updated content and interactivity led to the failure of a community based e-government initiative in South Africa within a year, despite its initial success (Benjamin, 2001). Heeks (2002) has noted several more cases of total or partial failure of ICT initiatives in developing countries.

Researchers have argued that most of these projects fail either totally or partially due to 'design-actuality' (Heeks, 2002) or 'design-reality' gaps (Heeks, 2003a), long-term sustainability problems (Aichholzer, 2004), or lack of commitment on the part of political leadership and public managers (Bhatnagar, 2000). While various theories have been advanced to help understand these failures, there have been few data-driven studies focused on the impacts and political and institutional sustainability of projects over relatively long periods of time (Heeks, 2003a). This paper examines one such case longitudinally, where the e-government project was successful in achieving its objectives of delivering e-government services for over a year, but failed to sustain operation over the long-term.

In this paper, we study the Sustainable Access in Rural India (SARI) project in Tamil Nadu, India. This project aims at rural social, economic, and political development by providing comprehensive information and communications services through computer and Internet kiosks in rural communities. Started in November 2001, the project at its peak established over 80 such kiosks in rural communities in Melur Taluk (an administrative unit within the district) of Madurai district in Tamil Nadu. Figure 1 shows the location of Melur within the state.

The Internet kiosks offer a number of services including basic computer education, e-mail, web browsing, e-government, health, agricultural and veterinary services mostly on a fee-for-service basis. Our focus here is on the e-government services, which included online birth, death, income, and community (caste) certifications, all of which are important to citizens wishing access to various government programs. The e-government services also included the ability to apply for senior pensions, and a program allowing citizens to lodge complaints and grievances with senior district officials and with the Chief Minister's cell in the state capital. All of these services were implemented through online forms that were available via the village Internet kiosks. These forms were completed by the community member and transmitted electronically to the local taluk office for processing.

In this study we focus on the systemic and institutional factors responsible for the initial successes and subsequent



**FIG. 1.** Location of Melur in India. From <http://www.tourindia.com/htm/homepage.htm>, with modifications by the authors.

sustainability failures of the program and attempt to draw generic lessons from these factors. The lessons learned from it can help us understand how best to enhance the efficiency and effectiveness of e-government services and to realize the long-term sustainability of these programs.

The remainder of the paper is organized as follows: first, we describe the overall project briefly and how it forged institutional partnerships with the government and other agencies (both public and private) for delivery of services; next we discuss the methods employed in our empirical study; then we discuss the results including an analysis demonstrating significant increases, when compared to villages without the Internet, in the number of applications submitted by the villagers for birth certificates and old age pensions; then, we examine why this partnership so far has failed to maintain long-term political and institutional sustainability; and finally we analyze the Critical Failure Factors and propose a general conceptual framework for studying sustainability failures in this type of intervention.

## DESCRIPTION OF THE E-GOVERNMENT PROJECT

The SARI project is a collaborative venture of several organizations: the Indian Institute of Technology (I.I.T.), Madras; Berkman Center for Internet and Society, Harvard University Law School; Georgia Institute of Technology; I-Gyan Foundation; and n-Logue Communications Pvt.

Ltd. It uses a Wireless-in-Local Loop (WLL) technology to provide Internet connectivity to rural villages.

This Internet connectivity is offered to the local community at kiosks which are run as a self-sustained business with cost recovery through service charges. A majority of the kiosks are locally owned and operated by self-employed entrepreneurs, while some are operated by self-help groups of a local NGO. Technical support for the kiosks is provided by n-Logue Communications.

The project had established 39 village kiosks when this study was conducted. However, not all of them were offering e-government services. During the period covered by this study (November 2001 to November 2002), the number of kiosks offering these services regularly was only 12. The entire taluk has 84 villages. The rest of the villages, numbering 72, were still being serviced by the traditional paper-based government to citizen systems. As of October 2004, the number of village kiosks in the program had increased to over 80. However, the e-government services offered by the kiosks had come to an end by December 2002.

### Institutional Partnerships with the Government and Other Agencies

The project started on a solid foundation with the full support of the state government in the form of written orders (issued in Feb. 2001) for starting its operations in the area, and had also developed institutional partnerships with other public and private agencies for delivering its services. The model that the project used for general delivery of services is depicted in Figure 2.

While the kiosks have offered a variety of services since their inception, many of them quite successful, we focus here on the e-government services that ended in almost complete failure after over a year of successful operation.

### Scope of the Partnership with the Government

The scope of the partnership with the government was limited to two aspects: first, it allowed the kiosks to send applications electronically to the Melur Taluk office for various e-government services, and, second, it established a coordinating mechanism for monitoring the prosecution of such applications. The coordination and monitoring was to be done by the district collector, the highest ranked government official in the district. These coordination meetings were to be conducted with the SARI project officials on a regular basis. While these coordination meetings were conducted regularly till the end of 2002, they virtually stopped after the incumbent district collector was transferred out of the district in Feb. 2003. We analyze later the reasons why this happened.

Note that this program did not aim at computerizing or transforming the back office operations connected with the processing of the e-government applications in the taluk office. The taluk office simply received the applications transmitted electronically from the kiosks and processed and delivered the services in the usual way. Thus the only procedural change that occurred in the taluk office was at the front end where it added an electronic mode for receipt of the applications.

### RESEARCH METHODS

We have used a combination of quantitative and qualitative research techniques for our study. Our main sources of quantitative data were the local government taluk office records, government census records, and surveys of the village kiosk operators. We conducted the field work for this project during June-August 2003; the data we analyzed was from November 2001 to November 2002, the duration for which e-government services were provided through the kiosks.

