



## Key Characteristics of Indian e-Governance Projects: A Special Reference to “Bhoomi”

Pabitranda Patnaik<sup>1\*</sup>, Rama Krushna Das<sup>2</sup> and Manas Ranjan Patra<sup>3</sup>

### ABSTRACT

*The diversified social, economical and cultural condition of India raises new challenges for good governance through the implementation of e-Governance projects. The very objective of e-governance is to bridge the gap between the government and the public providing effective, interactive and transparent governance. However, studies show that out of every six e-Governance projects, one is hardly successful. This demands a systematic study of e-governance projects in order to identify the key factors that directly or indirectly influence the success of such projects. This paper consolidates the observations made in e-governance projects in India during their complete development cycle until its deployment and focuses on “Bhoomi” project, one of the successful e-Governance projects in India. The key findings of the study is that, if all the implicit and explicit characteristics of e-Governance projects are properly defined, analyzed, studied and taken care of during project planning, development and implementation, then the chances of failure of such projects can be minimized.*

**Keywords:** e-governance project characteristics, Risk Management, Bhoomi Project.

### 1. Introduction

In present days, e-Governance has become a very common word, wherever governments have harnessed information technology with a range of activities. Considering the importance of e-Governance many countries all over the world have taken up e-governance projects in a priority basis. Though there are success stories which enthuse e-governance architects but many of them have failed to deliver the expected results. Recent studies reveal that, all over the world, only 15% of e-Governance projects have been successfully deployed whereas a majority of them have either failed or are yet to show their real benefits (Singh A. 2005). Particularly in India, the success percentage has been significantly low due to its geo diversity, lack of public awareness, mindset of the people, political as well administrative bottlenecks, among other factors.

Therefore, it is highly essential for one to study the key factors that contribute to the success or failure of an e-governance project. In this paper, the authors out of their experience in dealing with different e-governance projects bring out the factors that influence the effectiveness of an e-governance project. The activities involved in e-governance can be grouped into 3 broad categories such as Law & Order, Social

---

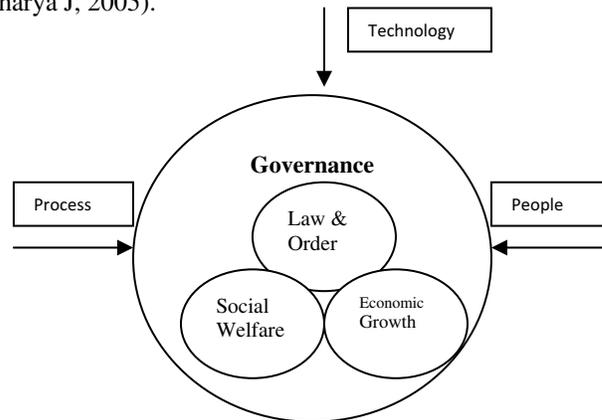
1 National Informatics Centre, Bhubaneswar, Orissa, India.

2 National Informatics Centre, Berhampur, Orissa, India

3 Department of Computer Science, Berhampur University, Berhampur, Orissa, India

\* *Corresponding author* (E-mail: ppabitra@hotmail.com, Telephone: +91- 9437003107)

Welfare and Economic Growth as shown in Figure-1. To convert the Governance to e-Governance the involvement of Process, People and Technology are required. Only by putting the technology, e-Governance can not be successfully implemented. Involvement of people and processes are also equally important (Bhattacharya J, 2005).

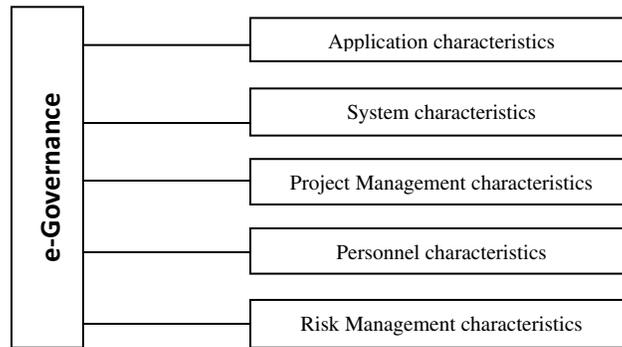


**Figure 1:** E-Governance

A software project is different from other projects on the following grounds (Hughes and Cotterell 2001).

