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Value-proposition of e-governance services: Bridging rural-urban digital divide in developing countries

Gyanendra Narayan and Amrutaunshu N. Nerurkar
Shailesh J Mehta School of Management, IIT Bombay, India

ABSTRACT

Success of governance goes in tandem with the collaborative participation of the citizens and the government. The role of government can not remain the same in the globalized and highly competitive world. More people perceive current governments as a source of services rather than just as a regulator. The need is to reach to the section of the society which has remained tangential to the government sphere due to cost and accessibility reasons. Diffusion of e-governance is much needed to reach out to these peripheral sections in the developing countries. The model proposed in this article improves upon the "time-to-public" and "time-in-public" of e-governance services. The article provides a roadmap to bridge the rural-urban digital divide based on an analysis of successful e-governance projects. It seeks to formulate a framework for delivering value-proposition to rural populace and equipping them for the better use of e-governance.

Keywords: *time-to-public, time-in-public, e-governance, digital divide, value proposition*

INTRODUCTION

Electronic Government is a form of organization that integrates the interactions and the interrelations between and among government and citizens, companies, customers, and public intuitions through the application of modern information and communication technologies (Ghosh and Arora, 2005). Generally it has been perceived to be government's offices providing online information or accepting online application through electronic channels but this doesn't depict the true philosophy of e-governance. E-governance is a philosophy where electronic equipment and facilitating software are just the means rather than the goal. E-Governance refers to the process of using information technology for automating the internal operations of the government as well as its external interactions with citizens and other businesses. A sense of belongingness in the system is the fundamental ideology driving e-governance in which few of the initiatives have been successful and few more are trying to better their performance.

ASPECTS OF E-GOVERNANCE

Economies around the world are becoming knowledge oriented enabled by enhanced use of technology. In India, which is one of the largest countries in world in terms of population, geographical size as well as pluralistic nature with different types of cultures and belief systems, any initiative which is person to person based has to be very elaborate thus exhausting resources in basic functioning of the system. This leaves hardly any scope for incremental improvements and innovation in the system in the place. E-governance may be a good answer to this issue.

Implementation aspects of E-governance

The implementation of e-governance systems has many aspects. For example, normally e-governance services are non-profit making services and most of the time their payback period is very high which makes them capital intensive. Further, connectivity is an issue to make the service accessible to a major section of the society. The "7-C model" (Singh Subir Hari, 2000) aptly keys various implementation aspect of e-governance. The 7 C's are (the order doesn't represent relative importance):

- **Capital:** e-governance services are meant for providing faster and effective services to the citizen and profit considerations are not very prominent aspect of these services. Many services which were implemented long ago are yet to break even due to high cost. The operational cost with a dole of subsidy to users makes it tough to generate operational profit though social benefits are many which are beyond the scope of the current discussion.

- **Connectivity:** Success of e-governance service is dependent on its reach to the people. A good system can be good only when it can benefit a larger section of the society hence the need of connectivity till the last mile.

- **Commitment:** As e-governance are not viewed in terms of accounting profits and shorter payback periods one of the great motivator money is absent. With a good chunk of outflow and little inflow the governments need determination and commitment to sustain the service. E-governance champions at different hierarchy of the system are needed to push through the project to its logical end. And needless to mention the gestation period of these services are normally longer than the industrial projects.

- **Competence:** Competence is required to gather the intelligence at the grass root level. Understanding of people's problem as well as those who are going to provide e-governance services (mainly operators and clerks) needs more than understanding of software engineering. Many good systems have failed because they did not capture the psychological aspects of the implementation. Competency of the information and communication technology, requirement engineering processes and ground level knowledge is a must for success.

- **Content:** In India the lack of customized content is one of the hurdles in implementation of the e-governance services. Requirement of an urban citizen and rural citizen differs. Also the content in not available in local language which can capture understanding of people at the grass root level. A customized content in a local language is one of the important aspects.

- **Citizen Interface:** Interface should be illustrative and easy navigating so that even naïve users do not find it tough to avail the services.