Initially, we reviewed, copied, and closely analyzed the entire set of local government logs of all relevant applications received and processed both using the e-government kiosk facilities as well as the traditional paper based approach (we found that records were kept properly for both the kiosk and the non-kiosk villages during the study). We were able to record complete data for all the 84 villages served by the local taluk office. This data showed that 12 villages had kiosks that regularly provided e-government services during this period while the remaining 72 were using only traditional methods for obtaining these services. Though there were 39 villages having kiosks during this period, we found that many of them were not offering e-government services regularly; they had offered these services only for very short periods, ranging from one to three months. Note that the villagers in the 12 kiosk villages could also use the traditional paper based system

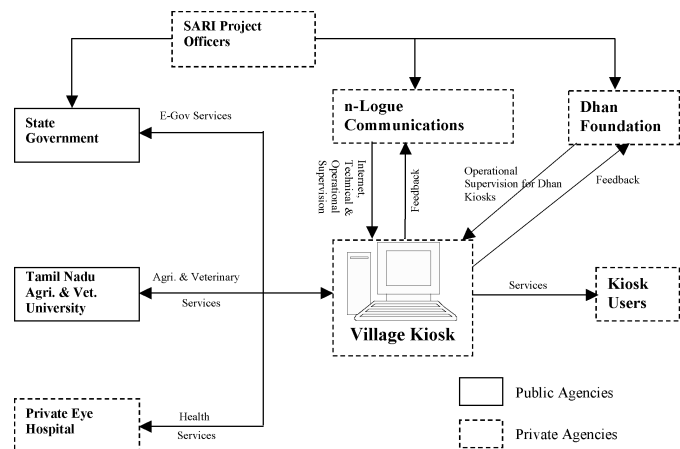


FIG. 2. Institutional partnerships for delivery of services in the SARI project.

by visiting the taluk office personally. Thus the taluk office could receive an application from the kiosk villages either electronically through the kiosk or through the traditional paper based system. However, in the 72 non-kiosk villages, the traditional method was the only mode available.

We found that the taluk office was maintaining manual hand-written registers of even the applications received through the 12 kiosks despite having a computer which received these applications through e-mail. These records were quite meticulously maintained and reliable. The records for the non-kiosk villages were also, of course, hand-written. In addition we collected the village level demographic data for all the 84 villages from the government census records. Though we also collected data on the e-government services from the 12 kiosks directly, we found that many of the kiosks had not maintained reliable records on these services and that the taluk office data was far more reliable.

In addition to collecting quantitative data, we also conducted detailed interviews with the government officials involved in the project, the SARI project officials, the kiosk operators, and the users of the e-government services. We interviewed 8 government officials, who included the state level government secretary of the information technology department and every official involved in the project at the district and taluk levels. We also interviewed 4 SARI project officials including the project manager stationed at state headquarters in Chennai and 3 local officials stationed at Melur. We also interviewed the 12 kiosk operators to understand the entire process behind delivery of e-government services. These interviews also helped us to understand why the services failed to sustain. As our analysis of the data indicated that the e-government services through the kiosks had led to an increase in the rate at which villagers obtain birth certificates for their children and apply for old age pensions, we also interviewed 10 users of these services in 4 kiosk villages to understand the reasons for their choosing the kiosks for obtaining these services instead of submitting a paper application as before. These users were selected randomly from the complete list of users maintained in the taluk office. We found that a total of 87 villagers had applied for birth certificates in these 4 villages while 12 had applied for old age pensions. From these lists, we randomly selected the names and addresses of 7 villagers who had applied for birth certificates and 3 villagers who had applied for old age pensions. As all the applications for birth certificates were for school going children, we actually interviewed the parents who had applied on behalf of their children. In the case of the old age pensions, we interviewed the actual applicants. One applicant each in both categories was female.

We conducted all interviews using structured questionnaires, designed separately for the village users, kiosk operators, and the government and the project officials. The

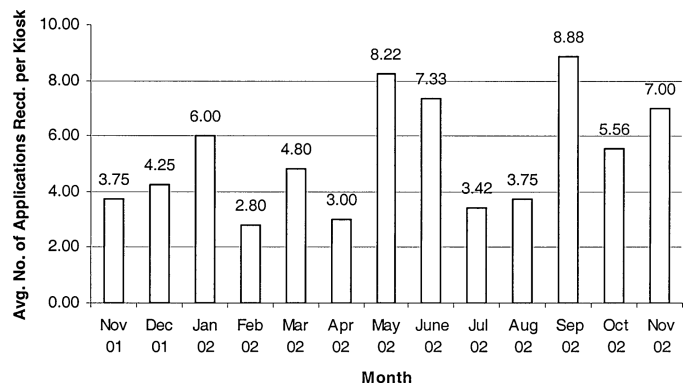
interviews with the users were conducted in the Tamil language by trained graduate students from a local university. Each of these interviews took around 30 minutes to complete. The interviews with the kiosk operators and the government and the project officials were conducted by one of the authors (Kumar) in both English and Tamil. These interviews took around one hour each to be completed.

## DATA ANALYSIS

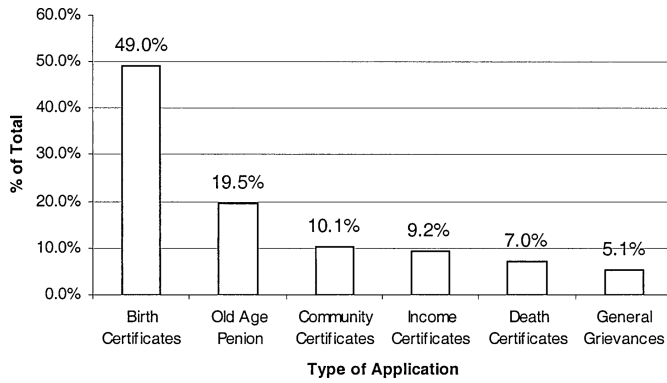
We used descriptive statistical techniques to analyze the rate at which villagers obtained the relevant services. A multiple linear regression model has been built to analyze the association between the presence of the kiosks and the rate of obtaining these services.

