

# E-governance Readiness: Challenges for India

**M. P. Sebastian**  
**Supriya K. K.**

## Abstract

Governments and public sector organizations around the globe are relying on information and communication technologies (ICTs) to reform the functioning of the system and provide better service delivery mechanisms for their citizens. E-governance is the effective use of ICTs, particularly the Web-based Internet applications, for better governance and service delivery. Indian government, like its global counterparts, is using ICT and E-governance as part of its broader governance modernization programmes. This article presents an overview of the E-governance scenario in India. It evaluates the readiness, capability and willingness of the government to provide E-services in terms of the factors like telecommunication infrastructure, human capital and web presence. Based on the assessment, the factors which hinder the E-initiatives development and the barriers for the effective implementation are identified. These barriers are then classified into the three dimensions which determine the E-governance readiness. A strategy for improving the E-governance readiness in India is also proposed.

## Keywords

E-governance, e-participation, e-readiness, ICT for development, barriers to e-governance

## Introduction

The developing and developed economies spend in excess of several hundred billion dollars every year on information and communication technologies (ICTs). The success of any technology depends on the extent to which it can solve the real world problems. It is widely presumed that universal access to ICT would bring about a global community of interaction, commerce and learning resulting in higher standards of living and improved social welfare (Dewan & Riggins, 2005). ICTs present before the global community a huge potential for social and economic development; especially in the context of developing countries. The past decade has witnessed the increasing importance of ICT in achieving a variety of development objectives, including poverty reduction, extension of health services, expansion of education opportunities and access to government services.

The rapid pace of technological change is altering how citizens expect to interact with the government and access services. The ageing of the public service workforce and

ever-present fiscal pressures are creating a stronger imperative to modernize government operations through innovative applications of technology (Seckel, 2010). The traditional service delivery model and operations have to be transformed drastically to accommodate the dynamic environment. The fast development of ICT derived a rapid growth in the number of government websites as well as the variety of services offered (Lee, Braynov & Rao, 2003). Nearly all countries across the globe, from the poorest countries to the most advanced ones, have some sort of Internet presence, or so-called E-government (Davidrajuh, 2004).

The United Nations Division for Public Economics and Public Administration (UNDPEPA) defines E-government as 'utilizing the Internet and the World Wide Web for delivering government information and services to citizens'. Most researchers, however, define E-government with respect to ICT. Moon (2002) defines E-government as 'the use of all ICTs, from fax machines to wireless palm pilots, to facilitate the daily administration of government'. The primary objective of most E-governments is to better serve the citizens.

The main objectives of the E-governance initiatives include enhanced access to government's services, improved service delivery and modernized day-to-day government operations. Essentially, the E-government delivery models can be briefly summed up as G2C (Government to Citizens), G2B (Government to Businesses), G2E (Government to Employees), G2G (Government to Governments) (Jeong, 2007). This article mainly focuses on government to citizen (G2C) E-governance initiatives.

Despite the rising public use of technology in India, not all citizens are comfortable in accessing services online and not all areas of the country are adequately connected (Cecchini & Raina, 2004). Thus, there is a need for deeper investigation on the state of the art of E-governance initiatives in India. The various reports (Dwivedi and Bharati, 2010; UN E-governance Report, 2004) suggest that in spite of the increasing expenditure on the E-governance activities in India, the outcomes are not up to the mark and pose many challenges. Debate is still on whether these investments are done effectively or they are getting wasted. It is known that much of the ICT facilities in the developing countries, in general, are not effectively used and the ICT for Development projects have high rates of failure (Brunello, 2010). The state of E-governance initiatives in India is also not different (Ray & Mukherjee, 2007). Most of the existing studies on E-governance in India focus on the impact, sustainability, effectiveness and security of the E-governance initiatives. There is a need to evaluate the readiness of the ecosystem to support and adopt these initiatives before they are implemented.

The ecosystem of an E-governance project consists of telecommunication infrastructure, supporting technology, policies, technical skills of the users, etc. The readiness of this ecosystem is an important factor which determines the success of these initiatives. It is important to investigate whether this ecosystem is ready to adapt the technology. A careful analysis of the already initiated ICT projects can help in finding out the major inhibiting factors and barriers affecting the readiness of the ecosystem and thus formulate a guideline for successful implementation of these projects.

This article analyses the state of the art of the ICT-driven governance transformation in India. An overview of the E-governance activities in India is provided in the following section. Based on the UNPAN survey for measuring E-governance readiness index in the countries, data is compiled for India during the period 2003 to 2012 (UN E-governance Report, 2003 to 2012). India's E-readiness and E-participation indices are analyzed to find out the

drawbacks of the programme. Based on the analysis, a review of the literature is done to identify the various barriers to IT-driven governance transformation which can affect the E-governance readiness and participation indices of the country. The stages of ICT-driven governance transformation and a strategy of connectivity-access and inclusion for improving the E-readiness scenario in India are also discussed.

## Overview of E-governance in India

India started its initial attempts towards implementation of E-governance with a focus on networking government departments and deploying IT to manage data intensive functions related to elections, census, tax administration, etc. These applications were focused more on automating internal government functions rather than improving the citizen service delivery (Mathur, 2009). In the 1980s, they were focused on connecting all the district headquarters and later the focus changed to the use of ICT to enhance the service delivery and also to reach the rural areas.