- **Cyber Laws:** Services should be backed by cyber laws to make the documents or information legally valid. Indian IT act 2002 was one of endeavor towards this which made emails and other digital documents valid as a legal document.

PROPOSED E-GOVERNANCE MODEL

The proposed model (refer to Figures 1, 2 and 3) draws from the comparative analysis model, e-governance system life cycle and socio-economic rationales. This model uses the comparative analysis model in a different way to provide recognition to the vertical and horizontal time lag in the system and introduces the concepts of time-in-public and time-to-public.

The model describes two time horizons viz. the horizontal and vertical time horizon in implementation of e-governance projects. Horizontal time horizon describes the means to bridge the gap between rural and urban implementation of the projects. Once this gap is eliminated then the model moves along the vertical dimension which describes the various scales in which projects can be implemented. The model and illustration through actual cases are discussed.

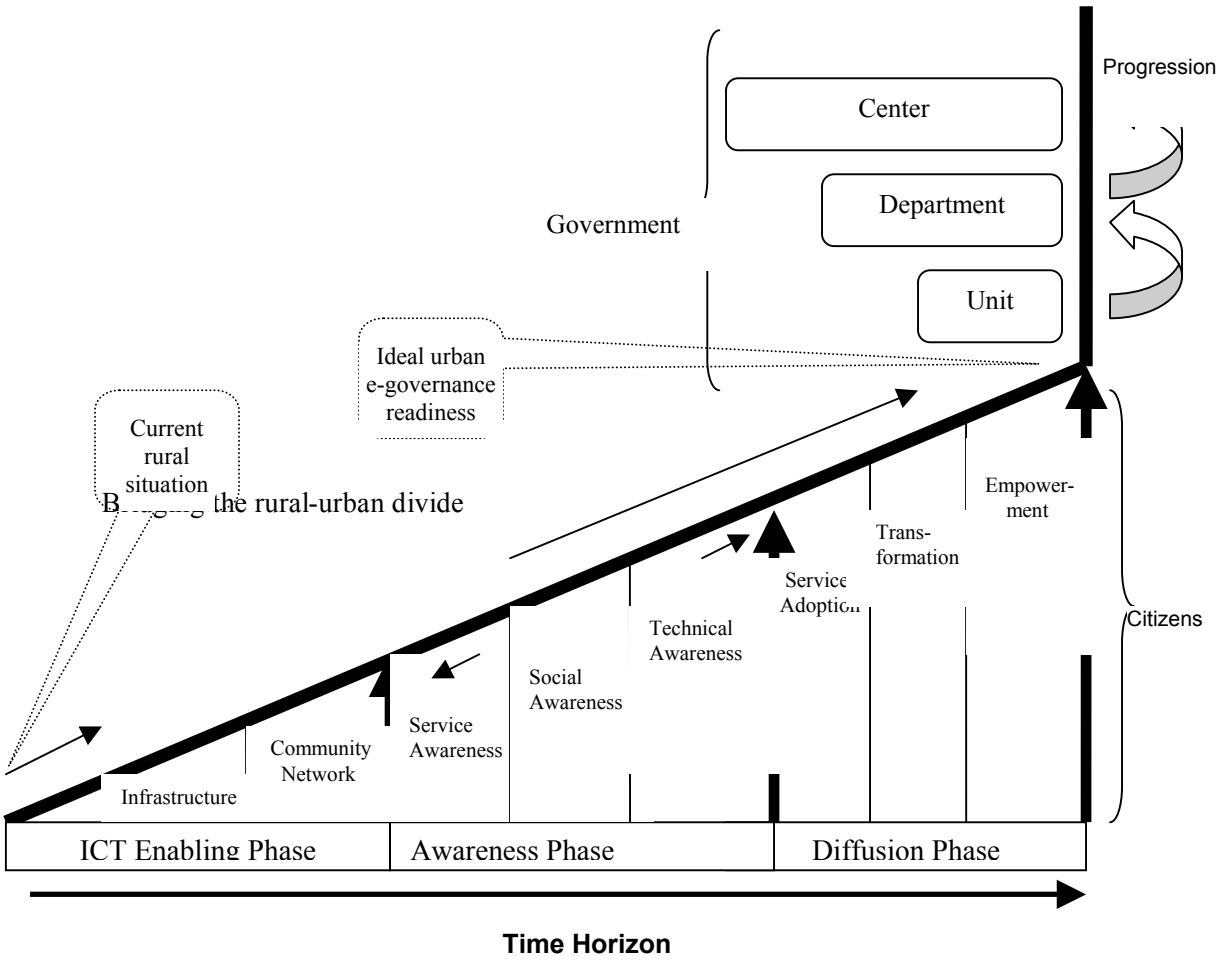

***Figure 1**: Proposed Model with the horizontal, vertical time horizon for bridging rural-urban divide*

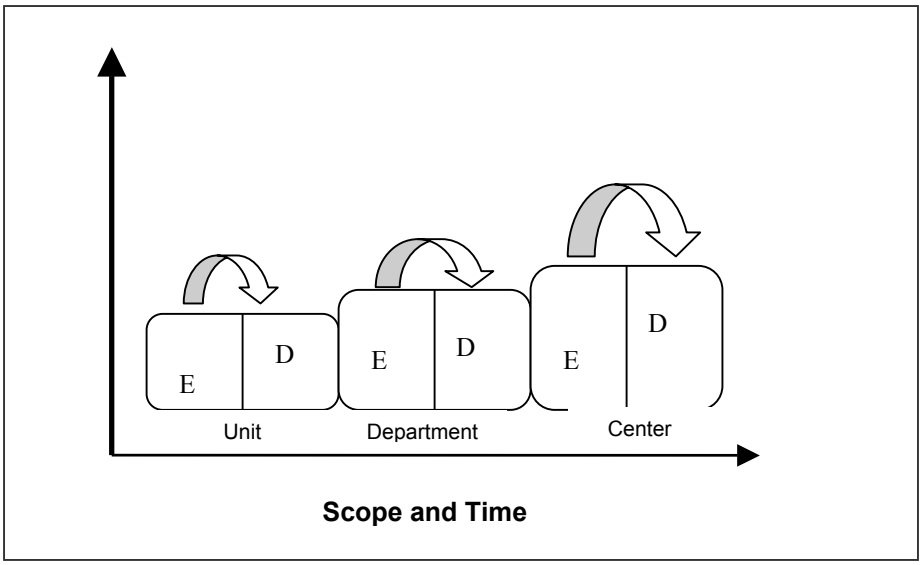

Figure 2: *Enlarged version of vertical time-horizon of the proposed model*

Components of the model

The model consists of two different time horizons. First is the horizontal time horizon and the second is the vertical. The horizontal time horizon shows the steps in the spread of the e-governance services regardless of the scope while the vertical time horizon is more concerned about the scope which takes into account implementation at different levels.

HORIZONTAL TIME HORIZON

It displays the steps that any society or country has to take to bridge the gap between the rural and urban implementation of e-Governance. As shown in Figure 1, the three phases are:

a. ICT Enabling Phase

This is the first step which provides fundamentals for implementation of e-governance project. It involves the ways and techniques to provide ICT in rural areas. This step is subdivided in the following sub steps:

[i] Infrastructure creation:
This is the basic and mandatory requirement for the implementation of an e-Governance project. In developing countries the digital infrastructure which includes telephone, data cables, wireless network etc. is hardly found in the rural areas. Immediate steps should be taken to provide the digital infrastructure to the rural poor.

[ii] Community network:
Once the basic digital network is established the next step is to set up the community network centers among the villages which at the minimum should include a computer, modem and a dial-up connection to access internet. Many countries are now funding

the local municipalities to build internet kiosks to deliver a host of services such as education, health care, agriculture, e-government, and communication.

b. Awareness Phase

Success of e-governance service is dependent on its acceptance among end users. Many e-governance services are in tattered state because they could not garner the acceptance from their users. This acceptance is by no mean a function of technology dexterity or high profile use of software engineering process. It is an inclusive process to make the end user aware about the values of the e-governance service. How is a particular service going to create value for its end user? This question should be solved by those who are providing services as well as those who are availing the services. Forcing it to end user is not the correct way to get acceptability. One of the most important dimensions is that the service should not be seen as providing value at the functional level rather it should also be seen as providing economical and most importantly the social value.