- *Invisibility*: In case of physical works such as roads or building constructions, the progress of the work can actually be seen, but, in case of software, the progress is not immediately visible.
- *Complexity* : Software projects are more complex than other engineering activities.
- *Flexibility*: It is the strength of software projects that, it can be modified to be accommodated in the physical systems.

An e-Governance project is a special type of software development project whose successful implementation largely depends on certain characteristics specific to a project under development. Thus one needs to analyze such characteristics before undertaking a project. These characteristics can be grouped into five broad categories as shown in Figure-2.



**Figure 2:** Characteristics of e-Governance projects

The rest of the paper deals in detail with each of these characteristics and show how those can influence the successful execution of e-governance projects. This has been demonstrated with reference to “Bhoomi” which dealt with the land record computerization of the state of Karnataka.

## 2. Application Characteristics

*Unique working style:* The working style and procedure of each functional unit in the government is different. For example, the Revenue Department of Orissa and Karnataka states have the same objective, but, the working procedures, manuals and formats are different to maximum extents. So, the Land Records software developed for Karnataka can not be implemented in Orissa. It requires to be highly customized, or a new software is to be developed.

*Regional language:* e-Governance has to speak in the language of the people. English was the only language of computer usage, but, slowly that concept is changing. As the language is different from state to state and government-to-government, so the software should support the regional languages for better interaction with the people. This regional language support requires to develop the software newly again, though it might be available for other states or governments.

*Target group size is very high:* e-Governance projects are primarily meant for the citizens, that's why the target group size is very high. It becomes difficult to consider the attitude, behavioural aspects and acceptance criteria of such a big group while developing the project. Further, creating awareness about the technology is also very time consuming when the group size is large.

*Mission-Critical application:* e-Governance projects are mission critical applications for the functioning of Government. If this project fails, then the functionality of the Government would be paralyzed to maximum extent. Hence, necessary care should be taken to develop the e-Governance projects.(Mastek, 1995)