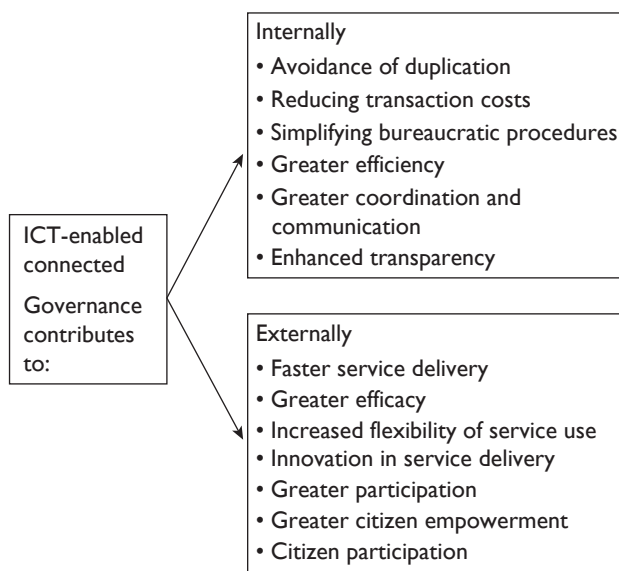
E-governance in India has reached at the transactional stage that provides various services to citizens, businesses and government organizations, offered by central government agencies and different state government departments. The National E-governance Plan (NeGP), initiated in 2006, attempts to make all government services accessible to the common man in his/her locality, through Common Service Centers (CSC) being set up across India. As on February 2012, about 97,159 (CSC Newsletter, 2012) CSCs were operational with different brand names that have started delivering services to the people. The rural landscape in India is set to take the advantage of the flourishing ICT initiatives by different institutions, in particular, the CSCs. However, the E-governance initiative needs to offer the required content and services in the local languages that can make the difference for the lives of the rural people (India E-development Gateway, 2013).

Now the E-governance programmes are extended to include a wide variety of citizen services related to agriculture, health, primary education, social welfare, rural energy, etc. Various online services like online transport service, market information, citizen services, rural development, postal and telecom services, educational services, grievance redressal, commercial services, etc., are offered under the E-governance scheme. India's latest flagship IT projects

for providing biometric-based ID to all the residents (Aadhar and NPR) are again great steps in India's E-initiatives. Apart from these, various states also offer different E-government services to its citizens.

India also offers its citizens various mobile governance services. Today, mobile phone has not been limited as a communication tool to send and get text and voice messages. It has emerged as a strong technology to bridge the digital divide between the urban haves and the rural have-nots. Within two decades of its launch in India, mobile phone has reached at remote rural hamlets despite the much known hurdles like lack of connectivity and electricity and low level of literacy. On the other side, it has created thousands of direct and indirect job opportunities for youths. In the second phase of the development, it has emerged as a delivery channel for different kinds of services. Government and private agencies have also started using 'mobile phone' to deliver citizen and business services to common man (India E-development Gateway).

C-DAC, Department of IT, institute for E-governance, information for development, national institute for smart governance and centre for good governance are some of the various institutions working on E-governance. The advantages of E-governance, both internal and external, are shown in Figure 1. The internal advantages focus on the government agencies and departments, whereas the external focus on the citizens.



**Figure 1.** Advantages of E-governance

**Source:** Layne and Lee (2001).

## Assessing India's E-governance Readiness

Governments are increasingly becoming aware of the importance of employing E-government to improve the delivery of public services to the people. Though studies have addressed the issues like impact, sustainability, advantages, etc., of the E-governance projects, there is a lack of focus on assessing the readiness of the ecosystem to support the project. This section of the article evaluates the country's capability in providing E-services to its citizens. As discussed in the previous sections, there exist different forms of E-government activities; namely G2G, G2C and G2B. The E-governance readiness index is a metric to assess the capability in providing government to citizen E-services. It measures the generic capacity or aptitude of the public sector to use ICT for encapsulating public services and deploying to the public, high quality information (explicit knowledge) and effective communication tools that support human development. The potential of E-government as a development tool hinges upon three prerequisites—a minimum threshold level of technological infrastructure, human capital and E-connectivity for all (UN E-Readiness Report, 2003).

A second measure to assess the quality of a country's E-services is the E-participation index. It quantifies the willingness, on the part of the government, to use ICT to provide high quality information and effective communication tools for the specific purpose of empowering people for able participation in consultations and decision-making, both in their capacity as consumers of public services and as citizens (UN E-Readiness Report, 2003). It should be noted that while the E-government readiness index assesses the quantity of information and services provided, E-participation assesses the same from a qualitative perspective, with a special focus on consultation and decision-making. This article follows the methodology of the UN E-governance survey for measuring the E-governance readiness index and E-participation index. The data for India on the above-mentioned measures are collected from these reports (UN E-governance Reports, 2003 to 2012) and an analysis of India's challenges in the IT-driven governmental transformation is presented in the following sections.

### E-governance Readiness Index

The E-government Readiness Index is a composite index comprising the Web Measure Index, the Telecommunication Infrastructure Index and the Human Capital Index.

Equal weightage is given to the three indices (Palvia & Sharma, 2007). It is a standardized index ranging from 0 to 1 with a higher score indicating better E-governance activity. Definitions and method of measurement for each of these are given below.