Value Proposition of e-governance services

The value proposition has been defined as the whole cluster of benefits promised to be delivered to the end-user by the organization (Kotler and Keller, 2006). It is more than the core-benefits of the services. Existence of value proposition is a pre-requisite for the diffusion and penetration of e-governance services. As shown in the detailed model (Figure 1), the perception of value proposition starts after the infrastructure creation phase. Physical presence of infrastructure leads to believability in the value offering. Effectiveness and acceptance of the service depends on the value-proposition offered by it. Lack of this is the reason that in few areas e-governance services takes more than required time to gain the acceptance. Three important aspects of value-offering to the end-user are: Service (functional) value, Economic Value and Social Value.

- ***Service Value:***
  This is the most obvious value offering that is primarily visible and communicated to the public in large. E-governance services either create new services or replaces existing manual procedural system. A faster, reliable, dependable, secure and accessible system has a higher value-quotient in its service value offering. Primarily to remove the digital divide, the service value's dependability, security and reliability should be higher.

- ***Economic value:***
  The benefit derived out of service is economic value. The less costly the service higher is the quotient. The cost can be identified as monetary cost, psychic cost and time cost. The monetary cost needs no elaboration. Psychic cost is more related with the mental harassment emerging out of normally tedious and long government procedures. It also discourages use of government services even though knowledge is widespread in the society. It also mutes the expectations of citizens thus leading to deterioration in government and citizen communication. It has consequential effect on services. Further, the effectiveness has its own economic value. It also explains the time cost associated with the economic value.

- ***Social value:***
  Starting from the telecentros in Brazil to Bhoomi or e-seva in India all have social value inherent in them which comes after a certain gestation period when more number of people start using the service. It is integral part of value proposition as it removes technology bias, gender bias of technology, caste bias (to some extent). It also acts as a unifier for different strata of the society. It leads to wider diffusion and thus use of

services from the tangential parts of society hitherto which have been left out of service loop. This process has intangible value which is the highest among all three values in long term.

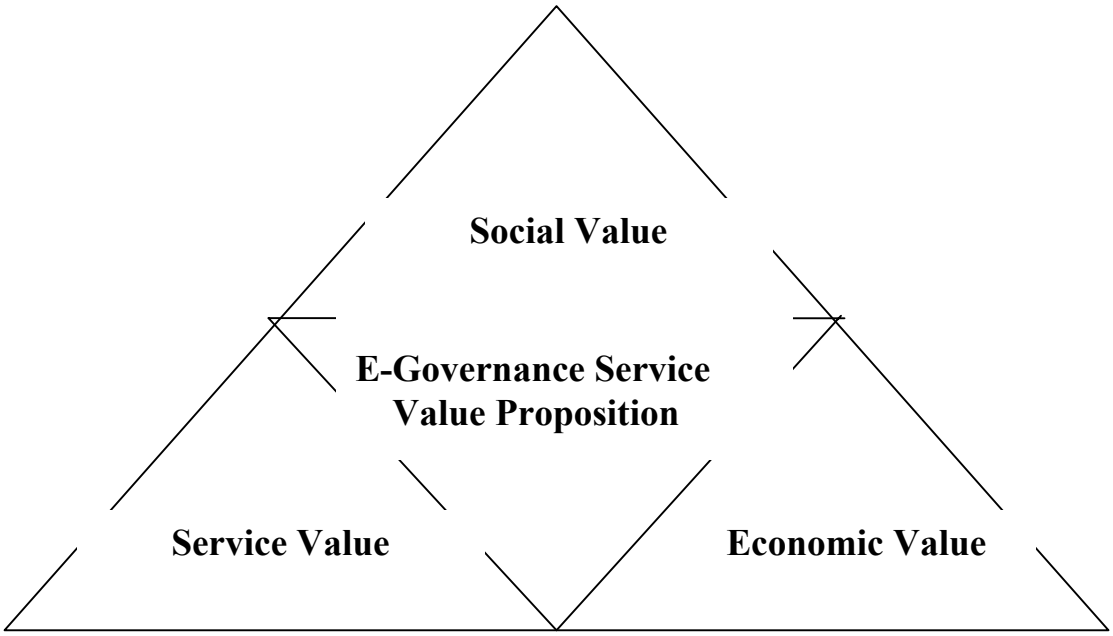

Figure 3: *E-governance service value proposition pyramid*

Sub-phases of the Awareness phase

The Awareness phase has 3 sub-phases:

[i] Service Awareness:
The people should be made aware of the services that will be provided by the proposed new model of governance. For example, if local government decides to provide motor license online the people should perceive it as an enhanced and easy way of obtaining license. Thus Service Awareness creates the differentiation that needs to be created for system to be successful.

[ii] Social Awareness:
Compatibility of any new service with the existing social and cultural norms is an important determinant of its diffusion. Research carried out in many developing countries in Indian subcontinent reveals that though the technology itself is considered gender-neutral, women in the households often lack independence, the decision making power, and the financial resources to make use of the e-governance services fully. Social awareness eliminates the gender as well as caste or race bias which might be present in usage of services.

[iii] Technology Awareness:
Another attribute of the service that affects the diffusion of e-governance is the perception in minds of people in developing countries that the underlying technology is

complex. Multi-pronged approach in all these three fronts of awareness is necessary to create a "Value Proposition" for the rural poor. In many cases, the local municipalities encourage kiosk operators to personally contact the households within the village to tell them about the kiosk and its services. The mass media can also be used to create awareness. While conducting the awareness programs the government or agencies should emphasize on the affordability of the services to the rural poor.

c. Diffusion Phase

This is the final phase to bridge the gap between the rural and urban service implementation. It consists of the following steps:

[i] Service Adoption:
In this step more rural people start using the e-Governance services repeatedly. This is the phase of rapid growth in which adoption rate accelerates fast and more than half of the people in the village adopt the system.

[ii] Transformation:
In this stage the services provided by the government transform their nature from manual, paper based to digital and online. Thus the time needed for any transaction involving government is reduced by large amount.

[iii] Empowerment:
The last stage of diffusion is the pinnacle of e-governance implementation. In this stage, the diffusion is at the highest level such that the citizens demand for more government services online which motivates the government to implement these services. For example, after the successful implementation of online license issue system in Andhra Pradesh, a state in India, the pulling demand for more online service from both urban as well as rural citizens motivated the government to innovate further. Gradual improvements in many services have been witnessed as an aftereffect of Empowerment.

Attributes which determine the level of diffusion of e-Governance

- ***Reliability:***
  Is the application running every time the rural citizen comes to the community center?
  Is the service provided as promised?
  Is the service provided right the first time? (Whenever the citizen is reaching the service center for availing the service, is the service being provided correctly in first go or does it need to be rectified due to some errors etc?)

- ***Responsiveness:***
  Is the rural citizen informed as to when the service will be available?
  How much time do the people need to wait for their turn?
  Is the staff at the community centers willing to help the customers?

- ***Assurance:***
  How does the staff at the community center behave with the rural citizens?

Citizens do operate on horizontal time horizon as discussed in our model. The government works on vertical time horizon for improved scope and capabilities. The government's time horizon is discussed in the following section.

VERTICAL TIME HORIZON

Hierarchy based organization may be classified in the following ways:

- Unit level
- Department Level
- Center level.

In a normal evolutionary model the scope of software increases from lower level hierarchy to upper level. Experimentation (E-Phase) and Diffusion (D-Phase) go parallel at several places. However, the E-phase is a pre-requisite for many e-governance projects' D-phase. After a moderate/high successful D-phase at lower level the process moves to higher echelon of hierarchy making a horizontal movement from left to right (depicted in Figure 2) the scope of project and time-consideration both significantly. However due to repetition of E-Phase and D-phase the time-to-public increases. In the case of parallel work several times issue of heterogeneity comes in prominence which in turn leads to higher time called horizontal increase in time lag (Multiplicity of effort at different counterparts of hierarchy leads to time lag called horizontal time lag. Hierarchy generated time-lag (Bottom-Up movement) will be referred as vertical time lag.). Except integration and other issue the horizontal time lag is a coagulation of multiple replicas of vertical time lag. This increases overall time-to-public thus reducing available time-in-public.

