

CHAPTER 4

THEORETICAL CONCEPTS of e-governance

“A transparent smart e-governance with seamless access, secure and authentic flow of information crossing the interdepartmental barrier and providing a fair and unbiased service to the citizen.”

Dr. APJ Abdul Kalam^[15]

4.1 Introduction

Today, citizens are becoming more and more conscious about their rights to get the required services at their doorstep and both the state and central governments recognize the need to deliver faster and efficient services to ordinary citizens through e-governance which is an effective instrument of administration. India’s experience in e-governance and ICT initiatives has demonstrated significant success in improving accessibility, cutting down costs, reducing corruption and extending help and increased access to un-served groups. e-governance initiatives have reached millions of people belonging to these sections of society. It helps to improve access to information and services because these have provided economic and social development opportunities, facilitated participation and communication in policy and decision-making processes and empowered the weakest groups. This has led to the fostering of a sense of ownership and the building of social capital, which in turn, constitutes a basis for local revitalization ^[3].

The advent of IT as a highly leveraged enabling tool for delivery of products and services has now redefined the fundamentals and changed the institutions and their mechanisms of delivery forever. Technology has proliferated in all spheres of life. Accompanied by the rapid growth ^[6] of the internet there has been a concomitant rise in online transactions. This information age paradigm shift is characterized by citizen and business integration driven as it were by the choice of service providers and means of access. In this context the concept of public governance has not gone unaffected. It too has seen a fundamental shift in the concept both in the manner and method by which the e-governance initiatives are being implemented at the central,

state and local government levels through various PPP's. This new practice of public administration has developed into the concept of EG. It helps simplify processes and makes access to government information more easy for public sector agencies and citizens.

4.2 History of e-governance

Recognizing the increasing importance of electronics, the GoI established the Department of Electronics in 1970. The subsequent establishment of the NIC ^[9] in 1977 was the first major step towards e-governance in India as it brought 'information' and its communication to focus. In the early 1980s, the use of computers was confined to very few organizations. The advent of personal computers brought the storage, retrieval and processing capacities of computers to government offices. By the late 1980s, a large number of government officers had computers but they were mostly used for 'word processing'. Gradually, with the introduction of better software, computers were put to other uses like managing databases and processing information. Advances in communications technology further improved the versatility and reach of computers, and many government departments started using ICT for a number of applications like tracking the movement of papers and files, monitoring of development programmes, processing of employees' pay rolls, generation of reports etc. The main thrust for e-governance was provided by the launching of NICNET in 1987 – the national satellite-based computer network. This was followed by the launch of the District Information System programme of the National Informatics Centre (DISNIC) to computerize all district offices in the country for which free hardware and software was offered to the State Governments.

The concept of e-governance has its origins in India during the seventies with a focus on the development of in-house government applications in the areas of defense, economic monitoring, planning and the deployment of IT to manage data intensive functions related to elections, census, tax administration etc. The efforts of the NIC to connect all the district headquarters during the eighties was a very significant development. From the early nineties, IT technologies were supplemented by ICT technologies to extend its use for wider sectoral applications with policy emphasis on reaching out to rural areas and taking in greater inputs from NGOs and the private sector as well. There has been an increasing involvement of international donor

agencies under the framework of ‘e-governance for development’ to catalyze the development of e-governance laws and technologies in developing countries.

e-governance in India has reached the ‘transactional’ stage and provides various services to citizens and business and government organizations and is dispensed by central government agencies and different state government departments. The National e-Governance Plan ^[10] (NeGP), initiated in 2006, attempts to make all Government services accessible to the common man in his locality, through CSCs being set up across India. As on April 2011, about 94,786 CSCs were operational with different brand names and delivering services to the people. The rural landscape in India is set to take advantage of the flourishing ICT initiatives, through various institutions, more specifically the CSCs. They will offer services in local languages that make a difference in the lives of the rural people. The major focus of e-governance in the www.indg.in portal is to support the ongoing e-governance movement in India by providing a one stop information access to available online citizen services, to state specific e-governance initiatives and to build awareness about online legal services, mobile governance, RTI etc.

4.3 Role of ICT in e-governance

e-governance is the application of ICT for delivering government services, exchange of information, communication transactions, integration of various stand-alone systems and services between G2C, G2B as well as back office processes and interactions within the entire government frame work. e-governance promotes more efficient and effective government, facilitates more accessible government services, allows greater public access to information, and makes government more accountable to citizens. e-government ^[7] has emerged beyond electronic service delivery and is a part of the ongoing reform and transformation of government enabling participatory governance and partnerships to improve efficiency and effectiveness. ICTs are effectively throwing up new dimensions to old institutional setups. ICT ^[4] plays a critical role in sustainable human development and poverty eradication. It is a powerful enabler of development goals because of the way in which it improves communication and the exchange of knowledge and information necessary for development processes. ICTs also play a critical role in speeding up the flow of

information and knowledge between government and citizens and transforming the way in which governments and citizens interact. Governments in many parts of the world have made huge ICT investments aimed at improving governance processes. It goes without saying that the impact of ICT on institutional changes is fast spreading across the boundaries of social and political arrangements of societies. e-governance is regarded as the ICT-enabled route ^[1] to achieving good governance since it integrates people, processes, information, and technology in the service of governance initiatives. The expected benefits of such public sector reforms have been identified as an increase in the efficiency of government operations by strengthening democracy, enhancing transparency, and providing better services to citizens and businesses.

Through e-governance, government services will be made available to citizens in a convenient, efficient and transparent manner. The government being the service provider, it is important to motivate the employees to deliver the services through ICT. To achieve this, government employees are being trained on technology and have started realizing the advantage of ICT. The aim is to make them thorough with e-governance applications and responsive to technology driven administration. ICT is the biggest enabler of change and process reforms with minimum resistance. Decades of attempts to reform government and its processes fade in the face of what ICT has achieved in few years. People did not so readily accept process change but in the name of ICT they do. The main role of ICT for governance is as follows

- Improve the quality of governance products and services being currently provided
- Provide new governance services and products
- Enhance the participation of the people in the choice & provision of governance products & services
- Bring new sections of society under the governance sphere including those who are most likely to remain excluded - namely the poor, the illiterate, the differently abled, the indigenous people, the migrants and displaced people

ICT is an instrument to enable and empower government to reform citizenry. e-governance is about transforming government to be more citizen-centered ^[8] through

IT, e-governance and ICT are seen as elements of a larger government modernization program. Success of e-governance depends on how government works, how it deals with information and how officials view their jobs and interact with the public. Achieving e-governance success requires active partnerships between government, citizens and the private sector. Leaders should also think about how to harness technology to achieve their objectives for reform.

4.4 Backbone of e-governance: Good governance

The concept of good governance has also emerged from the felt need called New Public Management which began in the early 1980s, to improve public service efficiency. The core values around which new public management works are economy, efficiency and effectiveness. e-governance making use of ICT for better government functioning, is a tool for achieving good governance. Good governance requires a long-term, strategic approach evolved through a consensus process. It also requires a long-term perspective on what is needed for sustainable human development. This can only result from an understanding of the social context of a given society or community. e-governance connects the citizen and government with ease and speed and hence has a pivotal role in the governance agenda.

Good governance has 8 major characteristics. It includes participatory, consensus oriented, accountable, transparent, responsive, effective and efficient, equitable and inclusive services ^[5] and follows the rule of law. It ensures that corruption is minimized and transparency is maximized, that views of minorities are taken into account and that the voices of the most vulnerable in society are heard in decision-making. It is also responsive to the present and future needs of society. Good governance is considered the single-most important factor for national development and poverty alleviation. It is based on certain key characteristics which are presented below.

- **Participation:** Participation by both men and women is the key cornerstone of good governance and it could be either direct or through legitimate intermediate institutions or representatives. Participation needs to be informed and organized. This means freedom of association and expression on the one hand and an organized civil society on the other.