**Web Measure Index**—The Web Measure Index is a quantitative index to measure the generic aptitude of governments to employ E-government as a tool to inform, interact, transact and network (UN E-governance Survey, 2003). It is based on a theoretical Web Presence Measurement Model, which is a quantitative five-stage model, ascending in nature, and building upon the previous level of sophistication of a government's online presence (UN E-governance Survey, 2003). For the governments that have established an online presence, the model defines stages of E-government readiness according to a scale of progressively sophisticated services. The five stages are theoretically ascending in the level of maturity or sophistication of E-government presence online. These include emerging presence, enhanced presence, interactive presence, transactional presence and networked presence. The definitions for each of the states are given in the schema depicted in Figure 2.

Web Measure assessments are quantitative in nature. UNPAN survey uses a questionnaire that requires the researchers to assign a binary value to the indicator based

on the presence/absence of specific electronic facilities/services available.

**Telecommunication Infrastructure Index**—It is a composite, weighted average index of six primary indices, based on basic infrastructural indicators that define a country's ICT infrastructure capacity. These include PCs/1,000 persons, Internet users/1,000 persons, Telephone Lines/1,000 persons, Online population/1,000 persons, Mobile phones/1,000 persons, and TVs/1,000 persons.

The data were standardized by constructing indices for each of the indicators. Based on the scores of the countries, maximum and minimum values are selected for each of the six indicators (UN Survey). The country's relative performance is computed as a value between 0 and 1 as follows:

$$\text{Indicator value} = \frac{(\text{Actual value} - \text{Minimum value})}{(\text{Maximum value} - \text{Minimum value})}$$

**Human Capital Index (HCI)**—HCI is mainly represented by three factors, life expectancy index, education index and income index. Since education index is the main factor which represents the skill requirement and literacy needed to use E-governance services, this article chooses education index as a measure of HCI. This is a composite of the adult literacy rate and the combined primary, secondary and tertiary gross enrolment ratio, with two-thirds

**Emerging Presence:** Web presence through an official website, or a national portal, information is limited, basic and static.

**Enhanced Presence:** Online services are enhanced to include databases and sources of current and archived information. The user can search for a document and there is a help feature and a site map provided.

**Interactive Presence:** Government's provision of online services enters the interactive mode; facilities for online downloading. The government officials can be contacted via email, fax, telephone and post. The site is updated with greater regularity.

**Transactional Presence:** Users are able to conduct online transactions, such as paying fines for motor vehicle violations, taxes and fees for postal services through their credit, bank or debit card.

**Networked Presence:** A G2C framework based on an integrated network of public agencies for the provision of information, knowledge and services. The emphasis is on feedback to the government. A web comment form is provided.

**Figure 2.** Web Presence Model

**Source:** Authors.

**Table 1.** India Readiness Index

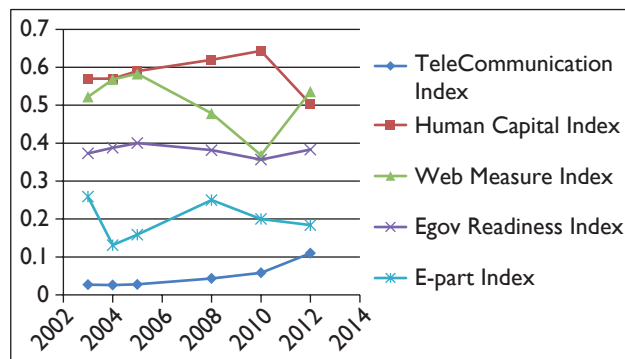
Year	Telecommunication Index	Human Capital Index	Web Measure Index	E-governance Readiness Index	World Rank
2003	0.027	0.57	0.522	0.373	87
2004	0.026	0.57	0.568	0.3879	86
2005	0.0277	0.59	0.5827	0.4001	87
2008	0.0435	0.6195	0.4783	0.3814	113
2010	0.0583	0.6432	0.3683	0.3567	119
2012	0.11	0.503	0.536	0.3829	124

**Source:** Data compiled from UN E-governance Reports.

of the weight given to adult literacy and one-third to the gross enrolment ratio, compounded as, Education index =  $2/3(\text{Adult literacy index}) + 1/3(\text{Gross enrolment index})$ .

Now the E-governance readiness index for the country is calculated based on these three indicators. Data on these indices for India for the period 2003 to 2012 are presented in Table 1.

Figure 3 shows that the Indian E-governance scenario is in a dull stage. The marginal increase in the readiness index from 2003 to 2012 is only 0.05. An interesting fact to be noted here is that the index was the highest in 2005 and the web measure index had attained the maximum value during this period. Among the three indices, the telecommunication infrastructure index has the lowest value in all the years, but has the highest marginal increase (0.083) among

**Figure 3.** Indices Trend

**Source:** Authors.

all. There is a gradual increase in the telecommunication infrastructure index from the value in 2003 to 2012, showing that the governments' measures are successful. But when comparing with other nations, India has a much lower value in this field.