We first present descriptive statistics to examine how the 12 kiosks appear to be associated with an increase in the rate at which the villagers obtain certain government services as compared to villages without Internet services. In all of the following analysis, the data pertain to all the applications received from the 12 kiosk villages (both electronically and through the traditional methods) and the 72 non-kiosk villages. We analyzed 6 e-government services that were offered by these kiosks: birth certificates, death certificates, income certificates, community certificates, petitions of grievance to government officials, and old age pensions. Figure 3 represents the average number of applications per kiosk received by the taluk office for all these six services from the 12 kiosk villages. As can be seen, the e-government services started with the very first kiosks opened in November 2001, picked up as more kiosks opened, and peaked in September 2002.

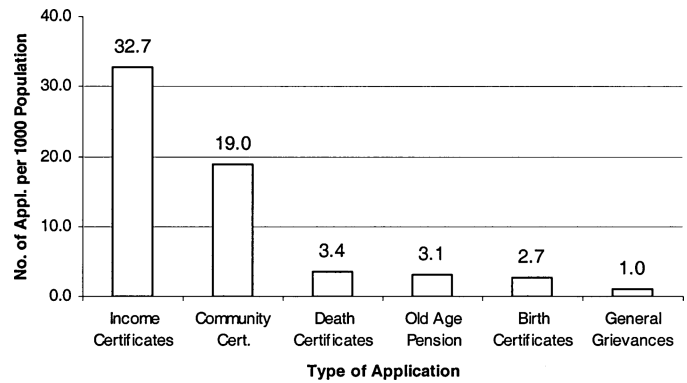
The applications virtually stopped in early December 2002 due to a computer breakdown in the taluk office. Hence, comparable data is essentially zero for December 2002. Though the taluk office started receiving applications again from January 2003, the service numbers have declined to nearly zero since then. Reliable data from



**FIG. 3.** Average number of e-government applications (all categories) received per kiosk in Melur.



**FIG. 4.** Distribution of types of applications received from kiosks (total applications = 682).



**FIG. 5.** Total applications received (per 1000 population) from all 84 villages (including both kiosk and non-kiosk villages).

January 2003 onwards is not available due to irregular record keeping in the taluk office, but discussions with the government officials and the kiosk operators reveal that the e-government services essentially stopped after November 2002.

We now present the data on applications for government services received from the kiosk and the non-kiosk villages in more detail. In this and all the subsequent analysis and figures, we present the data aggregated for 12 months, from December 2001 to November 2002. The main reason for choosing this period was the availability of comparable data for both the kiosk and the non-kiosk villages.

We first analyze the types of applications received from the kiosks for the various services. This is shown in Figure 4. As can be seen, the largest number of applications received was for birth certificates followed far behind by old age pension, community, income, and death certificates, and general grievances.

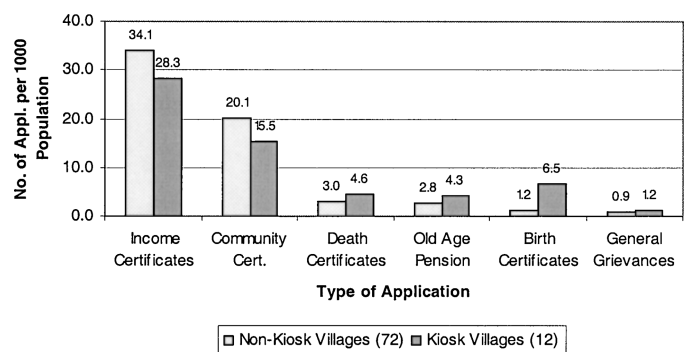
We wish to examine whether the presence of kiosks providing e-government services is associated with any increases in the rate at which these services are demanded. However, in order to do a comparative analysis of the kiosk and the non-kiosk villages, it is useful to first study the overall rate at which these services are demanded across the entire taluk for all the villages (including both the kiosk and the non-kiosk villages). We present this data in Figure 5. Though this data pertains to the same period during which the 12 kiosks were providing e-government services, we believe it still provides a useful starting point for examining whether there are any differences in the applications received from the kiosk villages versus those received from the non-kiosk villages.

As we can see, income and community certificates are the two most frequently demanded government services followed by death certificates, old age pensions, birth certificates, and general grievances.

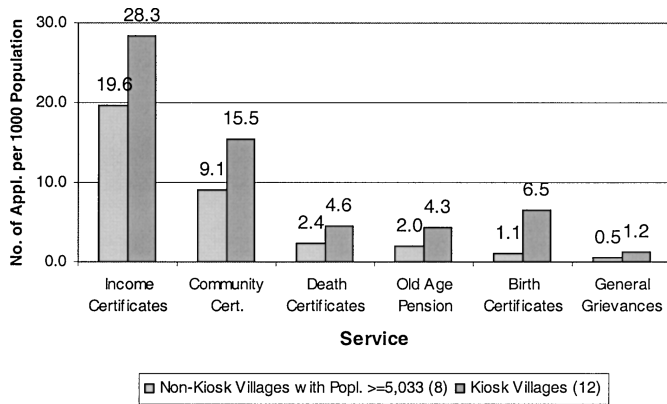
We now present a comparative analysis of the demand for these services for the kiosk and the non-kiosk villages

in Figure 6. We can compare the numbers in this Figure with the overall demand depicted in Figure 5. As can be seen, the number of applications (per 1000 people) is substantially higher in the kiosk villages for four categories: birth and death certificates, old age pensions, and general grievances. At the same time, two categories, namely income and community certificates, exhibit lower numbers. The non-kiosk villages exhibit higher numbers of income and community certificates and a lower level of use of the other four services. When we compare the kiosk and the non-kiosk villages, we find that the kiosk villages show a higher number of applications for the four categories mentioned above, namely, birth and death certificates, old age pensions, and general grievances.