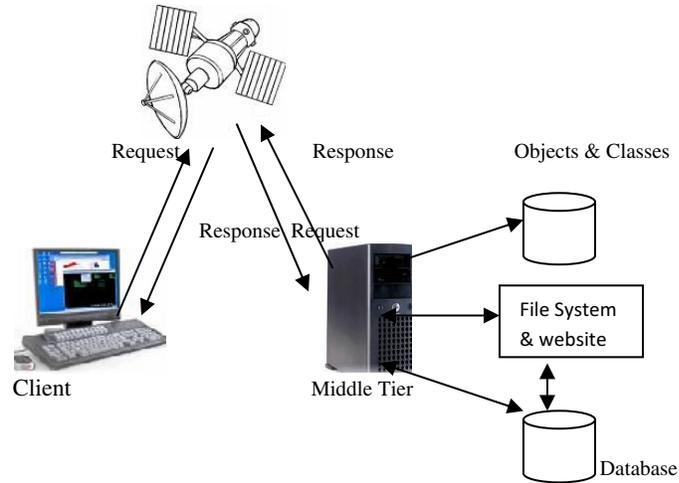
## 3. System Characteristics

- **Rigidity:** The functioning system of government is not easily changeable to use the new technology. In private sectors, the working procedures can be easily modified for adoption of the better technologies. Besides this, the man executing the functions and procedures is also rigid to accept the changing environment. He/she requires to be motivated properly to use the new technology whole heartedly.
- **Tightly defined user specification:** The forms, manuals, registers etc. can not be altered in their formats for implementing the e-Governance projects. Any minute changes may invoke legal implications for the government department. Using Business Process Re-engineering is very hard in government sector. Hence, great care has to be exercised during e-Governance project development.(Mastek, 1995)
- **Integration needs:** e-Governance projects need integration among many systems, many internal and external units functioning on different technologies. Therefore, the e-Governance application needs to integrate the data of different units on different heterogeneous systems.(Mastek, 1995)
- **Technology challenges:** The technologies of hardware, software and networking are changing very fast. In many cases, the technologies used for e-Governance projects are obsolete, but, on the part of the government, changing the technologies so rapidly is not possible.(Kumar, 2005)
- **Back office automation:** Success of e-Governance projects does not depend upon implementing the project at the top level only. All the lower level offices functioning at the grass root level need to be strengthened first. Then only, the data captured at the lowest level can be used at the top level without any redundancy and human intervention errors.

**Architecture:** There are three different architectures used for e-Governance applications (Budhiraja R, 2005).

- **Hardware & Networking Architecture:** It depends on what type of Server, Client and Networking architecture to be used for storing the data. State Data Centre will be used or the application will be hosted in some other servers. Similarly, for Networking, the type of network to be used, its

- reliability and availability for connecting all the back offices are required.
- *Data Architecture*: Whether centralized or distributed data storage method will be adopted. Similarly, the data access techniques are also important. In to-day's age, accessing the data through mobile technology is also required.
  - *Application Architecture*: N-tier application architecture are generally preferred. Particularly, 3-tier architectures are used for presentation & user interface, business logic and data access layers as in Figure-3.



**Figure 3:** Three-Tier Architecture

#### 4. Project Management Characteristics

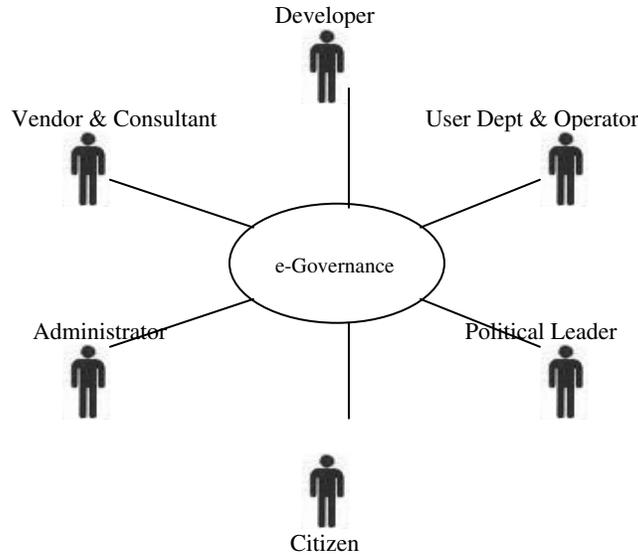
**Time** : Most of the e-Governance projects are running out of time. The planning and decision making process in the government, in the present scenario, is too much time consuming. Most of the times, the technology selected for the e-Governance project during planning stage becomes outdated or obsolete while the actual development stage reaches. The people involved in the planning stage might have been transferred to somewhere else before the execution of plan. The new employee takes more time in understanding and leading the work. Therefore, as a result, the time gap between project initiation and implementation is too high.

**Cost** : The cost involved in e-Governance project is also too high. Therefore, the officials feel risky for taking decisions quickly, as they, do not have clear idea on the technology. The vendors are attracted towards these projects expecting good returns. They are agreed to develop the projects without understanding the basic things and ground realities.

**Resources** : The management of resources such as machine, money, manpower and methods become very critical in the e-governance project development.

#### 5. Personnel Characteristics

One of the success factors of the e-Governance project is the personnel and human factors involved with the project. The knowledge, skill, attitude and mindset of these people are directly or indirectly affecting the result of the project. The different people associated with the e-Governance project are as shown in the Figure-4 below.(Riley Thomas, 2003)



**Figure 4:** Personnel related to e-Governance project

**Political Leaders:** These people are the Ministers or Chairmen who are the heads of the project unit where the e-Governance project is to be implemented. In the present environment, these group of people have very less knowledge in the field of Information Technology, so, they are mostly dependent on their Secretaries. Further, they are the public leaders and find very less time to devote in this area of e-Governance to understand the technology.