Despite the high progress in ICT, the lack of infrastructure and education has limited the enabling environment in India and the reach of E-government to include all citizens

(UN E-governance Report, 2004). Newer technologies remain the domain of the elite in most of the region. Large population, especially in the rural areas, remains without electricity and telephone. Where access is available, lack of literacy and technical skills pose limiting constraints on the demand for E-services (UN E-governance Report, 2005). The telecommunication infrastructure index shows that for the six indices that aggregate to the TCI index, India still has the lowest value for Internet index and PC index. The only factor that favours India here is the increase in the mobile subscription index from a value of 0.01 in 2003 to 0.2 in 2012.

Another surprising factor to be noted here is that the human capital index showed a rapid increase from the value in 2003 to 2010, but had a sharp decline afterwards. This reflects the relative lack of progress on key issues of health and education (life expectancy, literacy and school enrolment), despite rapid economic growth and must be taken as a negative vote on the country's political system, its economic and social policies and the effectiveness of government programmes. Table 2 presents the world average on the three indicators in the recent surveys. The fact is that India has a below average score on all the indices except for the web measure index. The recent measures taken by the Indian government to integrate the portals and to provide interactive services make India attain a decent score on the web measurement index. India is also in the top 21 per cent in the list of countries which offered online transactions and encouraged citizen participation.

Looking at the world rankings, India positioned 87 in 2003 and 124 in 2012. India has fallen by five places in the UN E-government survey in 2012 (119 in 2010 to 124 in 2012). Reacting on India's low ranking, Ashis Sanyal, former Senior Director (E-governance), Department of Information Technology, Government of India said,

India is low on E-government ranking as we are lagging in the crucial area of web-services. There are as many as

**Table 2.** World Averages

Year	Web Measure (Avg)	Infrastructure (Avg)	Human Capital (Avg)	Readiness Index
2008	0.3485	0.2103	0.7825	0.4513
2010	0.2818	0.2332	0.7599	0.42
2012	0.4319	0.3245	0.71721	0.495

**Source:** Compiled from UN E-governance Report.

5,000 websites of various government agencies supported by the National Informatics Centre (NIC) and there are as many as additional 1,000 websites independently developed by the government agencies. However, a majority of these websites are not dynamic. Even the vital information is not updated on a regular basis. So the lack of dynamic features on the website coupled with their non-updation is a key reason why India is low on the E-government ranking. Also, despite India being a multi-lingual country, a majority of its websites is in English and there exists huge gaps for the local language. This is another reason why India remains low on global ranking.

The survey also acknowledges that with a population of 1.2 billion, India has to deal with other challenges associated with this huge population. It highlights that E-services in India are in the formative stage; however, the Government of India has made substantial efforts in the last few years to overcome the challenges. The government has announced its plan to connect all 2,50,000 Panchayats with broadband Internet connection and is extending its flagship programme of CSCs to cover all the villages (UN report, 2012).

## The Extent of E-participation

The second measure to assess the state of the art of E-governance in a country is the E-participation index. It quantifies the willingness, on the part of the government, to use ICT to provide high quality information (explicit knowledge) and effective communication tools for the specific purpose of empowering people for able participation in consultations and decision-making, both in their capacity as consumers of public services and as citizens (UN E-Readiness Report, 2003). It assesses the quality and usefulness of information and services provided by a country for the purpose of engaging its citizens in public policy making through the use of E-government programmes. As such it is indicative of both capacity and willingness of the state in encouraging its citizens in promoting deliberative, participatory decision-making in public policy and of the reach of its own socially inclusive governance programmes.

E-participation, as defined in this article, aims to achieve these objectives through the means of:

1. Increasing E-information to citizens for decision making;
2. Enhancing E-consultation for deliberative and participatory processes; and
3. Supporting E-decision-making by increasing the input of citizens in decision-making.

E-participation framework: The article follows the E-participation framework used in the UN E-governance report. Data is compiled for India and the definitions of various components in the E-participation framework follows.

*E-information:* The government websites offer information on policies and programmes, budgets, laws and regulations and other briefs of key public interest. Tools for dissemination of information exist for timely access and use of public information, including web forums, E-mail lists, newsgroups and chat rooms.

*E-consultation:* The government website explains E-consultation mechanisms and tools. It offers a choice of public policy topics online for discussion with real time and archived access to audios and videos of public meetings. The government encourages citizens to participate in discussions.

*E-decision-making:* The government indicates that it will take citizen input into account in decision-making and provides actual feedback on the outcome of specific issues.

A score is given to the modules based on the quality and relevance and the final score for utilization of the website is calculated. E-participation index is calculated based on this. E-participation scoring assesses 'how useful' the features in the websites are and 'how well are they deployed by the government'. The reviewers focused primarily on the national site and also considered the ministry sites, for reviewing a nation's collective online presence (UN E-governance Reports). This article consolidates the data for India on all the dimensions from these reports.

E-participation is a qualitative measure employing proxy indicators for the following:

1. The quality of the services/products it offers on the websites for this purpose.
2. The relevancy of the information and services provided.
3. The usefulness to the citizen as a user.
4. The willingness of the government to provide relevant information and services and encourage the public to be active in promoting deliberative, participatory decision-making in public policy matters.

**Table 3.** E-Participation Index

Year	E-part Index	Rank
2003	0.259	41
2004	0.1311	59
2005	0.1587	34
2008	0.25	49
2010	0.2	55
2012	0.184	71

**Source:** Authors.

Table 3 shows India's E-participation index in the recent years. Compared to the E-governance readiness index and rankings, India has a decent ranking in e-participation index. Among the total of 191 countries, India's rank ranges from 41 to 71, this indicates that India is always in the top 40 per cent.