Next, let us consider the differences in the number of applications from the kiosk and the non-kiosk villages but controlling for the population of the villages. The average population of the 12 kiosk villages is 5,033. If we consider only those non-kiosk villages with a population equal to or greater than 5,033 and analyze the applications received from the kiosk and non-kiosk villages, we find that the non-kiosk villages now show a lower level of use for all



**FIG. 6.** Applications (per 1000 population) received from kiosk and non-kiosk villages.



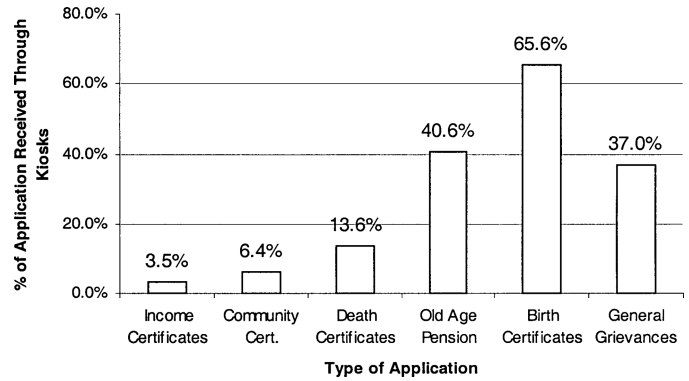
**FIG. 7.** Comparative analysis of applications received from kiosk and non-kiosk villages with similar populations.

the six categories, including income and community certificates (Figure 7), when compared to the overall demand depicted in the Figure 5. However, when we compare the kiosk and the non-kiosk villages in this figure, we find that the kiosk villages show a higher number of applications for all the six categories compared to only four in Figure 6.

It is important to interpret Figures 6 and 7 cautiously. As we can see from Figure 7, larger non-kiosk villages exhibit a lower level of use of applications for all categories, when compared to that for all the villages in the taluk as a whole (Figure 5). However, when we compare the kiosk villages with the non-kiosk villages having similar populations (Figure 7), the former show higher numbers in all the six categories.

It is worthwhile to ask why the larger villages show a lower level of use of applications when compared to that of the taluk as a whole. We think it is due to two reasons: larger villages usually have a significant percentage of ‘forward castes’ for whom some of these services are not relevant (for example, they don’t need community and income certificates as there is no reservation for them in any government services); secondly, these villages also have larger percentages of higher income households, which typically prefer to avail of institutional services (like hospitals in towns and cities) for births and deaths in the family. The certificates in such cases are issued by the respective urban municipalities and not by the taluk office. Similarly, the demand for old age pensions is less, as these are only available to the most economically disadvantaged. General grievances are also rarer from the relatively well-off sections of the community.

The suggestion that the kiosks succeeded in facilitating some of these services is supported further by the fact that the taluk office received a large proportion of the total applications (received both electronically and through the traditional method) through the kiosks in these vil-



**FIG. 8.** Proportion of total applications received through kiosks in the 12 kiosk villages.

lages. Figure 8 shows these percentages. This figure shows that the villagers accessed the kiosks far less for income, community, and death certificates than for the other three services. Our interviews with the kiosk operators and the taluk officials revealed that this was primarily due to the fact that these services required submission of additional documents and subsequent verification in the applicant’s village, which required the citizens to interact directly with the taluk officials. Hence the applicants preferred to use the traditional approach for these services.

### Multiple Regression Model

We now present an ordinary least squares (OLS) multiple regression model for examining the associations between availability of Internet-based e-government services and the number of applications received for various services. We used the following multiple regression model in studying this association:

$$\text{No. of applications received per 1000 persons in the village} = \beta_0 + \beta_1 * \text{Population of the village} + \beta_2 * \text{Literacy rate in the village} + \beta_3 * \% \text{ of SC/ST population in the village} + \beta_4 * \text{KIOSK} + \varepsilon$$

In the above equation, KIOSK is a dummy variable (with a value of 1 or 0 respectively) indicating whether the village has a kiosk or not. The variable “% of SC/ST Population” indicates the proportion of scheduled castes (SC) and scheduled tribes (ST) in the village. These are traditionally the most socially and economically disadvantaged communities in these villages. The reason for including this variable is that several government programs are targeted at these communities and this may affect the demand for these services. We included the population and literacy rate of the village as other explanatory variables, which we posit could explain the variation in the number of applications received for these services as well. In

**TABLE 1**  
Regression results for birth certificate and old age pension applications

Explanatory variable	Dependent variable: Birth certificate applications	Dependent variable: Old age pension applications
Population in hundreds	.003 (0.11) <sup>a</sup> (.013) <sup>b</sup>	-.025 (-1.11) <sup>a</sup> (-.142) <sup>b</sup>
Literacy rate in 2001	-1.101 (-0.24) (-.026)	-8.340* (-1.86) (-.215)
% of SC/ST population	-2.183 (-0.68) (-.074)	-4.257 (-1.39) (-.159)
KIOSK	4.950*** (3.58) (.436)	2.925** (2.20) (.283)
Constant	2.304 (0.74)	9.509*** (3.20)
Observations	73	73
R <sup>2</sup>	0.195	0.104
Adjusted R <sup>2</sup>	0.151	0.054
F-Statistic	4.43***	2.11*

<sup>a</sup>t-statistics in parentheses.