- **Rule of law:** Good governance requires fair legal frameworks that are enforced impartially. It also requires full protection of human rights, particularly those of minorities. Impartial enforcement of laws requires an independent judiciary and an impartial and incorruptible police force.
- **Transparency:** Transparency means that when decisions are taken their enforcement is done in a manner that follows rules and regulations. It also means that information is freely available and directly accessible to those who will be affected by such decisions and their enforcement. It also means that enough information is provided and that it is provided in easily understandable forms and media.
- **Responsiveness:** Good governance requires that institutions and processes try to serve all stakeholders within a reasonable timeframe.
- **Consensus oriented:** There are several actors and as many view points in a given society. Good governance requires mediation of the different interests in society to reach a broad consensus on what is in the best interests of the whole community and how this can be achieved. It also requires a broad and long-term perspective on what is needed for sustainable human development and how to achieve the goals of such development. This can only result from an understanding of the historical, cultural and social contexts of a given society or community.
- **Equity and inclusiveness:** A society's well being depends on ensuring that all its members feel that they have a stake in it and do not feel excluded from the mainstream of society. This requires all groups, but particularly the most vulnerable, to have opportunities to improve or maintain their well being.
- **Effectiveness and efficiency:** Good governance means that processes and institutions produce results that meet the needs of society while making the best use of resources at their disposal. The concept of efficiency in the context of good governance also covers the sustainable use of natural resources and the protection of the environment.
- **Accountability:** Accountability is a key requirement of good governance. Not only must governmental institutions be accountable to the public but also private sector and civil society organizations must be accountable to their institutional stakeholders. Who is accountable to whom varies on whether

decisions or actions taken are internal or external to an organization or institution. In general an organization or an institution is accountable to those who will be affected by its decisions or actions. Accountability cannot be enforced without transparency and the rule of law.

4.5 e-governance Maturity Model

e-government applications and projects ^[16] generally pass through various stages such as publishing of information on the web to carrying out transactions and even complete process re-engineering so as to bring in the true value and benefits of the efforts to the citizens. Gartner, an international e-business research consultancy firm, has formulated a four-phase e-governance model which can serve as a reference for governments to position where a project would fit in the overall evolution of an e-government strategy. In each of the four phases, the delivery of online services and use of ICTs in government operations serve one or more of the aspects of e-government: democracy, government, business. In most cases, governments start with the delivery of online information, but soon public demand and internal efficiency ask for more complex services. Of course this change will take effect gradually; some services will be online earlier than other services. In some cases the public demand is the driving force; in other cases cost saving aspects for the government lead the change. According to Gartner the e-governance four-phase maturity model is as follows

Early 90's	Information	→ Presence
Mid 90's	Interaction	→ Intake process
Present	Transaction	→ Complete transaction
Future changes	Transformation	→ Integration and organizational

In each of the four phases, the delivery of online services and use of ICTs in government operations serve one or more of the aspects of e-governance.

Phase I: Information

In the first phase, Information, e-governance means being present on the website, providing the relevant information to the G2C and G2B. This phase entails usage of

ICT to expand access to government information which is of importance to individuals and businesses. An efficient utilization of internet and communication technologies makes it possible to disseminate government information to a global audience in a fast and convenient manner. Although, the ways and means of disseminating this information keep on evolving further with the advancements in technology, an ideal way for a developing nation to enter this phase would be to set up a National Portal. This would provide a ready and comprehensive access to information online, ranging from Profile of the Nation, Parliament, Constitution, Executive and Judiciary to government publications, government services and government schemes for citizens and businesses. Setting up a National Portal will enable citizens and businesses to readily access government information without having to travel to government offices, stand in long queues or resort to malpractices to get the task done. This simple initiative can prove to be a revolutionary advancement for nations wrecked by complex bureaucracy and corruption. Some noteworthy examples of this stage with their portals include the UK Government's 'DirectGov' initiative, <http://www.direct.gov.uk/Homepage/fs/en>, 'Firstgov' portal of the US federal government, <http://www.firstgov.gov>, Singapore government's, <http://www.gov.sg>, Canadian government's national portal, <http://www.canada.gc.ca>, the Indian government's 'India Image' portal, <http://indiaimage.gov.in> and the New Zealand government's, <http://www.govt.nz>.

Phase II: Interaction

The second phase pertains to enhancing public involvement in the process of government functioning. Through the use of technology, the interaction between the governments and citizens/businesses can be stimulated and made more effective. People can submit their queries and grievances through email or specially designed forms, check the status of their grievance, voice their opinion and help in policy formulation on important issues through online opinion polls and discussion forums and avail a whole range of online services. This not only raises the trust level of citizens in the government but also saves a lot of time by providing services on a 24*7 basis which would otherwise have been done over the conventional 'counters' only during the working hours of the government. Good examples of this phase include the websites of the Department of Administrative Reforms & Public Grievances of GoI,

the passport information portal of India and some Indian state government portals such as AP and Haryana.

Phase III: Transaction

While in the Interaction phase, the citizen is able to exchange information online and get details of the procedures involved. When it comes to actually conducting the transaction, he/she has to resort to conventional means. However, in Phase 3, this situation is amended and this phase involves establishing websites and other applications that allow users to conduct transactions online. In other words, the user is able to avail the service online in the complete sense. Online monetary transactions and payments is a crucial component of this phase since the citizen can carry out the transaction without having to even visit the government office. This phase demonstrates the advancements of technologies such as digital certificates and payment gateways and results in long term cost saving and improvement in productivity. Services such as online booking and payment of travel tickets, payment of taxes, land registration, renewal of identity cards and payment of utility bills etc. which require monetary transactions can be effectively provided in this phase through citizen kiosks and web-enabled applications. The examples of this phase include projects such as the e-Sampark System, Chandigarh-India and the e-Seva project of the AP government, India.

Phase IV: Transformation

This phase alludes to the stage where the government has gone through the full transformation process and all citizen services are being made available online through a single 'virtual' counter round the clock. In other words, in this stage the capacity to instantly access any service in a 'unified package' is provided to the citizen. Ministerial/departmental/agency lines of demarcation are removed and services are clustered along common needs. Providing such fully integrated services will require broad organizational changes, aligning the organizational setup with new capacities and integrating the back-end operations and infrastructure. Since various countries are at different levels of maturity in terms of resources and infrastructure, the adoption of e-government also has to be viewed in the form of different phases of maturity.

4.6 National e-governance Plan (NeGP)

The NeGP is an enormous step towards making the government accessible to citizens, in ways that not only save huge costs to the government but also make it more transparent and efficient in its day-to-day interactions with the common man. To that effect, the role of the common services centers, envisaged as the front-end delivery network for government services assumes great significance. Over the years, a large number of initiatives have been undertaken by various state governments and central ministries to usher in an era of e-government. Sustained efforts have been made at multiple levels to improve the delivery of public services and simplify the process of accessing them. NeGP takes a holistic view of e-governance initiatives across the country, integrating them into a collective vision, a shared cause. Around this idea, a massive countrywide infrastructure is evolving reaching down to the remotest of villages, and large-scale digitization of records is taking place to enable easy, reliable access over the internet. The ultimate objective is to bring public services closer home to citizens, as articulated in the vision statement of NeGP. The government approved the National e-governance Plan ^[11] comprising of 27 MMPs and 8 components, on May 18, 2006. The government has accorded approval to the vision, approach, strategy, key components, implementation methodology, and management structure for NeGP. The existing or ongoing projects in the MMP category, being implemented by various Central Ministries, States, and State Departments would be suitably augmented and enhanced to align with the objectives of the NeGP.

4.6.1 Vision of NeGP

The National e-Governance Plan has been launched with the aim of improving delivery of government services to citizens and businesses and is guided by its vision. The vision statement clearly underlines accessibility, common service delivery outlets and successful implementation of e-governance applications by improving quality to satisfy its citizens. The vision has been designed keeping the rural population in mind. The need is to reach those sections of the society which have remained tangential to the government sphere due to various reasons like geographical challenges and lack of awareness. At present, citizens especially those living in remote rural areas have to travel long distances to avail a service through a government department or its local

offices. This is a time-consuming and costly affair for the common man. To overcome this problem, as part of the NeGP, one computer and internet enabled CSC is envisaged to be set up for every six villages so that villagers can easily avail these services. These CSCs are envisaged to offer online integrated service delivery on ‘Anytime, Anywhere’ basis. The use of ICT will enable the government to reach citizens thereby improving governance. This will also enable an improvement in the monitoring and implementing of various government schemes thereby increasing the accountability and transparency in government. e-governance helps in attaining this vision through the provision of citizen centric service delivery at nominal cost, and thereby providing better turnaround times and convenience in demanding and availing services.