**Administrators:** Administrators are the bureaucrats, who are the intelligent users of e-Governance projects. They have ideas in business logic and technology of the project to be developed and implemented. They are very good in understanding the shell of the project but not the kernel, for which, they are dependent on vendors or consultants. These people are the actual decision makers of the project. But, unlike private and public sectors, the Administrators are not stable in one function unit for a longer period. During their tenure, they start the project, but in most of the cases, they are transferred to some other units or departments before project is implemented. The new one, who assumes the responsibility takes more time to understand and may take the action differently from the earlier one, if he does not like it.

**Vendors and Consultants :** In many cases, the government IT departments in State and National level, or the large Private or Multi National Companies act as the consultants and they outsource the project to private vendors. In some other cases, the vendors are directly chosen by the departments to act as both Vendors and Consultants. It is felt that, most e-Governance projects are vendor driven projects, so the success of the project depends on the capability of these vendors.

**Developers:** The developers are the actual engineers who give shape to the vision into realities. Their knowledge of understanding the user requirement, the business logic and their skill set in required platform is directly helpful for project development.

**User Department and Operator :** Developing the software is only like a showpiece. It requires to be tested and operational by the user department. If these people take interest and feel the suitability of the software, then the project can be successful, otherwise, the project may go to a corner after some period of time.

**Citizens** : In G2C e-governance projects, citizens are the direct target groups and in G2G, citizens are the indirect target groups. But, in all the e-Governance projects, the focus is the “public service”. Therefore, the public should be aware of all these things and his stake. His knowledge, accessing capability and vision can make the project more success.

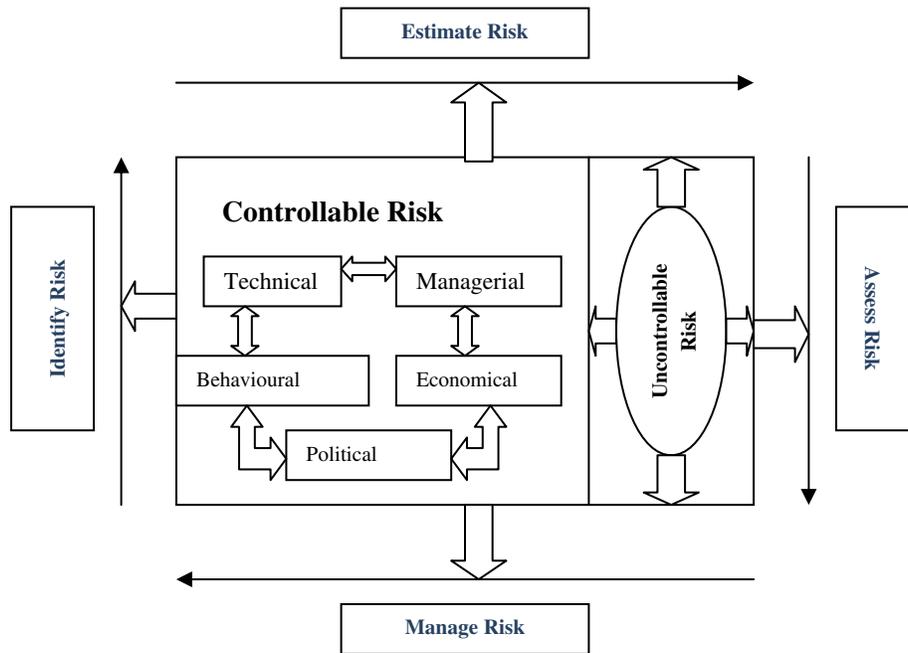
### 6. Risk Management Characteristics

Risk is the latent factor that causes failure of the project. For the purpose of this study, the risk is assessed as of two types as in Figure-5 given below. Identifying the risk factors, Estimation of the risk factors, Assessment of these factors and then Managing the risk are the major activities of Risk Management.(Pressman Roger, 1992)

#### 6.1 Controllable Risk

“Prevention is always better than cure”. The controllable risk factors can be assessed earlier before they occur and necessary measures can be taken during the project planning. These type of risk factors are as described below.