<sup>b</sup>Beta weights in parentheses.

\*Significant at 0.10 by the standard criteria.

\*\*Significant at 0.05 by the standard criteria.

\*\*\*Significant at 0.01 by the standard criteria.

sum, we have attempted to represent endogenously those variables that we believe could help explain variation in application frequencies.

We ran the above model for the following types of e-government applications received in the taluk office: birth certificates, death certificates, income certificates, community certificates, general grievances, and old age pensions. Results show that the coefficient on KIOSK is statistically significant at the 5% level for two services: applications for birth certificates and old age pensions. We present the results of the regression for these two services in Table 1.

As we can see from the above table, though the adjusted R<sup>2</sup> for the two regressions are relatively low (0.151 and 0.054 respectively) and the F-statistic is not significant at the 5% level for old age pensions, the coefficients on KIOSK are statistically significant at 5% level in both cases. The beta weights (0.436 and 0.283 respectively) for KIOSK also show the relative importance of this variable when compared to the other explanatory variables in predicting the number of applications. The coefficient ( $\beta_4$ ) itself is 4.950 for birth certificates and 2.925 for old age pensions. We conclude that offering e-government services through a kiosk is associated with an additional 5 (for birth certificates) and 3 (for old age pensions) applications received per 1000 people in villages with kiosks when controlling for relevant variables.

The fit of the above model improves considerably when we perform a logarithmic transformation of data for both the dependent and the independent variables. The regression model using log transformations becomes as follows:

$$\text{Log(No. of applications received per 1000 persons in the village)} = \beta_0 + \beta_1 * \text{log(Population of the village)} + \beta_2 * \text{log(Literacy rate in the village)} + \beta_3 * \text{log(\% of SC/ST population in the village)} + \beta_4 * \text{KIOSK} + \varepsilon$$

Using this transformation, the regression coefficients represent percentage changes in the dependent variable for 1% change in the corresponding independent variable. This transformation also imposes a decreasing effect of the independent variable on the dependent variable. Using this model, the regression results for birth certificates and old age pensions are shown in Table 2. The adjusted R<sup>2</sup> is now higher at 0.207 for birth certificates and 0.202 for old age pensions. In fact, under the log-log model, the presence of kiosks is also associated significantly with the applications received for death certificates, though the adjusted R<sup>2</sup> for this regression is relatively low at 0.059 and the F-statistic is not significant at 5% level. We include the results for this regression also in Table 2. The number of observations under this model has come down when compared to the previous model as some villages show zero applications in each category for the dependent variable.

## POSITIVE IMPACT OF THE KIOSKS ON GOVERNMENT SERVICE PROVISION

Researchers (Bhatnagar 2004; Fountain 2001; Heeks 1999) have suggested a number of benefits from e-government reforms including increased efficiency, decentralization, citizen empowerment, increased transparency, and cost reduction. The models presented above suggest that the presence of Internet e-government programs increases service provision. We also performed a

**TABLE 2**  
Regression results for birth certificate, old age pension, and death certificate applications under logarithmic transformation

Explanatory variable	Dependent variable: (Birth certificate applications)	Dependent variable: Log (Old age pension applications)	Dependent variable: Log (Death certificate applications)
Log (Population in hundreds)	-.580*** (-2.67) <sup>a</sup> (-.373) <sup>b</sup>	-.398*** (-3.58) <sup>a</sup> (-.452) <sup>b</sup>	-.151 (-1.62) <sup>a</sup> (-.218) <sup>b</sup>
Log (Literacy rate in 2001)	.709 (0.66) (.0938)	-.348 (-0.51) (-.065)	-.117 (-0.23) (-.0306)
Log (% of SC/ST population)	-.174 (-1.06) (-.137)	.019 (0.16) (.019)	.036 (0.39) (.049)
KIOSK	1.266*** (3.48) (.498)	.942*** (3.39) (.434)	.513*** (2.53) (.358)
Constant	2.050** (2.01)	2.003*** (3.68)	1.609*** (3.93)
Observations	46	56	57
R <sup>2</sup>	0.270	0.255	0.121
Adjusted R <sup>2</sup>	0.207	0.202	0.059
F-Statistic	4.26***	4.80***	1.96

<sup>a</sup>t-statistics in parentheses.

<sup>b</sup>Beta weights in parentheses.

\*Significant at 0.10 by the standard criteria.

\*\*Significant at 0.05 by the standard criteria.

\*\*\*Significant at 0.01 by the standard criteria.

qualitative study of the program to try to understand why the presence of Internet kiosks resulted in a relative increase in some government services in order to understand what benefits (if any) accrued to the citizen users. For this qualitative study we interviewed the kiosks operators along with the citizen users.

All the 12 kiosk operators stated that the e-government services led to savings in time, cost, and effort required in obtaining these services. In the absence of the kiosks, citizens have to personally visit the taluk office at least twice to obtain a birth certificate (once for submitting the application and then the second time to collect it), while with the Internet the same can be done through the village kiosk without making any visit (in most of the cases). This saves considerable time and money for the applicants. The increase in applications for old age pensions also seems to be due to the same reason. The operators estimated that the actual savings in the case of applications for birth certificates varied from three to seven days in time, and Rs.

50 to Rs. 200 (approx. US \$ 1.1 to 4.4) in total costs. The cost savings do not include the wages lost when visiting the taluk office. These are substantial benefits for the applicants.