Hence, the vision is to use e-governance as the route for governments to strengthen good governance. All services provided through the various e-governance initiatives are expected to assist the government at the Central and State levels in reaching the yet ‘unreached’ citizenry and enable the involvement and empowerment of marginalized groups through their participation in the government processes thereby contributing towards poverty reduction and bridging the sharp social and economic divide.

4.6.2 National e-governance Model

The Government of India has taken a pro-active role to provide e-enabled services to citizens through e-governance. GoI has also come up with a similar model like Gartner’s for its e-governance initiative. According to the NeGP, the e-governance model adopted by GoI is as follows



Fig 4.1 e-governance model adopted by Government of India

In the first stage, information is collected and is made available to citizens in the form of websites; this information is collected regularly and updated. Then comes the communication stage, that is, citizens will be able to download forms, contact officials and make appointments and requests online which previously would have been only possible with long queues near counters. Internally the government organizations can use LAN, WAN, intranet and e-mail to exchange information. The third stage is the transaction stage where citizens can do transactions with the government online, that is pay bills, reserve tickets online, finalizes decisions etc., without going to government offices. The fourth and final stage is the integrated stage where a total seamless integration of e-functions and services across administrative and departmental boundaries takes place. Now the citizen can interact with the government at a single point and can transact with the government. Currently India is somewhere between Stage 2 and Stage 3, that is, some government transactions can be done online and most information about different departments is available online for citizens.

All the information regarding the government and its transactions is available on a central portal called “The e-India portal”. This portal is internally connected to different Government of India portals and different state portals. All transactions related to G2G, G2C and G2B take place through this portal. This portal is connected through the Internet, LAN, WAN and Intranet for government organizations. The connectivity will be through the internet, mobile telephone networks, wireless networks, home PCs, integrated CSCs, kiosks and DTVs for citizens and businesses.

4.6.3 Implementation Strategy for NeGP

A prudent approach therefore is proposed for the NeGP is based on lessons learnt from the past and the experiences of successful e-governance applications that have been implemented nationally and internationally. The approach and methodology adopted for NeGP contains the following elements:

- **Common Infrastructure:** NeGP implementation involves setting up of common and support IT infrastructure such as: SWAN, SDC, CSC and NSDG.

- **Governance:** Suitable arrangements for monitoring and coordinating the implementation of NeGP under the direction of competent authorities have been set up. The programme also involves evolving/ laying down standards and policy guidelines, providing technical support, undertaking capacity building, research and development etc. DIT strengthens itself and various institutions like NIC, Standardization, Testing and Quality Certification (STQC), Centre for Development of Advanced Computing (C-DAC), National Institute for Smart Governance (NISG) etc., to play these roles effectively.
- **Centralized Initiative, Decentralized Implementation:** e-governance is being promoted through a centralized initiative to the extent necessary to ensure citizen-centric orientation, to realize the objective of inter-operability of various e-Governance applications and to ensure optimal utilization of ICT infrastructure and resources while allowing for a decentralized implementation model. It also aims at identifying successful projects and replicating them with required customization wherever needed.
- **Public-Private Partnerships model:** It has to be adopted wherever feasible to enlarge the resource pool without compromising on the security aspects.
- **Integrative elements:** Adoption of unique identification codes for citizens, businesses and property is to be promoted to facilitate integration and avoid ambiguity.

4.6.4 Mission Mode Project (MMP)

The National e-governance Plan of the Indian government seeks to lay the foundation and provide the impetus for the long-term growth of e-governance within the country. The plans seeks to create the right governance and institutional mechanisms, set up the core infrastructure and policies and implement a number of Mission Mode Projects ^[12] at the center, state and integrated service levels to create a citizen-centric and business-centric environment for governance. "Mission Mode" implies that the objective and the scope of the project are clearly defined, that the project has measurable outcomes and service-levels, and that the project has well-defined milestones and timelines for implementation. MMPs are owned and spearheaded by various line ministries concerned with central, state, and integrated MMPs. The concerned ministry/department is entirely responsible for all decisions related to their MMPs. However, decisions impacting NeGP as a whole are taken in consultation with

DIT. Additionally, wherever required by the concerned Ministries/ Departments, DIT provides the necessary support for project formulation and development. Every state has the flexibility of identifying up to 5 additional state-specific MMPs. In cases where central assistance is required, such inclusions are considered on the advice of the concerned line ministries/ departments. The following Table No.4.1 shows some core projects of MMP in various sectors.

Table No.4.1 Mission Mode Projects: The Core Projects

Central MMPs	State MMPs	Integrated MMPs
Banking	Agriculture	CSC
Central Excise & Customs	Commercial Taxes	e-Biz
Income Tax (IT)	e-District	e-Courts
Insurance	Employment Exchange	e-Procurement
MCA21	Land Records	EDI for Trade
National Citizens Database	Municipalities	National e-governance service delivery gateway
Passport	Gram Panchayats	India Portal
Immigration, Visa and Foreigners' Registration & Tracking	Police	
Pension	Road Transport	
e-Office	Treasuries	

4.7 Infrastructure of e-governance

Seventy percent of India's population lives in rural areas, which are underdeveloped in terms of infrastructure. Over the last decade, GoI has taken multiple e-governance initiatives to remove the long-existing digital divide. The NeGP of the GoI very clearly lays out the guidelines for the roll out of such networks. The government's e-governance initiatives allows the State to provide various G2C services and provides a unified communication network to all government offices across the country. Tulip [13] has been a preferred government partner for many years now and has completed a large number of projects in the public sector. Tulip has completed various IT projects with the central and state government institutions. The project has received various

national and international accolades, and has become the role model for network deployment in rural areas. A common digital service delivery infrastructure consisting of the SWAN, SDC, NSDG/SSDG, CSC is being created in every State and Union Territory to ensure a seamless and single-window delivery of public services to the common man.

4.7.1 State Wide Area Network (SWAN)

State Wide Area Network is an advanced telecommunication infrastructure, which is used extensively nowadays, for an exchange of data and other types of information between two or more locations, separated by significant geographical distances. The medium of connectivity can be copper, optical fiber cable or wireless, whichever is feasible. Such wide area networks, in a way, create a highway for electronic transfer of information in the form of voice, video and data. DIT in GoI is implementing an approved scheme known as SWAN scheme, envisaged to create such a connectivity in each State / UT, to bring speed, efficiency, reliability and accountability in the overall system of G2G functioning. SWAN is designed to cater to the governance information and communication requirements of all the State / UT Departments.

4.7.2 State Data Center (SDC)

State Data Centre has been identified as one of the important elements of the core infrastructure for supporting e-governance initiatives of NeGP. Under NeGP, an SDC will be created for the states to consolidate services, applications and infrastructure to provide efficient electronic delivery of G2G, G2C and G2B services. These services can be rendered by the states through a common delivery platform seamlessly supported by core connectivity infrastructure such as SWAN and CSC connectivity extended up to the village level. SDC provides many functionalities and some of the key functionalities are Central Repository of the State, Secure Data Storage, Online Delivery of Services, Citizen Information/Services Portal, State Intranet Portal, Disaster Recovery, Remote Management and Service Integration etc. SDCs would also provide better operation & management control and minimize the overall cost of Data Management, IT Resource Management, Deployment and other costs.

4.7.3 National e-governance Service Delivery Gateway (NSDG)

The NeGP of the GoI aims to cooperate, collaborate and integrate information across different departments in the Centre, States and Local Government. Government systems are characterized by islands of legacy systems using heterogeneous platforms and technologies. These are spread across diverse geographical locations, in varying states of automation, making this task very challenging. The NSDG, an integrated MMP under the NeGP, can simplify the above task by acting as a standards-based messaging switch and providing seamless inter-operability and exchange of data across the departments. NSDG acting as a nerve centre, would handle a large number of transactions and would help in tracking and time stamping all transactions of the government. The NSDG is an attempt to reduce such point to point connections between departments and provide a standardized interfacing, messaging and routing switch through which various players such as departments, front-end service access providers and back-end service providers can make their applications and data inter-operable. The NSDG aims to achieve a high order of inter-operability among autonomous and heterogeneous entities in the centre, states or local bodies of government.