On the basis of the analysis of the E-governance readiness index and E-participation index, the article identifies the major challenges for India's IT-driven people-centric governance approach which include the following:

1. Inadequate access to digital tools
2. Poor supply of electricity
3. High cost of online access relative to local purchasing power
4. Lack of awareness about or skills related to ICTs
5. Lack of local relevance of online services
6. Lack of local language content and tools
7. Concerns over security and reliability of ICT infrastructure
8. Lack of supporting legal protection for online transactions
9. Non-sustainability of many ICT pilot projects

## Barriers to ICT-driven Governance

ICT presents the global development community a vast potential for social and economic development. But in spite of all these advantages, the rate of adoption and the rate of success of ICT for development projects are very low. This is attributed to a lot of other elements which act as barriers to ICT deployment. The above analysis indicates that there exist a number of barriers in achieving an efficient governance transformation through ICT, which also accounts for the low score on the indices. Durickovic and Kovacevic (2011) identified rapid technology change, questions on privacy and security and digital divide as the main barriers to ICT deployment. Mamaghani (2010) talks about a different set of parameters which act as barriers to ICT deployment, which include, investment, policy changes, poor infrastructure, lack of ICT skills and education and absence of partnership from the private business sector. Ebrahim *et al.* (2005) has done a review on barriers of E-governance adoption. Henningson and Veenstra (2009) classified various E-governance transformational barriers.

The article reviews the literature on barriers to technology and E-governance adoption and identifies the factors relevant to Indian E-governance transformation. The factors are then classified into various dimensions that determine the E-governance readiness in India. As India is lagging behind in the global E-governance ranking, it is important to look at these barriers closely because these barriers are the causes for the poor indices on most of the measures. This section of the article identifies the various ICT deployment barriers affecting India's E-readiness index.

1. **Technology change:** Rapidly changing technologies cause low adoption and increased failure rates for E-governance projects. It makes scalability and sustainability of the E-governance activity difficult. Training the citizens and employees to use a particular technology is a difficult task.
2. **Questions on Privacy and Security:** Fear of losing private information is the main privacy issue reported in the literature (Lambrinouidakis *et al.*, 2003). Lack of knowledge for security risks and consequences and unauthorized external and internal access to systems and information were also reported as major concerns (Robins, 2001; Zeichner, 2002).
3. **Digital Divide:** Digital divide is a major problem faced by the developing countries. Digital divide exists at three levels, namely, People, Geographies,

**Table 4.** Barriers to ICT-driven Governance Transformation

Category	Barriers	Literature
<b>IT Infrastructure</b>	Shortage of reliable networks and communication Inadequate network capacity or bandwidth System complexity and incompatibility Lack of integration across government systems Lack of knowledge regarding E-government inter-operability	Dillon & Pelgrin (2002) Al-Mashari & Zairi (1999); Gil-Garcia et al. (2007); Moon (2002) Themistocleous & Irani (2002)
<b>Security and Privacy</b>	Threats from hackers and intruders Threats from viruses, worms and Trojans Absence of privacy of personal data High cost of security applications and solutions Unauthorized external and internal access to systems and information Lack of security rules and policies	Gefen et al. (2002) Joshi et al. (2001) Lambrinouidakis et al. (2003) NECCC (2000) Robins (2001)
<b>IT Skills</b>	Lack of IT training programmes in government Shortage of well-trained IT staff in market Lack of employees with integration skills Developing web site by unskilled staff Unqualified project manager Shortage of salaries and benefits in public sector	Bonham et al. (2001) Heeks (1999) Ho (2002) Layne & Lee (2001) NECCC (2000)
<b>Organizational and Managerial</b>	Lack of coordination and cooperation between departments Lack of effective leadership support and commitment amongst senior public officials Unclear vision and management strategy Lack of implementation guidelines Resistance to change by high-level management Complex business process	Burn & Robins (2003) Heeks (2001) Lenk & Traunmuller (2000) Janssen & Cresswell (2005)
<b>Governance including Political and Legal</b>	Insufficient IT governance Structure of the public sector Political pressure (or lack thereof) Division of costs	Liu & Hwang (2003) Fountain & Osorio-Urdua (2011) Scholl (2005) Fernandez & Rainey (2006) Ebrahim & Irani (2005)
<b>Digital Divide</b>	Poor infrastructure Access to technology Lack of government initiatives Struggling economy Illiteracy and education	Prieger (2008) Parayil (2005) Henningsson & Veenstra (2010)
<b>Policy Changes</b>	Rapidly changing policies Unstable political conditions	Mamaghani (2010)
<b>Technology Change</b>	Rapidly changing technologies Training issues Cost associated with new technologies	Durickovic & Kovacevic (2011) Mamaghani (2010)
<b>Investment</b>	Lack of Leadership Unclear Vision Management strategy	Lenk & Traunmuller(2000)

Source: Authors.

and Businesses. In addition to connectivity, affordability and capability are the other socio-technical factors which cause digital divide (Parayil, 2010).