The findings above were corroborated by the users interviewed. While all of them reported savings in time and cost, the estimates of the savings varied considerably. We present the reported savings in time and cost in Table 3. The costs for the traditional method do not include the lost wages for the day when traveling to the taluk office.

As we can see from the table, for birth certificates the users reported savings in time from one to four days and in total cost from Rs. 25 to Rs. 215 (approx. US \$ 0.6 to 4.8). One user narrated how he had to visit the taluk office three times and pay Rs. 100 in bribes (over and above the statutory application fee of Rs. 10) to obtain a birth certificate for his son two years earlier. For his second child, he applied through the kiosk in Oct. 2002 and was able to obtain the certificate within two days without

**TABLE 3**  
Savings in time and cost due to the kiosks

Government service	Cost and time estimate without e-government	Cost and time estimate with e-government	Savings in cost and time
Birth Certificates	Rs. 60 to 250, 3–7 days	Rs. 35, 2–3 days	Rs. 25 to 215, 1–4 days
Death Certificates	Rs. 60 to 250, 3–7 days	Rs. 35, 2–3 days	Rs. 25 to 215, 1–4 days
Old Age Pensions	Rs. 25, one day in visiting the taluk office	Rs. 10, No visit required	Rs. 15, one day

making any visit to the taluk office at a total cost of only Rs. 35 (the kiosk operators charge Rs. 10 for sending the application and another Rs. 25 for paying the statutory fees and collecting the certificate from the taluk office). This indicates that the e-government services have also led to reduced corruption in the taluk office in the delivery of these services. We examine this in more detail later.

We found the same reasons for the increase in the number of applications for old age pensions, though here the ease of being able to apply through the kiosk seems to be more important. Unlike the birth certificates, for old age pensions the users receive a reply directly from the taluk office. But applying through the kiosk saves them the time and the money spent in visiting the taluk office. We found that one of the three users we interviewed had not even applied earlier (before the kiosk was set up) for this pension due to the difficulty in visiting the taluk office given his advanced age. This indicates that the kiosks have also led to a positive social impact, as some of the users may not have otherwise availed of this pension. This also indicates that the kiosks succeeded in reaching a particularly disadvantaged section of the community.

These results are consistent with the consumer surpluses shown in other e-government programs. Bhatnagar (2004) reviewed the "efficiency gains" in twelve interventions globally. He found dramatic time savings resulting from many of the programs. For example, an online tax system in Chile reduced processing time from 25 days, before the e-gov program, to just 12 hours over the Internet.

Another possible reason for the increase in the number of applications at kiosks is the publicity activities of the kiosk operators which generated awareness about these services. However, interviews with the users indicate that the main deterrent from these services earlier was the high cost involved and not lack of awareness. What the operators succeeded in accomplishing, through publicity, was to make known that the kiosks were cheaper and more convenient than the traditional methods.

### SUITABILITY OF SERVICES FOR E-GOVERNMENT

It is worthwhile to examine why the taluk office succeeded in delivering these two services through the kiosks and not the other ones. We think it has to do with the official procedures required in dealing with different types of applications. While for birth and death certificates the records are maintained in the taluk office itself, for the other services the applications are sent to the field level staff for additional verification in the villages. Thus the taluk office could easily deal with birth and death certificates within the office itself, while it had to depend upon the field level staff for other services. We found that the field level staff put up a stiff opposition to accepting applications from the

kiosks, as they feared erosion in their authority and opportunities for rent-seeking. We examine this aspect in more detail later. However, the field staff did verify the applications for old age pensions in the villages. We suspect this was due to the fact that the opportunities for corruption are much less in these cases, as the applicants are very old and poor.

We found that another important reason for the successful delivery of office based services was the presence of a dedicated Tahsildar (head of the taluk office) who was personally monitoring the disposal of these applications. In fact, his transfer in January 2003 contributed significantly to the collapse of the entire service.

The above analysis points out some important generic lessons as to the types of services suitable for e-government. The services which require less interaction with other levels in the government hierarchy seem to encourage successful delivery, while those requiring coordination between different levels need more monitoring and supervision. Effective control and monitoring over the staff at different levels of the administrative hierarchy is also very important.

### CRITICAL FAILURE FACTORS

While the kiosks succeeded, initially in delivering e-government services to their communities, why did they fail subsequently? Interviews with the kiosk operators and the taluk officials indicate that this occurred mainly due to the difficulties in obtaining quick and adequate responses from the taluk office to the applications sent from the kiosks. Whereas earlier the taluk office was sending replies within 24 hours in most cases, it was now taking 3 days or more to send just the first acknowledgement. There are a multitude of potential reasons for this phenomenon which we discuss below.

#### Lack of Adequately Trained Personnel

Our interviews with the taluk office staff and the kiosk operators reveal that the government officials were not trained adequately to understand and provide this new mode of service, and those who did gain knowledge and experience with time were shifted frequently to new locations. Indeed, the junior official responsible for the kiosk applications was shifted after the first year of operation of the kiosks, which was an immediate reason for the sharp deterioration in service.

Initially, the SARI project was providing training in the e-government services to the taluk office staff. However, we found that this training had virtually stopped after the transfer of the Tahsildar. This lapse in training was in part due to a lack of sufficient resources with the private-sector implementing partner responsible for the training.

### Lack of Sustained Public Leadership, Commitment, and Institutionalization

Lack of effective public leadership and sustained commitment is another major reason for the ultimate failure of the program. We found that the Tahsildar, who was instrumental in motivating the staff to provide e-government services, was shifted out of the office in January 2003. This was a major blow to the project. The new official, brought in to replace him, failed to show the same level of leadership and commitment.