4.7.4 Common Services Centers (CSC)

The CSC is a strategic cornerstone of the NeGP, as part of its commitment in the National Common Minimum Programme to introduce e-governance on a massive scale. The CSCs would provide high quality and cost-effective video, voice and data content and services, in the areas of e-governance, education, health, telemedicine, entertainment as well as other private services. A highlight of the CSCs is that it will offer web-enabled e-governance services in rural areas, including application forms, certificates, and utility payments such as electricity, telephone and water bills. The scheme creates a conducive environment for the private sector and NGOs to play an active role in the implementation of the CSC Scheme, thereby becoming a partner of the government in the development of rural India. The PPP model of the CSC scheme envisages a 3-tier structure consisting of the CSC operator called Village Level Entrepreneur (VLE), the Service Centre Agency (SCA) that will be responsible for a division of 500-1000 CSCs and a State Designated Agency (SDA) identified by the state government responsible for managing the implementation over the entire state.

4.8 e- Readiness of e-governance

The concept of e-governance has its origins in India during the seventies with a focus on the development of in-house government applications in the areas of defense, economic monitoring, planning and the deployment of IT to manage data intensive functions related to elections, census, tax administration, passports etc. e-Readiness is the ability to use ICT to develop one's economy and to foster one's welfare. Each year, in cooperation with the IBM Institute for Business Value, the Economist Intelligence Unit produces a ranking of e-Readiness across countries, based on six pillars of e-readiness: connectivity & technology infrastructure, business environment, social & cultural environment, legal environment, government policy & vision and consumer & business adoption. e-Readiness indices at the macro level are constructed primarily for ranking countries and facilitating comparisons between countries over time. They are also used to track the global digital divide, i.e. the gap between countries that have access to ICT.

The United Nations e-Government Survey ^[2] 2010 finds that citizens are benefiting from a more advanced e-service delivery, better access to information, more efficient government management and improved interactions with governments, primarily as a result of an increasing use by the public sector of information and communications technology. Most countries have published a tremendous amount of information online, many going beyond basic websites to provide national portals that serve as a major starting point for users to connect to government services in different ministries. At the same time, many developing countries need to devote additional energy to transactional services as well as to the electronic means of engaging citizens in public consultation and decision making. The following Table No.4.2 shows the Economist Intelligence Unit e-readiness rankings in 2010 ^[14]. It includes the ranks of the first 10 countries and other selected countries. Sweden is first with an e-Readiness score of 8.49 out of 10 and India is 58th position with an e-Readiness score of 4.11.

Table No. 4.2: Economist Intelligence Unit e-readiness rankings in 2010 of selected countries

Rank	Country	e-readiness Score (Out of 10)
1	Sweden	8.49
2	Denmark	8.41
3	United States	8.41
4	Finland	8.36
5	Netherlands	8.36
6	Norway	8.24
7	Hong Kong	8.22
8	Singapore	8.22
9	Australia	8.21
10	New Zealand	8.07
13	South Korea	7.94
17	Ireland	7.82
22	Bermuda	7.47
26	Israel	6.96
39	Poland	5.70
49	Thailand	4.86
54	Philippines	4.47
58	India	4.11
63	Sri Lanka	3.81
68	Iran	3.24

Source: Economist Intelligence Unit, 2010.

4.9 Challenges of e-governance in India

Implementation of e-governance has changed the way of living of the people in many countries. The GoI has embraced e-governance as a trigger and means to redefine and streamline outdated, inefficient processes and procedures while simultaneously exploiting the full power of modern ICT. The aim is to provide citizens with easier and faster access to government services. India has recognized the benefits of e-governance and through it, ushered in a paradigm of citizen-centric service delivery.

e-governance is reforming the way government manages and shares information with external and internal clients. Specifically, it harnesses ICT to transform relations with citizens, businesses and the various arms of government. There are however, numerous challenges. Some of the key areas needing attention are as follows:-

- **Clarity in objective setting:** Project approval and funding of projects through multiple departmental budgets lead to wide variations in the approach to project objective setting, without a clear focus on outcomes or on building sustainable services. The service needs of citizens/ businesses and those of other departments are often either overlooked or accorded lower priority in relation to internal needs. Very often, objective setting is purely in ICT terms such as computers, networks and so on which are specified in great detail, while government business process outcomes are either not defined or are defined in vague terms that do not lend themselves to measurement post implementation.
- **Ensuring service delivery:** e-governance projects have primarily focused on internal process automation and generally are hardware and infrastructure driven with little focus on citizen service delivery or outcomes.
- **Awareness:** There is a general lack of awareness regarding benefits of e-governance as well as the process involved in implementing successful G2C, G2B and G2G projects. The administrative structure is not geared for maintaining, storing and retrieving governance information electronically. The general tendency is to obtain the data from the files as and when required rather than using document management and workflow technologies.
- **Awareness of government officials about ICT:** More than anything else, it is the mindset of government officials that poses the biggest bottleneck to e-government. There are a number of reasons why they resist the use of computers beyond the usual typing of letters and documents. The primary reasons are that they are resistant to any kind of change in their familiar working environment; they fear that computerization of different government activities may make some people redundant and think that computers are meant for low-level typist kind of work.

- **Public Awareness about ICTs:** Although there is much hype about IT among the younger generation, there is not a high level of awareness among the general public about how ICTs may be useful to their lives. Also, there is a cultural inhibition about the use of PCs in this country. From a cultural context, people are generally not familiar with the concept of using computers. ICTs are still generally perceived as catering to the rich and the elite. As a result, there is no demand or pressure from the public for service delivery through the use of ICTs.
- **Non-acceptability of IT systems:** It is often seen that even after an IT system is implemented in a government office, it becomes hard for government officials to convince themselves to use it. Besides the general lack of awareness about ICTs and the fears discussed earlier, some other factors also play a part in the non-acceptability of IT systems. They fear that important data may get lost or they are doubtful about the security features of computers.
- **Leveraging Private Capital:** The experience of successful e-governance initiatives indicates that well structured service-oriented projects can attract private capital linked to explicit service-linked revenues from users or from government. The current system of project formulation i.e. based on budgetary allocation / grants places little or no pressure on departments to develop project structures that can attract private capital, a goal that necessitates additional rigor and complexity at the project formulation and development stage.
- **Resistance to re-engineering of departmental processes:** Successful implementation of e-governance projects requires a lot of restructuring in the administrative processes and redefining of administrative procedures and formats. This meets with resistance in almost all departments at all levels. Additionally there is a lack of expertise among departmental MIS executives in exploiting data mining techniques, updating of and collection of real time content in the website etc. Therefore the content collected or maintained by various e-governance portals is unreliable or full of gaps. In such a scenario, it is difficult for any e-governance solution to achieve its intended results. Hence, it is essential to undertake process re-engineering as an integral part of

e-governance project implementation in order to ensure increased efficiency and reduced costs.

- **Standardization:** A departmental approach and the absence of a national framework for common standards has resulted in the adoption of different technical standards and varied architectures. This has significant implications for designing effective integrated applications and also entails long-term costs and sub-optimal results.
- **Independent Impact Assessment:** In the current system, there is no requirement or institutional mechanism for an independent assessment of projects post-implementation to determine whether they have achieved the set objectives, except in purely financial terms. Further, very few projects have formal performance metrics defined at the start of the project to measure outcomes.
- **Localization/Multi-language support:** e-governance has an impact only when the services to citizens are made available in their respective language. However, this is a challenge that needs to be addressed by formulating clear standards and guidelines with respect to the fonts, storage, input etc. ICT solutions were mostly developed with an English language interface. However, in India vast majorities (95 percent) of the citizens do not know English and use the local language. The fact is that India has 22 official languages; for the success of e-governance, this reality needs to be reflected in the implementation strategy.
- **Internal Capacity/Project Management Expertise:** Departments/ states have limited access to any institutional mechanisms for building capacities in the areas of e-governance project development and design, bid process management, professional project management, development of contractual frameworks and service level agreements.
- **Underutilization of existing ICT infrastructure:** To a larger extent, the computers in the department are used for the purpose of word processing only, resulting in the under-utilization of the computers in terms of their use in data mining for supporting management decisions. The time gap between the procurement of the hardware and development of the custom applications is so

large that by the time the application is ready for use, the hardware becomes obsolete.