- **Technical Risk** : These type of risk factors include
  - Wrong selection of hardware, system software and networking technology for the e-Governance projects
  - Poor design of software
  - Improper skill set of the software developers.
- **Managerial Risk**: Poor management skill of Project Managers, Project Leaders and Administrators.
- **Economical Risk**: e-Governance projects are high priced projects. Most of the times, the benefits are drawn in long run. So, necessary cost-benefit analysis is required to find the benefits to be drawn from the project. If the project is not well planned and started in a hurry, a large amount of fund is wasted.



**Figure 5: Risk Management**

- Political Risk: The internal politics in the project team, planning and steering committees badly affect the project productivity. If good inter personal relation is not maintained among the persons involved in the project then the project can not be succeeded.
- Behavioural Risk: The behaviour, attitude and mindset of the people for planning, developing, executing and accepting the project is a major factor of project success. For e-Governance projects the behaviour of Political Leaders, Administrators, Vendors, Consultants, User Department and after all the behaviour of Citizens should be positive.

### 6.2 Uncontrollable Risk

The risk factors that can not be assessed earlier and can not controlled by the project team are called as uncontrollable risks.

The following type of risks can be considered as uncontrollable risks of an e-Governance projects.

- Global changes in technologies : Hardware and software technologies are changing rapidly and not at the control of project team.
- Natural calamities and disasters : These are the unnatural and accidental events which affect all type of developments.
- Unstable governments: Frequent changes in government and political parties also hampers the development activities so also e-Governance projects.

## 7. KEY Characteristics of Bhoomi Project:

One of the successful E-Governance Projects in 1991, Government of Karnataka initiated a project for Land Records computerization. Fund was sanctioned and Gulbarga district was selected for pilot implementation, but the project could not succeed due to poor management of the characteristics of the project (Chethana,G. H. 2007). Bhoomi was taken up in 1999 and within 2 years of time, it was successfully implemented in the State, overcoming all the challenges. For the purpose of the study, the different characteristics of Bhoomi are discussed in the following tables. Table-1 to Table-5 contain the characteristics of Bhoomi Project both in textual and numeric form and Table-6 contains the benefits derived due to the success of the project (Chethana,G. H. 2007) .

**Table 1: Application Characteristics**

Sl.No.	e-Governance Project Characteristics	Bhoomi Project
1.	Uniquely working style	The Bhoomi Project is unique for Karnataka State. It can not be directly implemented in other state without sufficient customization
2.	Regional Language	<i>Kannada</i> , the regional language of Karnataka is used.
3.	Target Group Size	All the citizens.
4.	Mission critical application	Land Record system is very sensitive and critical application

Source of data is [http://dqindia.ciol.com/content/top\\_stories/2007/107121001.asp](http://dqindia.ciol.com/content/top_stories/2007/107121001.asp) by Gadiyar H. Chethna, Bhoomi Empowers Rural Karnataka on December 10, 2007 (Chethana,G. H. 2007) .

**Table 2: System Characteristics**

Sl.No	e-Governance Project Characteristics	Bhoomi Project
1.	Rigidness	Land Records Procedures, Manuals and Acts are strictly followed
2.	Tightly defined user specification	The formats and specifications as per the Government rule are followed
3.	Integration Needs	3 months of time was taken for integration
4.	Technology Challenges	(i)H/W & Networking (ii)S/W development (iii)20 million records digitization
5.	Back office Automation	177 no. of Taluks & 203 no. of Kiosks were developed
6.	Architecture	N-tier Architecture is followed.