Another important development that contributed significantly to the failure of the service was the transfer of the district collector, who was responsible for coordination and monitoring of the project, from the district in February 2003. The new official failed to show the same level of commitment for coordination and monitoring of the project. Transfer of both the key officials, the Tahsildar and the district collector, around the same time was a double blow for the project from which it never recovered.

This experience points to the need for institutionalizing the services instead of allowing it to be dependent on individual initiatives.

### Lack of Consistent Evaluation and Monitoring

Lack of proper evaluation and monitoring of the performance of the partnership is another major reason for its failure. We found that the monthly coordination meetings between the district administration and the private project partners for evaluating and monitoring the e-government services had also stopped with the transfer of the incumbent district collector.

### Lack of Involvement of All Stakeholders

Though the project had the blessings of the government at the highest level, we found that the entire experiment remained confined within the governmental administrative set up and the private project partners at the local level and the local elected representatives (at the village and taluk levels) were never deeply involved in the project organization. Though they were aware of the project, they never recognized it as a serious public initiative, as the constituency of those who benefited from the e-government services never grew large enough to warrant any serious attention from them. The fact that the kiosks provided e-government services only in 12 out of the 84 villages in the taluk also contributed to the relatively small size of the constituency that benefited from the project.

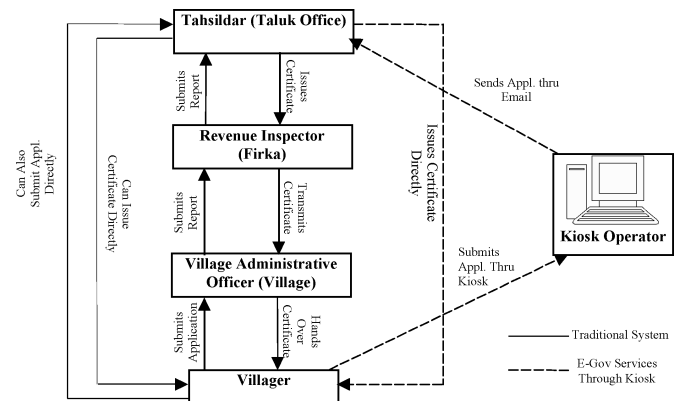
### Shift in Existing Power Relationships Due to the Kiosks

A deeper analysis of the deterioration in e-government services reveals another important reason for its failure: the perceived shift in the existing power relationships in the delivery of services due to the entry of the kiosks. This has deep implications for the sustainability of the kiosks and is also relevant in understanding how the partnerships with other agencies could be affected.

We found enough qualitative evidence to suggest that the main opposition to the delivery of e-government services through the kiosks came from some taluk and village level officials, who perceived a threat to their role, authority, and influence in the community if they lost their traditional contact with the villagers applying for these services. With e-government services the kiosk operator assumed the role of a facilitator, communicating with the taluk office. The diminished opportunities for corruption associated with control over how, when, and to whom the services are provided also seems to be a major reason for the opposition of the local officials.

How the kiosks changed these power relations in the context of this partnership is described in Figure 9. As can be seen, the e-government services led to a reduction in the intermediate channels of communication in the government hierarchy, thus reducing delays and rent-seeking opportunities. This seems to be the primary reason for the reduced corruption in the delivery of these services, as noted earlier.

It is relevant to note here that some of the reasons mentioned above have also been corroborated by (Srinivasan, 2004) in a study done on the same project about a year later. She notes that weakening of support from the local bureaucracy was one of the main causes of failure of the e-government services. She further emphasizes that this happened due to lack of institutionalization and the 'top-down' approach to e-government in this case, where



**FIG. 9.** Shift in existing power relationships due to the delivery of services through the kiosks.

the support from the lower level officials remained only as long as the initial ‘champions’ were in office.

**CRITICAL FAILURE FACTOR MODEL**

Heeks and Bhatnagar (1999) have proposed a number of analytic frameworks that aid in our understanding of the “critical success” and “critical failure” factors (the CSF and the CFF as they put it). They have proposed ten critical factors that can contribute either to the success or failure of an intervention, to wit: information, technical, people, management, process, culture, structure, strategy, politics, and environment. According to their framework, our analysis above falls within a number of these factors:

Critical Failure	Heeks & Bhatnagar “Factor”
training	People factor
sustained leadership, institutionalization	Management, Cultural, and Structural factors
evaluation and monitoring	Process and Management factors
power shift	People, Management, Cultural, Structural factors

It is instructive to note that among all the critical failure factors, “information” (the content, data, forms) does not appear, neither does “technology” (the hardware, network, software). This is particularly interesting since it is these factors that are so often discussed when considering e-government interventions (how do you get the right hardware out there, how do you design the software system, how do you develop the local content).

The final critical failure that we described, where power was shifted away or disintermediated from certain stakeholders, is worth further attention. A significant source of the resistance was due to reduction in the opportunities for corruption in the provision of many of these services. Bhatnagar (2004) has considered at some length the role of e-government in combating corruption. He has chronicled cases where e-government has helped reduce bribes and removed powerful brokers and intermediaries, raised public awareness, and increased transparency and accountability. Given its significant cost in social and economic development outcomes, the prospect that e-government might help to mitigate corruption is exciting indeed. But it is clear in this case that public officials are motivated to resist e-government programs that undermine their rent-seeking opportunities.

**SUSTAINABILITY FAILURE MODEL**

The Heeks and Bhatnagar (1999) critical success/failure model provides an analytic framework to study a project

at a moment in time. It is basically a synchronic model that looks at the current cultural factors that contribute to success or failure. We will now describe a simple taxonomy for sustainability failures that more explicitly codes for on-going or long-term survivability. For the SARI e-government project, we argue that it suffered a political and institutional sustainability failure.