- **Lack of coordination between the government department and solution developers:** Designing of any application requires a very close interaction between the government department and the agency developing the solutions. At present the users in the government departments do not contribute enough to design the solution architecture. Consequently the solutions developed and implemented do not address the requirements of an e-governance project and hence do not get implemented.
- **Lack of infrastructure for sustaining e-governance projects on a national level:** Infrastructure to support e-governance initiatives does not exist within government departments. The agony is that government departments are not equipped to be in a position to project clear requirements nor are there any guidelines for involving the private sector. Whatever efforts have been made by various government organizations may be defined as islands of computerization. The infrastructure creation is not guided by a uniform national policy, but is dependent on the needs of individual officers championing a few projects. Therefore, the required networking and communication equipment is either nonexistent in government departments, or if it exists at all, it does not serve any tangible purpose as far as the requirement of a e-governance project is concerned. The use of connectivity options provided by government agencies like NICNET etc. are used in a very limited manner for the purpose of data transmission between various locations viz. district, state, center etc. and are mainly utilized for e-mail and internet purposes only.
- **Sharing of data across various e-governance implementations:** One of the key benefits that a citizen is looking at from e-governance initiatives is a single window access to various government services no matter which department is responsible for giving the service. To achieve this, there is a need to be able to seamlessly share data across the applications.
- **Security Issues:** While there are clear standards like ISO 27001 and ISO 20000 for IT securities and IT service management which are presently being used by various e-governance applications, it has been seen however, that the

concerns of the respective departments with regard to data and application security and control are still not adequately addressed. The reasons include the lack of adequate knowledge and understanding of the various management controls on these standards by the departments. Policies like access control and security are not made very comprehensive, and the controls in international standards need to be made more prescriptive for our requirements. The RFP should also highlight the concerns of the government department with respect to the requisite strategic controls clearly.

- **Lack of adequate training programs:** Many e-government or computerization projects suffer gravely from a lack of adequate training programs. Training is of vital necessity in familiarizing users with computers and overcoming their fears. Some officials go through unplanned 'IT Training', often in another country, and then come back not getting any scope for utilizing their newly gathered knowledge of IT and forgetting it all in due time. The training programs are mostly not need-based. They are arranged at arbitrary periods, and not during the implementation phase of an e-government project.
- **Lack of reliable maintenance:** Another significant problem is that generally there is no in-house maintenance personnel. It is of vital necessity that computers get fixed as soon as they malfunction or users very easily lose confidence in the IT systems. Most offices have contracts with local hardware companies for maintenance, but their services are often not immediate.

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E-Governance: Past, Present and Future in India

Nikita Yadav

Research Scholar, Singhania University,
Pacheri Bari, Rajasthan

V. B. Singh

Delhi College of Arts & Commerce, University of
Delhi, Delhi

ABSTRACT

Online working of a government or providing its services online to its citizens at their door step is known as E-Governance. E-Governance is E-Commerce technology means online availability of government services. The technology and the methods used in E-Governance project provide a roadmap for efficient delivery of services at the door step. In today's time the development of any country depends on the uses of E-Governance and also their penetration. Development of any country can be judge by the scope of E-Governance in that country. Moreover, today's government has also full faith in E-Governance and its widespread network across the world proves it. Due to widespread demand of E-governance and exponentially increasing size of data, new technologies like Open source solutions and cloud computing need to be incorporated. In this paper, the latest trends of technology that the government of most of the country has adopted have been discussed. While working on this project we have concluded that E-Governance has made the working of government more efficient and more transparent to its citizens We have also presented an exhaustive list of E-Governance projects which is currently being used in India and in international scenario. We have provided a mechanism for improving E-Governance by including technologies such as Open Source and Cloud Computing.

General Terms

Information Technology

Keywords

E-governance, cloud computing, open source software.

1. INTRODUCTION

Today's is the world of change and revolution. Things which are not dynamic are considered as mortal. The rise of e-government has been one of the most striking developments of the web Global shifts towards increased deployment of IT by governments emerged in the nineties, with the advent of the World Wide Web. The technology as well as e-governance initiatives have come a long way since then. Recognizing the increasing importance of electronics, the Government of India established the Department of Electronics in 1970.[7] The subsequent establishment of the National Informatics centre (NIc) in 1977 was the first major step towards e-Governance in India as it brought 'information' and its communication in focus. However, the main thrust for e-Governance was provided by the launching of NIcNET in 1987 – the national satellite-based computer network. This was followed by the launch of the District Information System of the National Informatics centre (DISNIc) program to computerize all district offices in the

Country for which free hardware and software was offered to the State Governments. NIcNET was extended via the State capitals to all district headquarters by 1990 [7].

E-Governance was started in India by AHSAYA in Kerala. This project involves setting up around 5000 multipurpose community technology centers called Akshaya e- Kendra's across Kerala. Run by private entrepreneurs, each e-Kendra set up within 2-3 kilometers of every household, will cater to the requirements of around 1000-3000 families to make available the power of networking and connectivity to common man. Akshaya is a social and economic catalyst focusing on the various facets of e-learning, e-transaction, e-governance, information and communication.

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. Below following countries with their respective projects has been described:-

USA: On July 18, 2001 Task Force to identify priority actions that achieve strategic improvements in government and set in motion a transformation of government around citizen needs was done [10].

Various projects:-

1. Recreation One Stop: - This project was started on 31 April 2002. It aimed to:-
 - Agreement with private sector reached on implementation of new recreation online projects.
 - Additional recreation projects available online.
2. EZ Tax filling:-This project was started on 31 April, 2002. It aimed to:-
 - Filling and refunding of taxes online.
 - Initial deployment of industry partnership free e-filling solution for 2003season.
3. Federal Assets Sales:-started on 31 March, 2003. It aimed to:-
 - Develop pilot business integration
 - Re-host federal sales.
4. E-Payroll/HR: - started on 31 March, 2002. Aimed to:-
 - complete and submit business case to PMC
 - integrated enterprise architecture

5. E-Authentication: - started on 1 July, 2002. Aimed at:-

- Initial authentication gateway prototype
- Full deployment

UK: In April 2000, the cabinet Office in the UK came out with the document 'E-Government: A Strategic Framework for Public Services in the Information Age' [9].

Various projects:-

1. Cornwall Electronic Health Record Pilot: - this project was started in April 2000[11]. It aimed to:-

- Pan-community EHR demonstrator
- Connect all General Practitioners to NHSnet (national-level NHS Virtual Private Network or intranet)
- 24 hour emergency care record
- Common information architecture
- Condition-specific care modules – mental health, coronary heart disease, diabetic care

2. Go-between Project: - this project is for Calne Community Area in Wiltshire. This project is designed to assist a local rural community organize its transport services by identifying unmet local demand and matching it with spare capacity [12]

3. Plymouth Bus Project:-Commissioned by Plymouth City Council to undertake a comprehensive study of the bus network and propose initiatives for its future development and investment. (Completed in January 2009) [12]

4. Integrating Transport:-Started in South West Hertfordshire. Lead consultant on a project commissioned by Watford Borough Council. Preparation of a sustainable transport strategy for implementation over the next ten years. (Completed October 2008)[12]

New Zealand

In May 2000, Realising the importance of opportunities offered by ICT, the New Zealand Government came out with its e-government vision document and an 'E-Government Unit' was established by the State Services commission

Various projects:-

The Treaty of Wetangi: It is the founding document of New Zealand. This website, launched in 2003, to provide information and resources for an informed understanding and greater public knowledge of the treaty[13].

As people's want advancement in their lifestyle same they want in their government. Success or failure of any government depends on three things:

- The way the government works.
- Transparency in its working and information.
- Communication to its citizen.

In developing countries, Government beneficiary scheme can be reached to the lowest pyramid of society efficiently by implementing E-Governance projects. It can bridge the gap between rich and poor. Rest of the paper is organized as follows. Section 1.1 and 1.2 of the paper describes about E-Governance. Applications of E-Governance and challenges in implementing E-Governance have been described in section 2, 3, 4 and 5. In section 6; future technologies for e-governance are described.