Time-to-public:

E-governance modules evolve over time along the hierarchy of the organization. In the proposed model we are excluding the time taken to conceive the plan and necessary time required to get a go ahead for a pilot level implementation at the unit level. As different departments and organization differ in resources and planning capabilities, the discussion requires major research thrust in particular direction.

After necessary formalities, the pilot project starts at the unit level which gets as a project in the unit level and it differs in the scope and capital intensity. However due to lack of centralized repository of software and lack of communication it has been found that different units start their individual pilot project along different positions of the time-line. This leads to the problem of synchronization, lack of standard and architectural discrepancies apart from heterogeneity in communication. The re-engineering process is repeated at several places for the same thing. This increases the time-to-public as the whole process-reengineering gets repeated at almost all places. Time-to-public can be cut-short by removing or reducing the pilot project at department level. The time-to-public can be reduced vertically along with the hierarchy discussed in this article or it can be reduced horizontally thus enabling wider and simultaneous implementations at several places.

Horizontal increase in time-to-public reduces the scope of e-governance system while isolated vertical time lag may not be as significant in their effect on scope as their target user group is limited in a particular geography.

Time-in-public:

Time-in-public refers to the concept of longevity of the e-governance system in the real life. Due to the limited relevant age of software and changing requirements-regulation, the effective life of software diminishes very rapidly. From development of the software to its expiry/modification/re-engineering the software increases its cost. Any expiry of any module due to regulatory change or other factors reduces the penetration of system due to non-availability. This reduces the scope. A higher time-in public has several benefits:

1. Increased Scope
2. Better Return on Investment
3. Extra time for adaptability
4. Increased awareness
5. Prospects of service broadening

BHOOMI – ONLINE LAND RECORD SYSTEM [1]

We will now discuss an illustrating case from the state of Karnataka, India. This case is an excellent example of bridging the rural-urban divide by the approach which has been discussed in the above model. This approach covers the horizontal time horizon. Also it shows how the government has scaled the services to cover the entire state. Government has done considerably well in the movement of vertical time horizon.

The project is known as project “Bhoomi” (“land” in Hindi language). The government of Karnataka sensed that there were many problems in the manual system of the land records maintenance like opaqueness, affinity to manipulations, harassment and extortion, delay in delivery of land records etc. It leads to the e-governance project “Bhoomi” so that farmers in any village can avail his land record without any difficulty and delay.

HORIZONTAL TIME HORIZON: BRIDGING THE RURAL-URBAN DIVIDE

In this section we will discuss the phases along which Bhoomi program has moved towards greater acceptance and accessibility. With specific examples from the villages and districts where it has been implemented it shows how it has moved along infrastructure creation, service awareness, social awareness, technical awareness and finally the diffusion at the end.

ICT enabling phase

This phase is very important as it the media which makes services accessible to the people. Without Information and communication technology the creation of e-governance services is not possible. The infrastructure in terms of kiosk and other equipments mainly connectivity equipments and printer were the integral part of this phase.

- ***Infrastructure creation:***
  Karnataka state was first integrated with the telephone lines so that every village under each district gets connected via telephone.

- ***Community network building:***
  The Karnataka state government started with the opening of Community Computer Centers and internet kiosks at various districts administrative units and sub-districts. The kiosk is nothing but a small room where there are a minimum of 2 to 3 computers as well as touch screens, a printer and few officials connected to the internet and a large database of land

records,. The government called these kiosks “RTC Kiosks” (RTC stands for Record of Rights, Tenancy and Crop Inspection).

Awareness phase

The value proposition of Bhoomi is excellent. Different awareness levels have spread different values to the end-user. Different awareness phases and diffusion aptly capture different value propositions of Bhoomi. It has been discussed in detail below.