Heeks (2002, 2003a, 2003b) has argued that most “e-government for development” projects have ended in failure. He offers a taxonomy of such failures as:

- Total Failure
- Partial Failure Type 1—Goal failure (main stated goals not achieved)
- Partial Failure Type 2—Sustainability Failure
- Partial Failure Type 3—Zero-Sum Failure (succeeds for one group but fails for another)
- Success (Heeks, 2003b)

We now describe a simple Sustainability Failure Model as having five principal modes:

- Financial/economic sustainability failure. For example, a donor supported program loses its funding after some fixed period of operation and has to shut down.
- Cultural/social sustainability failure. For example, some social group within the community gains a benefit from the intervention but some others are hurt. This tension is not tenable over time and results in the subsequent sustainability failure.
- Technological sustainability failure. For example, the field hardware and software fail to track upgrades to the equipment within the central government offices and thus, over time, their ability to network degrades and fails.
- Political/institutional sustainability failure. For example, the relevant local institutional leaders leave the critical organization and without larger institutional structures in place the project fails.
- Environmental sustainability failure. For example, a project that sources a large number of PC’s without plans for their eventual disposal or reuse when they reach the end of their effective life.

We believe that this model for sustainability failures captures the principal problem sources. In the case of the SARI e-government project, it failed over the long run due to a political and institutional sustainability failure.

Bringing together of our sustainability failure model and the Heeks and Bhatnagar (1999) critical success/failure model leads to the following summation: the SARI e-government program proved to be politically and institutionally unsustainable due to people, management, cultural, and structural factors.

## CONCLUSION

This study clearly shows that providing e-government services through kiosks in rural communities is associated with increases in the applications submitted by citizens for certain e-government services. A carefully designed delivery mechanism through the kiosks can also lead to savings in time, cost, and effort. It also has the potential for reducing opportunities for corruption in government offices in the delivery of these services.

However, the failure of the project to sustain itself over the long term leads us to some important conclusions. The first and the foremost is that public managers should clearly understand the importance of leadership, strong and sustained commitment, adequate training of the staff, consistent evaluation and monitoring of the performance, and institutionalization of the initiative. Private partners need to work consistently with the government and respond to the changing environment within the government. Both sides should attempt to involve all the relevant stakeholders. Given these factors, such projects have the potential not only to improve the delivery of services qualitatively, but to also lead to improved institutional transparency and reduced opportunities for corruption.

## REFERENCES

- ADB. 2003. *To serve and to preserve: Improving public administration in a competitive world*. [http://www.adb.org/documents/manuals/serve\\_and\\_preserve/Chapter19.pdf](http://www.adb.org/documents/manuals/serve_and_preserve/Chapter19.pdf) (accessed November, 2004).
- Aichholzer, G. 2004. Scenarios of e-government in 2010 and implications for strategy design. *Electronic Journal of e-Government* 2(1):1–10.
- Benjamin, P. 2001. Community development and democratisation through information technology: Building the new south africa. In *Reinventing government in the information age*, ed. R. B. Heeks, pp. 194–210. London: Routledge.
- Bhatnagar, S. 2000. Social implications of information and communication technology in developing countries: Lessons from asian success stories. *The Electronic Journal of Information Systems in Developing Countries* 1(4):1–9.
- Grant, G. 2005. Realizing the promise of electronic government. *Journal of Global Information Management* 13(1): i–iv.
- Heeks, R. 2002. Information systems and developing countries: Failure, success, and local improvisations. *The Information Society* 18(2):101–112.
- Heeks, R. 2003a. Most e-government-for-development projects fail: How can risks be reduced? <http://idpm.man.ac.uk/publications/wp/igov/index.shtml> (accessed November, 2004).
- Heeks, R. 2003b. *Egovernment success/failure: Definitions*. <http://www.egov4dev.org/sfdefn.htm> (accessed November 2004).
- Norris, P. 2003. Deepening democracy via e-governance, draft chapter for an world public sector report. <http://ksghome.harvard.edu/~pnorris/ACROBAT/e-governance.pdf> (accessed September 10, 2005).
- OECD. 2003. The e-government imperative. Oecd e-government studies. <http://www1.oecd.org/publications/e-book/4203071E.PDF> (accessed November, 2004).
- Pacific-Council. 2002. Roadmap for e-government in the developing world. <http://www.pacificcouncil.org/pdfs/e-gov.paper.f.pdf> (accessed November 2004).
- Seifert, J. W., and G. M. Bonham. 2003. The transformative potential of e-government in transitional democracies. [http://www.maxwell.syr.edu/maxpages/faculty/gmbonham/Transformative\\_Potential\\_of\\_E-Government.pdf](http://www.maxwell.syr.edu/maxpages/faculty/gmbonham/Transformative_Potential_of_E-Government.pdf) (accessed October 2004).
- Srinivasan, J. 2004. Sustainable access in rural india (sari) project, madurai, tamil nadu. *Information and Communication Technologies for Development: A Comparative Analysis of Impacts and Costs from India*. <http://www.iiitb.ac.in/ICTforD/SARI%20final.pdf> (accessed October 2004).
- UN-ECOSOC. 2003. Status of and trends in the development of e-government. Report of the secretariat. <http://unpan1.un.org/intradoc/groups/public/documents/un/unpan008253.pdf>. (accessed November 2004).
- UNDP-APDIP. 2003. E-government. <http://www.eprimers.org/primers/e-Government.pdf> (accessed November 2004).