1.1 E-Governance: Use of internet by the government to provide its services at the door step of customers, business and other stakeholder.

In E-Governance, government makes best possible use of internet technology to communicate and provide information to common peoples and businessman. Today, electricity, water, phone and all kinds of bills can be paid over the internet. All this is what government and citizens is using and doing. All are dependent on internet and when citizens depends on government internet services all that come is E-Governance.

There are four pillars of E-Governance:-

1. **CONNECTIVITY:-**Connectivity is required to connect the people to the services of the government. There should be a strong connectivity for an effective e-governance.
2. **KNOWLEDGE:** - Here knowledge refers to IT knowledge. Government should employ skill full engineers who can handle the e-governance in an efficient way. These engineers also handle all kind of fault that may occur during the working of e-governance.
3. **DATA CONTENT:** - To share any kind of knowledge or information over the internet, there should be its database. This database should have the data content which is related to government services.
4. **CAPITAL:-**Capital can be on public or private partnership. It refers to money used by government to provide their services or to that sector of the economy based on its operation

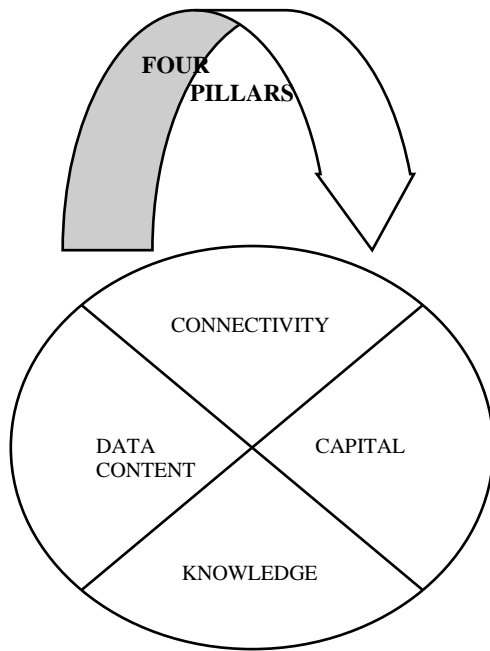


Fig 1: pillars of e-governance

1.1 E-governance models

E-GOVERNANCE services can be shared between citizens, businessman, government and employees. These four models of e-governance are as:-

1. Government to citizens (G2C)
2. Government to government (G2G)
3. Government to employees (G2E)
4. Government to businessman (G2B)

Government to citizens (G2C):-This model of e-governance refers to the government services which are shared by citizens. Here, citizens visit to the link of services that they want to use. This models strong the bond between government and its citizen. Type of services which are provided by this model includes:-

- Payment of online bills such as electricity, water, telephone bills etc.
- Online registration of applications.
- Copies of land-record.
- Online filling of complaints.
- Availability of any kind of online information.

Government to government (G2G):-This model refers to the services which are shared between the governments. There is lots of information that need to be shared between various government agencies, department and organizations. These types of services or information are as:-

- Sharing of information between police department of various state.
- Government document exchange which includes preparation, approval, distribution, and storage of all governmental documents is also done through e-governance.

- Most of the finance and budget work are also done through e-governance.

Government to businessmen (G2B):-Through this model, bond between private sector and government increase and businessmen use to communicate. They share information through this model like:-

- Collection of taxes.
- Rejection and approval of patent is also done by this model.
- Payment of all kind of bills and penalty.
- Sharing of all kind of information, rules and data.
- Complaints or any kind of dissatisfaction can be shown by this.

Government to employees (G2E):-This model increases the transparency between government and its employee. Here, employee can keeps a check on the functioning and working of government and government can keeps on its employees. Information that can be shared by this model:-

- All kind of data submission(attendance record, employee record etc) from various government offices is done by this model
- Employee can file all kinds of complaints and dissatisfaction by this model.
- All kind of rule- regulation and information for employees can be shared by this.
- Employees can check their payment and working record.
- Employees can register all kind of working forms online.

2 DIFFERENT AREAS OF E-GOVERNANCE

Today area of e-governance is very wide. E-Governance is implemented by government in almost every field. From urban states to rural areas and from politics to teaching-Governance has spread its root everywhere. Either its public or private sector, common man or businessman all is largely dependent on e-governance. Here we have presented different areas where e-governance is widely used. In the following section, we are describing the projects used in urban and rural areas of India.

2.1 E-Governance projects in urban areas:-

2.1.1 Transportation:- Services provided by e-governance in this area are:-

- Issuance of Time Table of buses.
- Provision of booking facility for Interstate transport.
- Transportation Improvement Program.
- Regional Transportation Plans.
- Congestion Management Process.
- Transportation Demand Management.

Various projects [1]:-

1. CFST:-Citizen Friendly Services of Transport Department by Andhra Pradesh government to provide services such as Issue of learner licensees

- Issue of driving licenses ,Renewal of driving licenses etc
- 2. Vahan and Sarathi:-The backend applications Vahan&Sarathi help in speeding the overall work flow in the transport department but Tamil Nadu govt.
- 3. OSRTC:- The Orissa State Road Transport Corporation project was started to provide transport related facilities online
- 4. HRTC: - Himachal Road Transport Corporation project is for online bookings, cancellation of seats, for enquiry about departure of buses, availability of seats and buses etc.

2.1.2 Online payment of bills and taxes:-Services provided by e-governance in this area's:-

- Online Transaction
- Payment of Bill
- Payment of taxes
- Payment of house EMIs

Various Projects:-

1. FRIENDS: - This project is started by Kerala Government for its citizens to make online payment of electricity and water bills, revenue taxes, license fees, motor vehicle taxes, university fees, etc [1].
2. E-SEVA:-Electronic seva by Andhra Pradesh government to pay utility bills, avail of tradelicenss and transact on government matters at these facilities.
3. BWSSB ganakeekruthaGrahakaraSeve, water billing, and collection system: - This e-governance project is started by the Bangalore government. In this every month bills of houses are generated through BGS software
4. DOMESTIC: - This project is started by Daman and Diu. It is an Electricity Billing System for domestic consumers.
5. E-Pourasabha Municipal Application:-E-Pourasabha is an e-governance application for urban local bodies. It is implemented for Tax Collection system, Property Tax, Water Tax etc.
6. E-Mitra by the Government of Rajasthan
7. SAMPARK by Chandigarh government
8. E-Suvidha by the government of Uttar Pradesh

2.1.3 Information and public relation key

services:-With these kinds of projects people can get any kind of information with just a single click.

Various projects:-

1. LokMitra: - By the government of Himachal Pradesh. The services offered include information about vacancies, tenders, market rates, matrimonial services, village e-mail.

2. Mahiti Shakti: - By Gujarat government to provide information related to its working to its citizens.
3. OLTP: - By Andhra Pradesh government. With this project 16 government departments in Andhra Pradesh are connected on a single network.

2.1.4Municipal services: - Services provided are as:-

- House Tax Assessment, Billing and Collection.
- Maintain records of Land & property.
- Issue of Death Certificates.
- Registration & Attorneys of properties.
- Review and approval authority for site plans

Various projects:-

1. E-Panjeeyan:-It is started by Assam government to deals with the computerization of the Document registration work at Sub Registrar Office.
2. SDO Suite:-By Assam government. This system helps in issuing various certificates like Land sale Permission, Legal heir certificate, Issue of Passport Verification Certificate, Birth and Death Report,
3. Palike:-The Palike-property tax software capture the basic details of the owner and property, payment details for which receipt is generated and given to the citizen was hosted.
4. Rural Digital Services (Nemmadi):-Provide services such as issuance of certificates, issuance of orders in respect of Social Security Schemes such as old age pension, widow pension, freedom fighter pension etc.
5. TRIS:- Tripura Registration Information System is meant for capturing of online photograph and bio-metric impression, Service for visit commission, request for duplicate document, searching of document etc.