**Table 3: Project Management Characteristics**

Sl.No.	e-Governance Project Characteristics	Bhoomi Project
1.	Time	2 Years or 20000 man months (approximately)
2.	Cost	Rs. 20 crore

**Table 4 : Personnel Characteristics**

Sl.No.	e-Governance Project Characteristics	Bhoomi Project
1.	Political Leaders	Chief Minister of Karnataka & Union Minister of IT of Govt. of India
2.	Administrators	(i) Commissioner, Survey, Settlement & Land Records (ii) Administrators of Revenue Departments
3.	Officials	2,000 no. of officials and 10,000 no. of Village Assistants
4.	Developers	The s/w development team
5.	Citizens	Public

**Table 5 : Risk Management Characteristics**

Sl.No.	e-Governance Project Characteristics	Bhoomi Project
1.	Technical Risk	(i) Paper Records were not in good condition (ii) Using biometric finger print (iii) Volume of data is very large (iv) Sensitive nature of data
2.	Managerial Risk	Very huge, complex and many people are involved
3.	Economical Risk	Huge fund i.e Rs. 20 crore
4.	Political Risk	Internal and external politics involved
5.	Behavioural Risk	Initially, the Village Assistants were reluctant.

**Table 6 : Benefits provided by Bhoomi Project**

Sl.No.	Purpose	Old manual system	Bhoomi Project	Speed of Service
1	Getting Record of Rights	3-30 days	5-30 minutes	Very high
2	Mutation	200 days	35 days	7 times faster
3	No. of Land records distributed	Very Low	14 million Records	Very high
4	No. of mutations per year	Very Low	1.6 millions	Very high

From the study, it is observed that, all the characteristics defined for e-Governance projects are directly or indirectly taken care of in Bhoomi project. As a result, Bhoomi is one of the most successful e-governance projects in India. Due to the successful implementation of Bhoomi project the citizens get the benefits as given in Table-6.

In addition to the above benefits, many other indirect benefits such as controlling the bribery systems, faster processing and issuing of Farm Bank cards to the farmers etc. are also obtained from the system.

## 8. Concluding Remarks

In this paper an in depth study has been made in understanding the key characteristics of e-governance projects that are already undertaken by different provincial governments in India as well as by the federal government. The objective of the study is to focus on these project characteristics for successful implementation of different e-governance projects. It is found that e-Governance projects have their own

characteristics. These characteristics should not be considered as drawbacks or failures and at the same time cannot be kept aside while undertaking the project. These characteristics require thorough understanding and must be considered carefully in making a project successfully operational.

## References

1. Bhattacharya J (2005), *Executive level e-Governance Capacity Building e-Governance Oracle-HP e-Governance Center of Excellence*. [http://orissagov.nic.in/e\\_governance/presentationMaterial/PRESENTATION](http://orissagov.nic.in/e_governance/presentationMaterial/PRESENTATION)
2. Budhiraja R.,(2005),*Role of Standards and Architecture for e-Governance Projects*, The Eighth National Conference on e-governance, Bhubaneswar
3. Choudhury R.D.,Banwet D.K.,Gupta M.P.(2007),*Identifying Risk Factors in for E-governance Projects*, [http://www.iceg.net/2007/books/1/28\\_411.pdf](http://www.iceg.net/2007/books/1/28_411.pdf)
4. Gadiyar H Chethana (2007), *Bhoomi Empowers Rural Karnataka* [http://dqindia.ciol.com/content/top\\_stories/2007/107121001.asp](http://dqindia.ciol.com/content/top_stories/2007/107121001.asp)
5. Hughes B.,Cotterell M(2001)., *Software Project Management*, Second Edition, Tata McGraw Hill Publications. Pages 3-5
6. Kumar K.(2005),*Technology Challenges in e-Governance* <http://pcquest.ciol.com/content/fx/2005/105070103.asp>
7. Mastek(1995),*Government* <http://www.mastek.com/e-governance.asp>
8. MoCullough Sterling J(1991), *Software Quality Assurance Methodology Evaluation*, Conference Record. IEEE International Conference on 23-26 June 1991 Page(s): 364-368 vol.1
9. Moon M.Jae,Welch Eric W.,Wong W.(2005),*What Drives Global E-governance ? An exploratory Study at a Macro Level*. <http://ieeexplore.ieee.org/iel5/9518/30166/01385502.pdf>
10. Pressman Roger S.(1992),*Software Engineering, A Practitioner's Approach*, McGraw Hill International Editions. Pages 96-102.
11. Riley Thomas B(2003)., *E-Government vs. E-Governance: Examining the differences in a changing public sector climate* , International Tracking Survey Report '03 Number Four. [http://www.electronicgov.net/pubs/research\\_papers](http://www.electronicgov.net/pubs/research_papers)
12. Singh A.(2005),*Sidestepping Pitfalls* <http://dqindia.ciol.com/content/egovernance/2005/105052101.asp>
13. Valsangakar P(2005)., *Relevance of Program management in Large e-governance Projects* <http://www.gcsindia.com/RelevanceofProgramManagement-paper.doc>