Once the infrastructure was set up, the government took the help of National Informatics Center (NIC, an agency of Government of India) to develop a software called "Bhoomi". This software provides for printing of land records as and when required. It incorporates process of online updating to ensure that the farmers are provided with the updated records. Biometric Authentication ensures that no body can hack the system by imitating other users.

- ***Service awareness:***
  The First on-line Kiosk of India was started in Sakleshpur, Karnataka on 6th February 2001. The government took active participation in convincing the farmers of the village about the use and the advantages of the system. The system was in vernacular language of Kannada and the User Interface was a touch screen with minimum user input.

- ***Social Awareness:***
  With the help of local kiosk officials government encouraged the farmers and their children as well as their wives to use the kiosk computer systems. It also provided the basic training to use the software. This helped the farmers to eliminate any social or cultural bias present while using the system.

- ***Technical Awareness:***
  Another attribute of the kiosks that affects their diffusion is the perception that the technology is complex. The government with the help of NIC conducted various division and state level workshops to train the village officials. Overall, the communication with the farmers was kept transparent and the farmers were convinced of the high utility of the new system.

Diffusion phase

- ***Service- Adoption:***
  The e-Governance Bhoomi service was started with few sub-districts (50) capturing about 5 Million RTCs in 2001. Currently it has connected every Taluka (sub-sub district) and many villages so that almost more than 100 millions land records are being covered under this project. After successful pilot implementation the government implemented the project in various phases.

  The project has captured about 5 Million RTCs data of 50 sub districts on digital media and it also captured the data on 15 million RTCs of remaining 127 sub districts in later phase.

Table 1: *Transformation due to e-Governance*

Name of Service	Current Time	After e-Governance project
Copy of Land Records Entries	5-30 days	1 hour
Mutation of land ownership	2-8 months	45 days after receipt
Copy of land map & boundaries	1 month	Same day

Source: http://www.mit.gov.in/plan/ppt/Land%20Records.ppt

Empowerment Phase

The effect of initiative has been multi pronged with few of the Kiosks are being used for additional cross-selling initiatives. The scheme is also providing connectivity to banks and courts. Plans are afoot to broad band the Bhoomi kiosks and use these for various cross selling initiatives like provision of weather details, details of government schemes etc. Also technical phases are on for providing EIS, and other MIS data using multidimensional RTC hyper cubes.

VERTICAL TIME HORIZON: GOVERNMENT INITIATIVES ALONG HIERARCHY

This section discusses about the scope of the Bhoomi project as it has progressed from the pilot and testing phases to a mass level implementation and recently Government of India recognized it as a model land record keeping system and announced its intention to replicate the same model in different states of India.

At unit level

Government has trained the revenue staff up to village accountant level on data entry operation totaling the number to 8000. In the few years it has plans to implement the system in every village [6]. Knowledge sharing initiatives are not in vogue thus leading the E-phase and D-phase elongation at every village level.

At department level

The process of interlinking of district level data banks to the state level data warehouse is already on and it has operationalized the scheme in remaining 127sub districts. At this stage the E-phase has been drastically cut short by using trained staff and transferable employees to each sub-district. The district level data centers are being used as centers for disaster recovery.

At center level

Other states are following the same model, however they have started from the scratch thus increasing horizontal and vertical time lag. The vertical time lag has been very less in the case of Bhoomi due to participation of agency NIC as a nodal guiding agency.

CONCLUSION

Bridging the digital divide and effective participation of stakeholders has been an issue of concern for implementers of e-governance. The presented model addresses the concern of rural-urban gap and time-lags. A continuous and smooth transformation in the process is required which should be guided by the e-governance champion in the hierarchy of governance. Effective partnership can be achieved by deeper and narrower implementation of phases on horizontal time horizon while vertical time horizon requires commitment, capital and competence in relatively higher proportion from government. The government to citizen (G2C) interaction will be most effective only at the end of the horizontal time horizon and at the lowest possible level of the vertical time horizon as the citizens interaction with government services is personal ab intio. Future work may address motivational and commitment concerns in the e-governance.

Endnote

[1] http://www.revdept-01.kar.nic.in/

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