2.1.5Roads and traffic management:- Services provided by this type of e-governance is:-

- Network of Roads & Bridges
- Road construction and their maintenance
- Traffic Management
- Safety ,Accident and pollution control

Various projects:-

1. BHOOSWADEENA-This project is computerized land acquisition system with tight integration with BHOOI. The purpose of this project is to develop a system to automate the process Land acquisition
2. I-GeoApproach Internet Geometrics:-Purpose of this project is development of Geometrics based web enabled decision support system for Rural Road Network of Madhya Pradesh.
3. RSPCB (Rajasthan State Pollution Control Board):- The project relates to establishment of computer based system by fulfilling the Hardware, Software

and Networking Requirements The project will be beneficial to the Government, Central Pollution Control Board, RSPCB itself.

4. CFST:- Citizen Friendly Services of Transport Department This project is started by the government of Andhra Pradesh to keep check on pollution control, road safety, road signs and safety of its citizens.[1]

2.2 Areas of e-governance in rural areas:-

In rural areas e-governance has its very powerful impact. Here, from agriculture to local information everything is done through e-governance.

2.2.1 Agriculture:- Following are the projects used in Agriculture.

1. Gyandoot: In the State of Madhya Pradesh it is an Intranet-based Government to citizen (G2c) service delivery initiative.
2. BELE:- It is a web-based application with 3-tier architecture for capturing and monitoring the major activities and services.
3. AGMARKNET: - It is a project approved by Department of Marketing & Inspection (DMI), Ministry of Agriculture, and Government of India.
4. SEEDNET:-It is a SEED informatics network under ministry of Agriculture, Government of India. The project was started in Chhattisgarh in the month of July' 2008 for Kharif season.
5. Mustard Procurement Management System:- It is started by Haryana government. It conducted the Survey of mustard sown by the farmers and feed this data in to the database of the system. This data is then processed and generate coupons having information of dates on which farmer may visit in the mandi to sale his mustard.

2.2.2 Local information: - For local information such as prices of seeds, fertilizers, loan rates etc. government has started e-governance service in this area also.

Various projects:-

1. E-JanSampark:-Services & Information accessible to the common man in his locality to meet his basic need. This project is started by Chandigarh.
2. Prajavani: - it is started by the Government of Andhra Pradesh.it is a Web based On-line Monitoring of Public Grievances.
3. WebPortalsforHyderabadandCyberabadPolice:-It is designed by hyderabad, developed and hosted with many exciting public utility features like Safety tips for all citizens, verification status of Passports, Stolen vehicles etc.[1]

4. Intranet Portal of Chandigarh Administration:-It provides an environment where administration could interact.
5. E-DISHA EkalSewa Kendra:-This project is started by Haryana government.E-Disha to deliver any service from any counter/location, so at the peak requirements of services, counters can be extended as per crowd.
6. E-Samadhan: - the Government of Himachal Pradesh stressed upon to develop grievances redressed mechanism so that the genuine public grievances may be redressed in a time bound manner.

2.2.3 Disaster management: - To manage disaster, is a very big challenge for the government as these are natural phenomena and are unpredictable. To deal with these disasters, much state government has started e-governance service for this.

Project in this area is:-

1. Chetana: - It is a Disaster management system which has been started in the state of Bihar to deal with natural disasters such as flood and earthquake.

2.2.4 Land record management:-By facilitating e-governance service in this area, millions of land records can be maintain in a very short time span.

Major projects in this area are:-

1. Bhoomi:-It is the first e-Governance land records management system project which is successfully implemented for the benefits of the common man by the Government of Karnataka.
2. Comprehensive Modernization of Land Records (CMLR):- This project is started by the government of Andhra Pradesh. It allows integrating functions of property registration, mutations and updating of field survey maps.
3. Land Record Computerisation: - The objective of the project is to computerize fresh allotment, land transfer, regularisation of occupied land etc. related activities of the Dept. of Land Management at district level.
4. Gyandoot: - it is an intranet in Dhar district of Madhya Pradesh, connecting rural cybercafés catering to the everyday needs of the masses [4].
5. Land Records Management System State Government of Punjab.
6. Devbhoomi State Government of Uttarakhand.
7. Bhu-Lekh – UP State Government of Uttar Pradesh.
8. E-Dhara State Government of Gujarat.

2.2.5 Panchayat:- Services provided by e-governance in this area are:-

- Issue of Birth/Death certificate.
- Application for inclusion of name in Voter list.
- Conducting various welfare schemes for the poor and needy sections of the society.
- Preparing district wise planning, implementing those plan, and review for success.
- To provide wage employment to the needy from amongst the poorest section of the rural society.
- Rural water supply and sanitation.

Various projects:-

1. E-GramViswa Gram Project:- This Project Initiates e-Gram Project connecting 13716 Gram Panchayats and 6000 Citizen Common Service Centres as a part of the e-Gram connectivity Project by Gujarat.
2. RajNidhi: - "RajNidhi" is a web enabled information kiosk system developed jointly by Rajasthan state's Department of Information Technology and Rajasthan State Agency for Computer Services (Raj Comp) [4].
3. Raj-SWIFT:-The Rajasthan State's Department of Information Technology (DoIT) has developed Government's own Intranet called as "raj-SWIFT"[4]
4. Support for P & RD sector in Assam:-NIC, Assam State Centre has been identified as the technical consultant for e-Governance solution and Computerization of the Department of Panchayat and Rural Development.
5. SamanyaMahiti by the State Government of Karnataka

3 E-GOVERNANCE IN HEALTH

Service provided by these projects are as:-

- Availability of medicines
- Special health camps
- Facilities at Anganwadi canters

Various projects:-

1. Online Vaccination Appointment for International Traveller:-Citizen centric application for the purpose of vaccination of the persons proceeding abroad and issuance of International Health Certificate
2. SMS based Integrated Disease Surveillance System: - it is an SMS based Integrated Disease Surveillance System facilitates to report the occurrences of disease, number of persons affected from the area of occurrences immediately to the concerned authority.
3. Hospital OPD Appointment:-Hospital OPD Appointment System is another welfare measure undertaken by Chandigarh Administration to make life of citizens simpler.

4. NLEP (National Leprosy Eradication Program):- NLEP is web based application developed for monitoring of leprosy cases in Chhattisgarh State.
5. HEALING:-it is a Health Information system for Kerala Government which is developed and implemented for Medical Health & Family Welfare department

4 E-GOVERNANCE IN EDUCATION:-

Providing basic education (elementary, primary, secondary) to children

- Providing computer education to children
- Results for 10th& 12thclasses
- Information on eligibility for "Distribution of books" scheme

Various projects:-

1. CASCET:-This project is started by the Karnataka government for Education Department.
2. Online Scholarship Management System:-It is meant for the purpose of distribution of scholarships and fees reimbursement.
3. AISES (All India School Education Survey):- this project is started by Assam government. This project is used for surveying the number of schools in district. Census
4. CAPnic:-This is for the Centralized seat allotment process for professional courses and come under Kerala.
5. VHSE Examination Management System:-it has been developed to handle pre-examination related activities of the vocational higher secondary education.

5 CHALLENGES IN E-GOVERNANCE

In this paper we have described basically three types of challenges. These are

Technical Challenges:-Technical issue involve the following challenges [9] such as

- i. Interoperability
- ii. Privacy
- iii. Security
- iv. Multiservice Interaction

Organizational Challenges:-Organizational challenges include-

- i. Lack of Integrated Services
- ii. Lack of Key Persons
- iii. Population
- iv. Different Languages

According to an officer from NIC, success factors of e-Gov projects [7] –

- 10% Technology
- 60% Process
- 20% Change Management
- Rest is luck

Economical Challenges:-Economical challenges [9] are as:-

- i. Cost
- ii. Maintainability
- iii. Reusability
- iv. Portability

6 PROPOSED FUTURE TECHNOLOGY OF E-GOVERNANCE

To make E-Governance more efficient and powerful, two technologies can be boon to it. These technologies are Open Source Software and Cloud Computing. In this section, we have proposed a framework to incorporate open source and cloud computing in E-Governance.

6.1 Open source software

Open Source Software (OSS) is software made available in both source code and binary form, under a license which allows users to freely use, modify and redistribute the software without the need to pay royalties to the original software author.