4. Education and ICT skills: Low level of education is a key barrier to the ICT adoption and use. The basic ICT use does not require high levels of educational

attainment. However, it does require basic literacy skills such as reading and writing. Therefore the level of education received and attained by socially excluded groups will determine their capability to use ICTs. Also, low educational levels provide an indication that individuals might not only lack the



basic literacy levels required but also lack the basic computing and technological skills needed to use ICTs. Shortage of IT staff in the market is also identified as a major concern (Heeks, 2002).

5. Investment: Low investment in ICT is a major threat for developing countries. It is primarily because of the lack of leadership and unclear vision and management strategy (Lenk & Traummuller, 2000).
6. Infrastructure: IT and communication infrastructure still acts as the key barrier for E-government adoption. The IT infrastructure is composed of hardware and software that will provide secure electronic services to citizens, businesses and employees. The communication infrastructure includes mobile networks, telephone networks, broadband connection and tele centres.
7. Policy changes: In developing countries, unstable political conditions and inadequate policy formulation also act as barrier for ICT deployment (Mamaghani, 2010).
8. Public-private partnership: Mamaghani (2010) also talks about the importance of public-private partnership for an efficient ICT project implementation.

The barriers to E-governance in India and the various factors which contribute to it are listed in Table 4.

## Classification of E-governance Barriers

In this section, we classify the E-governance barriers along the three dimensions of telecommunication infrastructure, human capital and web presence, the factors that determine the E-governance readiness of a country. The barriers which affect the development index of each of these dimensions are grouped together. The classification is done by looking at the various factors that cause these barriers and their relationship with each of the dimensions. E-participation readiness dimensions are not included for the classification purpose as India performs fairly better along these dimensions as shown earlier. This section finds out the various barriers which influence the indices on the E-governance readiness dimension.

### Telecommunication Infrastructure

The barriers which affect the development of this index are as follows:

1. Technology Change: Rapidly changing technologies and the high cost of new technology makes it difficult to build an efficient telecommunication infrastructure. The existing technologies become obsolete fast and it makes the developing countries lag behind their developed counterparts on this index.
2. IT Infrastructure: System complexity and incompatibility, shortage of reliable networks, inadequate network capacity and lack of integration across government systems are the factors that can affect the telecommunication infrastructure index.
3. Investment: Low investment in the field is a major factor which affects the telecommunication infrastructure index. Availability of fund is a main problem in developing countries like India. Lack of leadership, unclear vision and poor management strategies are the factors affecting the investment decisions.
4. Digital Divide: One main problem associated with the poor telecommunication infrastructure is digital divide. Digital divide in terms of skills and technology access makes it difficult to achieve the full benefits of E-governance initiatives.

### Human Capital

Human capital index is a main factor which assesses the E-governance readiness of a country. One of the barriers which falls under this dimension is as follows:

1. Education and IT Skills: It is the most important factor which affects the human capital index of a country. Lack of IT training programmes and shortage of well-trained IT staff in the market are the major barriers in this category.

### Web Presence

It is the third index which contributes to the E-governance readiness of a country. The major barriers under this dimension are as follows:

1. Security and Privacy: Lack of security rules and policies, threats from hackers, intruders, and viruses, absence of privacy of personal data are the major problems in developing an effective web model for the E-governance initiative. People feel unsafe to avail the services over the web in such conditions.
2. Organizational and Managerial Barriers: Lack of effective leadership support, unclear vision and management strategies, lack of implementation

guidelines, resistance to change, etc., can also affect the deployment of web services.

Apart from these, insufficient IT governance also affects the E-governance initiatives in the country.

## Discussion

On the basis of the findings from E-governance readiness and E-participation readiness analysis, the article identifies the major barriers which affect the success of E-governance initiatives in India. These barriers are then classified along the various dimensions. Poor telecommunication infrastructure is the main factor which results in a poor score on the E-governance readiness index for India. The lack of access to computers and Internet are the main reasons for poor telecommunication infrastructure. India does fairly better along the other two dimensions of web presence and human capital. But lack of education and IT skills are major threats to IT-based governance transformation.

E-governance programmes should focus on attaining the following objectives to migrate to the phase of citizen service transformation. E-governance initiatives should be citizen-centric and demand driven. Instead of applying a push service delivery model where the citizens are forced to consume whatever is available, government should follow a demand-based pull model. Public data should be available freely for use for all. Citizens should get an opportunity in decision-making process.

### *Strategy of Connectivity–Access–Inclusion*

The initial step to be taken by the government to ensure effectiveness of the E-governance programme is to increase the connectivity. The current scenario demonstrates that the ICT infrastructure in India is still in its infancy stage and needs a lot of investment. Access is the next step; it should be ensured that all the citizens have access to ICT. Access-for-all is multi-faceted. First it implies availability of the physical infrastructure. The end-users should have access to tools, such as the television, radio and landline telephones, has expanded to include the personal computer and newer devices such as mobile/handheld computers, mobile phones and hybrid mobile devices (all-in-one phones, PDAs). Real access requires some final 'connection' for a user such as logging on to a computer that connects to the Internet through a dial-up connection,

broadband connection, etc., or using a mobile device to connect to the Internet via wireless connection; or simply having a land line telephone hardwired to a physical system that can be utilized for access.

Along with the physical infrastructure, education and skills are necessary. These include basic literacy to computer skills and technology training, which can be achieved through the integration of computers/technology into traditional subject area curriculum. For accessibility to be pervasive, it is also necessary that information technologies are affordable. There is a close link between access to technology and its cost. Even though costs have gone down substantially, a major cause of low access in developing countries remains its relatively high cost (UN E-governance Report, 2005). So the government needs to focus on the development of human capital and communication infrastructure.