## About the Authors

*Pabitranda Patnaik* has obtained his MCA from National Institute of Technology, Jamshedpur and MBA (Finance) from IGNOU. He is having more than 17 years of working experience in the field of IT. Since last 15 years, he is working with National Informatics Centre and have handled many e-Governance projects. He is involved in software analysis, design, development, implementation and maintenance of e-Governance projects in the state of Orissa. Further, he has active participation in implementing Quality Management Systems in e-Governance projects.

*Rama Krushna Das* is working with National Informatics Centre (NIC), Government of India for the last 20 years. He is involved in different E-Governance projects of NIC. He has led the group in the implementation of the e-grama project in Orissa. His research interests include e-Governance, software engineering and implementation of SOA in e-Governance projects

*Manas Ranjan Patra* is a Reader in Computer Science having about 20 years of teaching and research experience. He holds a Masters degree in Physics and a Ph.D. in Computer Science. He is a recipient of United Nations Fellowship and has worked in the International Institute of Software Technology, Macau. He has about 50 research publications to his credit. His research areas include software engineering, service oriented modeling and multi-agent systems

Good governance is being recognized as an important goal by many countries across the world. e-Governance has to be citizen friendly. Delivery of services to citizens is considered a primary function of the government. In a democratic nation of over one billion people like India, e-Governance should enable seamless access to information and seamless flow of information across the state and central government in the federal set up. No country has so far implemented an e-Governance system for one billion people. It is a big challenge before us. National Mission Project – Feasibility of implementing the project from a financial, administrative, and political perspective within a reasonable time frame. The basic characteristics of a well-designed e-Governance system such as audit trail, data integrity, role-based access and data security will bring in much required traceability, accountability and reliability required for any land administration system. Open access to data and the transparent and traceable mutation process has also reduced the number of disputes. e-Governance system can monitor the activities only after transactions / process data are digitally captured completely. Integration of Bhoomi with Registration Software, Land acquiring Bodies and Banks was a major step in bringing uniqueness to the Land Records System in Karnataka. Independent evaluation studies have shown that Bhoomi has significantly reduced corruption and improved service delivery. The Government of India has recognized the need to modernize the Central Government offices through the introduction of Information and Communications Technology. e-Office is aimed at increasing the usage of work flow and rule based file routing, quick search and retrieval of files and office orders, digital signatures for authentication, forms and reporting components. Immigration, Visa and Foreigners Registration & Tracking (IVFRT). e-Governance in Municipalities. It is a unique initiative of the Government of India conceptualized under the umbrella of the overall National e-Governance Plan (NeGP) and the Jawaharlal Nehru National Urban Renewal Mission (Jnnurm) aimed at improving operational efficiencies within Urban Local Bodies (ULBs). E-Governance is not only popular in India but also worldwide. To make working of government more efficient, responsive and transparent many developed and developing countries have taken some useful steps for the expansion of e-governance in their respective countries. Countries which are in the race of e-governance implementation are UK, USA, New Zealand, Brazil etc.