Another point to be noted here is that physical access to ICT was only the first step towards building the real access, which led to economic and social opportunity. Whereas a certain level of physical infrastructure was needed to reach a threshold level for real access to start accelerating, it is necessary for governments to complement it by other access supporting economic, social, educational and cultural elements (UN E-governance Report, 2004).

E-inclusion goes beyond E-government. Technology should be employed to remove access divides and to promote opportunities for social and economic development. Information technology can facilitate the dissemination of information and reduce inequalities of opportunity. Inclusion and participation through ICTs or E-inclusion then become key tools at the disposal of a socially inclusive government.

## Conclusion

ICT is universally regarded as an essential tool for enhancing the competitiveness of the economy of any country. Recent researches in the IS field underlines the role of ICT in the economic and social development of a country. Though ICT is generally viewed as a communication tool, it has a larger scope. Government organizations implement IT to improve service delivery for the citizens and businesses and also to improve the efficiency of the government. These E-governance initiatives enable a long-term transformation of the governments that go far beyond the online service delivery.

This article presented an overview of the E-governance scenario in India. Based on the UN E-governance survey, data on E-governance readiness and participation indices for India over a period of 2003–2012 were analyzed to have a deeper understanding of the current scenario. The scores clearly indicated that India lags much behind the world average in the E-governance arena. The main challenges identified are India's huge population, poor human capital and poor ICT infrastructure. Connectivity is also one major issue India faces today. However, the marginal increase in the indices value over the above stipulated period keeps the hopes for development alive. Based on the assessment, the article identified the barriers which restrict the efficiency of the ICT-driven governance transformation initiatives. These barriers cause poor scores on most of the development indices for India. A classification of these barriers along the readiness dimensions are also presented in the article. Strategies for India to achieve efficient governance are also proposed in the article.

The readiness of the ecosystem to support a particular project needs to be evaluated carefully before it is implemented. The E-governance readiness in India is evaluated in terms of the supporting technology infrastructure, human capital and web measure. The main contribution of the article is the assessment of the E-governance scenario in India and the trend analysis of the scores on the readiness and participation indices. The classification of the barriers is presented in the article. It also conveys the challenges that have to be taken care of. Secondary data is used for the analysis and the article presents a simple trend analysis on the data. A deeper empirical analysis on more factors may be useful for refining the E-governance strategies. A detailed case analysis of the pre- and post-implementation stages of few E-governance projects in India can give more insights on the scenario.

## References

- Al-Mashari, M., & Zairi, M. (1999). BPR implementation process: An analysis of key success and failure factors. *Business Process Management Journal*, 5(1), 87–112.
- Bonham, G., Seifert, J., & Thorson, S. (2001). *The transformational potential of E-government: The role of political leadership*. Paper presented at 4th Pan European International Relations Conference, University of Kent.
- Brunello, P. (2010). ICT for education projects: A look from behind the scenes. *Information Technology for Development*, 16(3), 232–239.
- Burn, J., & Robins, G. (2003). Moving towards e-government: A case study of organisational change processes. *Logistics Information Management*, 16(1), 25–35.
- Cecchini, S., & Raina, M. (2004). Electronic government and the rural poor: The case of Gyandoot. *Information Technologies and International Development*, 2(2), 65–76.
- Common Service Centre News Letter (2012). *Governance India Limited*. New Delhi.
- Davidrajuh, R. (2004). Planning e-government start-up: A case study on E-Sri Lanka. *Electronic Government*, 1(1), 24–35.
- Dewan, S., & Riggins, F. J. (2005). The digital divide: Current and future research directions. *Journal of the Association for Information Systems*, 6(12), 298–337.
- Dillon, J., & Pelgrin, W. (2002). *E-government/commerce in New York State*. New York: Office of Technology.
- DPEPA, UN (2001). *Benchmarking e-government: A global perspective*. United Nation Division for Public Economics and Public Administration. USA: American Society for Public Administration.
- Durickovic, T., & Kovacevic, D. (2011, May). *E-government in the context of developing countries*. MIPRO, 2011 Proceedings of the 34th International Convention, Opatija, Croatia, pp. 1370–1375.
- Dwivedi, S. K., & Bharti, A. K. (2010). e-Governance in India—Problems and acceptability. *Journal of Theoretical and Applied Information and Technology*, 17(1), 37–43.
- Ebrahim, Z., & Irani, Z. (2005). E-government adoption: Architecture and barriers. *Business Process Management Journal*, 11(5), 589–611.
- Fernandez, S., & Rainey, H. G. (2006). Managing successful organizational change in the public sector. *Public Administration Review*, 66(2), 168–176.
- Fountain, J. E., & Osorio-Urzuva, C. A. (2001). Public sector: Early stage of deep transformation. In *The economic payoff of the Internet revolution* (pp. 235–268). Washington, DC: Brookings Institution Press.
- Gefen, D., Warkentin, M., Pavlou, P., & Rose, G. (2002). *E-government adoption*. Paper presented at Americas Conference on Information Systems, Tampa, FL.
- Gil-Garcia, J. R., Chengalur-Smith, I., & Duchessi, P. (2007). Collaborative e-government: Impediments and benefits of information-sharing projects in the public sector. *European Journal of Information Systems*, 16(2), 121–133.
- Heeks, R. B. (2002). Information systems and developing countries: Failure, success and local improvisations. *The Information Society*, 18(2), 101–112.
- Heeks, R. (1999). *Reinventing government in the information age: International practice in public sector reform*. London: Routledge.
- Henningson, S., & Veenstra, A. F. (2010). *Barriers to IT driven governmental transformation*. 18th European Conference on Information System, Pretoria, South Africa.
- Ho, A.T-K. (2002). Reinventing local governments and the E-government initiative. *Public Administration Review*, 62(4), 434–444.
- India E-development Gateway (2013). National e-governance plan. Retrieved from <http://negp.cdacmohali.in/Projects/>

- OtherProjectsandInitiative.aspx?id=8&page=IndiaDevelopmentGateway
- Janssen, M., & Cresswell, A. M. (2005). An enterprise application integration methodology for e-government. *Journal of Enterprise Information Management*, 18(5), 531–547.
- Jeong Chun Hai @Ibrahim (2007). *Fundamental of development administration*. Selangor: Scholar Press.
- Joshi, J. Ghafoor, A. Aref, W. G., & Spafford, E. H. (2001). Digital government security infrastructure design challenges. *Computer*, 34(2), 66–72.
- Lambrinouidakis, C., Gritzalis, S., Dridi, F., & Pernul, G. (2003). Security requirements for e-government services: A methodological approach for developing a common PKI-based security policy. *Computer Communications*, 26(16), 1873–1883.
- Layne, K., & Lee, J. (2001). Developing fully functional E-government: A four stage model. *Government Information Quarterly*, 18(2), 122–136.
- Lee, J. K., Braynov, S., & Rao, H. R. (2003, December). *Effects of public emergency on citizens' usage intention toward e-Government: A study in the context of war in Iraq*. Paper presented at the 24th International Conference on Information Systems, Association of Information Systems, Seattle, WA, USA.
- Lenk, K., & Traunmuller, R. (2000). *A framework for electronic government*. Paper presented at 11th International Workshop on Database and Expert Systems Applications, IEEE Computer Society, London.
- Liu, S., & Hwang, J. D. (2003). Challenges to transforming IT win the US government. *IT professional*, 5(3), 10–15.
- Mamaghani, F. (2010). The social and economic impact of information and communication technology on developing countries: An analysis. *International Journal of Management*, 27(3), 607.
- Mathur, D. (2009). e-Governance Approach in India—The National e-Governance Plan (NeGP). In *Transforming governance: E governance initiatives in India* (pp. 3–51). Hyderabad: Computer Society of India.
- Moon, M. (2002). The evolution of E-government among municipalities: Rhetoric or reality. *Public Administration Review*, 62(4), 567–578.
- NECCC (2000). *E-government strategic planning*. Las Vegas, NV: National Electronic Commerce Coordinating Council.
- Palvia, S. C. J., & Sharma, S. S. (2007). E-government and e-governance: Definitions/domain framework and status around the world. In *Foundation of e-government* (pp. 1–12). Hyderabad: Computer Society of India.
- Parayil, G. (2005). Digital divide and increasing returns: Contradictions of informational capitalism. *The Information Society*, 21(1), 41–51.
- Prieger, J. E., & Hu, W. M. (2008). The broadband digital divide and the nexus of race, competition, and quality. *Information Economics and Policy*, 20(2), 150–167.
- Ray, S., & Mukherjee, A. (2007). Development of a framework towards successful implementation of e-governance initiatives in health sector in India. *International Journal of Health Care Quality Assurance*, 20(6), 464–483.
- Robins, G. (2001). *E-government, information warfare and risk management: An Australian case study*. Paper presented at 2nd Australian Information Warfare Security Conference, Perth.
- Scholl, H. J. (2005). E-government-induced business process change (BPC): An empirical study of current practices. *International Journal of Electronic Government Research (IJEGR)*, 1(2), 27–49.
- Seckel, A. (2010). *Citizens @ The Centre: B.C. Government 2.0 - A Transformation and Technology Strategy for the BC Public Service*. British Columbia.
- Themistocleous, M., & Irani, Z. (2002). Novel taxonomy for application integration. *Benchmarking: An International Journal*, 9(2), 154–165.
- UN Global E-government Survey (2003). *Global E-governance survey: E-government at the Crossroads*. United Nations Publications, New York.
- UN E-governance Report (2004). *Global e-government readiness report: Towards access for opportunity*. United Nations Publications, New York.
- UN E-governance Report (2005). *UN global e-government readiness report: From e-government to e-inclusion*. UNPAN/2005/14, United Nations Publication, New York.
- UN E-governance Report (2008). *UN global E-government readiness report: From e-government to connected governance*. United Nations Publications, New York.
- UN E-governance Report (2010). *Leveraging E-government at a time of financial and economic crisis*. United Nations Publications, New York.
- UN E-governance Report (2012). *United Nations e-government survey 2012: E-government for the people*. United Nations Publications.
- Zeichner, L. M. (2002). Developing an overarching legal framework for critical service delivery in America's cities: Three recommendations for enhancing security and reliability. *Government Information Quarterly*, 18(4), 279–291.