Working of E-Governance in Open Source environment

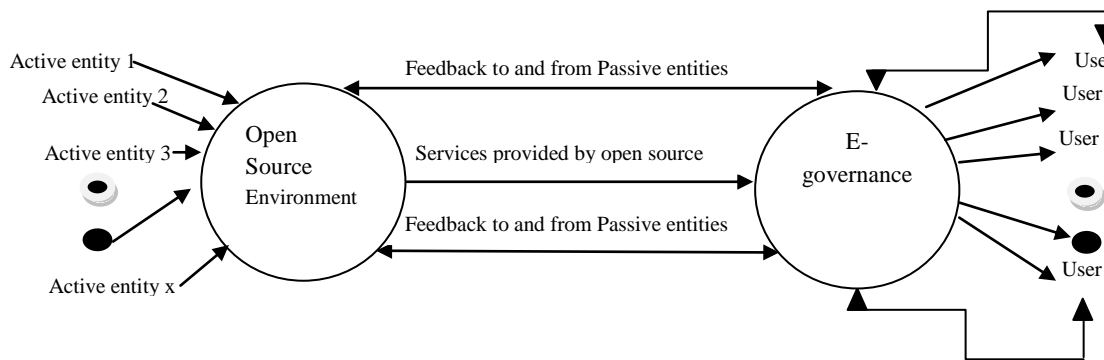


Fig 2: E-Governance and Open Source

Two entities that are actively involved in open source environment are active and passive entities. Active entities are code developers while passive entities are users who give their feedback openly to e-governance in open source environment. This feedback is bi-directional where an active and passive entity communicates. In this, active entities develop the code in open source environment which in turn is used by e-governance and provide its services to its citizens. Users can give their feedback to e-governance. This feedback is bidirectional.

For many governments the world over, the choice of Open Source is a strategic one. Majorities of projects which are based on Open Source technology has been highly seemed in European countries. This preference towards Open Source platforms is firstly because, acquiring and upgrading proprietary software is expensive. There is also the proposition that it is safer to entrust knowledge in the public domain to Open Source, which is also in the public domain, than to proprietary platforms. Thirdly, using open source would enable India to encourage our own software professionals to provide software support in the form of add-on applications that could be written at a cost much lower than that required to buy multi-featured packaged software

The Indian Government has recently proposed to go the open source way in its e-governance projects, and the Department of Information Technology has issued a Draft Policy in this regard. The move has been welcomed by the IT industry. The draft titled Policy on Device Drivers for Procurement of Hardware for e-Governance states that the, “Government of India (GOI) endeavors to provide e-governance services, which are technology-neutral, cost-effective, interoperable and vendor-neutral. The GOI Policy on open standards is a step towards meeting this objective in the development of e-governance applications.” The policy will be applicable in all new e-governance projects, as well as in existing ones [16].

The case for Open Source Software for governments in developing countries is a compelling one. Characteristics that make OSS an ideal candidate to be used by government are:-

1. It provides increased ownership and local autonomy.
2. It also provides increased flexibility to address localization issues and extensibility.
3. There are also numerous cost benefits to be gained from the use of OSS.

- Many open source software projects have been extremely successful (measured by market share), particularly in server/back-office application spaces, and there is enormous industry investment in promoting the growth and improvement of community-based software projects.[8]

6.2 E-Governance and cloud computing

There is no doubt that worldwide revolution in Internet is changing our lives in terms of the way we work, learn and interact. Today not only private sector largely depends upon internet but government sector also depends upon internet. In this internet world, Cloud computing has become one of the hottest technique in the IT area. Today's e-governance is implemented with clouds as clouds provide number of

Working of E-Governance with Clouds

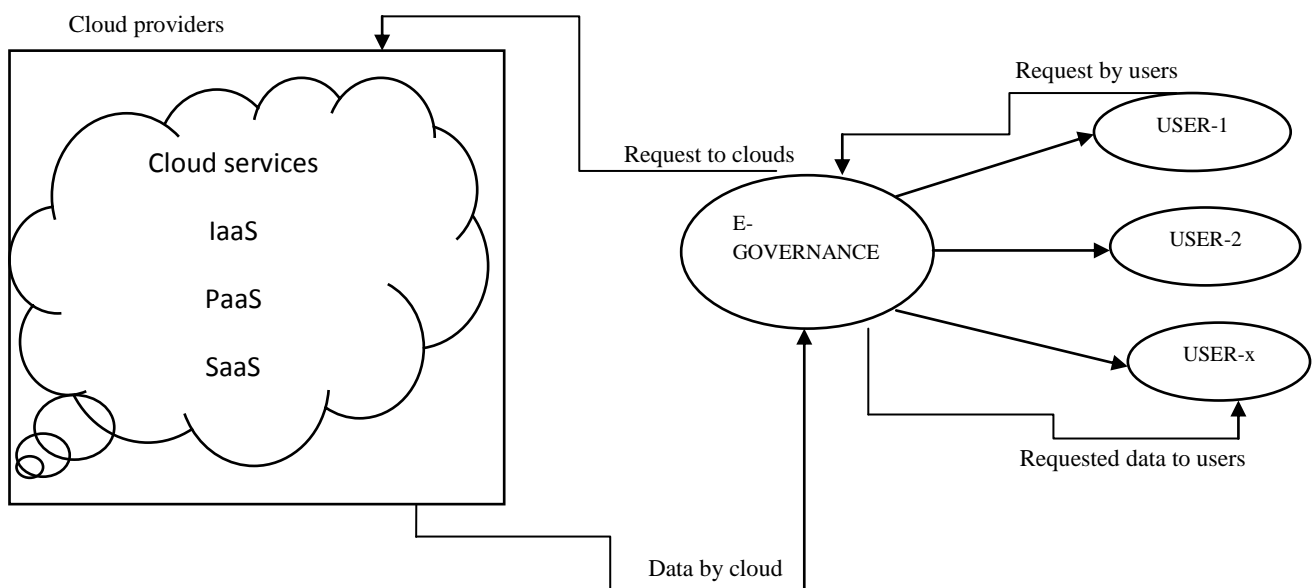


Fig4:-E-Governance with clouds

benefits and make e-governance more efficient to use. Cloud computing allows computer e-governance users to conveniently rent access to fully featured applications. Cloud computing also provides software development and deployment environments, and computing infrastructure assets such as network-accessible data storage and processing model.

Cloud computing is a business model of delivering IT resources and applications as services accessible remotely over the Internet rather than locally. In the traditional, IT resources and applications are provided in the form of products which are sold or licensed from a vendor to a user and then exploited locally on a local computer infrastructure.

SANTA BARBARA, CA-Eucalyptus Systems, creators of the most widely deployed on-premise cloud computing platform, today revealed that open source Eucalyptus Infrastructure-as-a-Service (IaaS) s/w is the cornerstone of the e-governance cloud project in India that is delivering the power of modern information technology (IT) to remote districts and villages

throughout the country. NIC has selected and deployed the open source Eucalyptus software as the foundation for its cloud project, which calls for the execution of cloud-based e-governance projects on a broad scale.

NIC is providing the network backbone and a wide range of ICT (Information and Communication Technologies) services to government organizations throughout India, including a nationwide communication network for decentralized planning, improvement in government services and wider transparency of national and local government institutions [14]. Following model, we propose for usages of cloud computing in E-Governance:

Clouds provide services (IaaS, PaaS and SaaS means Infrastructure as a service, Platform as a service and Software as a service) which in turn are consumed by e-governance. These services are used by e-governance and in turn provide services to its number of customers at the same time. With clouds, when loads increase a lot even then its performance doesn't decrease.

Now a days, cloud provider use Storage Area Network (SAN) to improve the storage quality of clouds. SAN provide large scale storage infrastructure to cloud provider so that they can accessed their management and evolution of heterogeneous SAN environment efficiently [18].

6.2.1 Need of clouds for E-Governance

Implementing e-governance without clouds is an old technique and is not too much efficient. There are number of

reason which make cloud computing hottest Buzzword not in IT area but also in e-governance implementation

1. Data Integrity:-To deal with large data over the years for E-Governance applications, data should be integrals and scalable at higher level.
2. Security Auditing: - As corruption is increasing in government sector also, .somemechanism is needed to keep track on e-governance worker so that no changes in personal data of individual which is on.

In below figure, various services provided by clouds to e-governance has been shown. Almost every kind of service is provided by clouds from designing to testing, storage to hosting and networking to security.

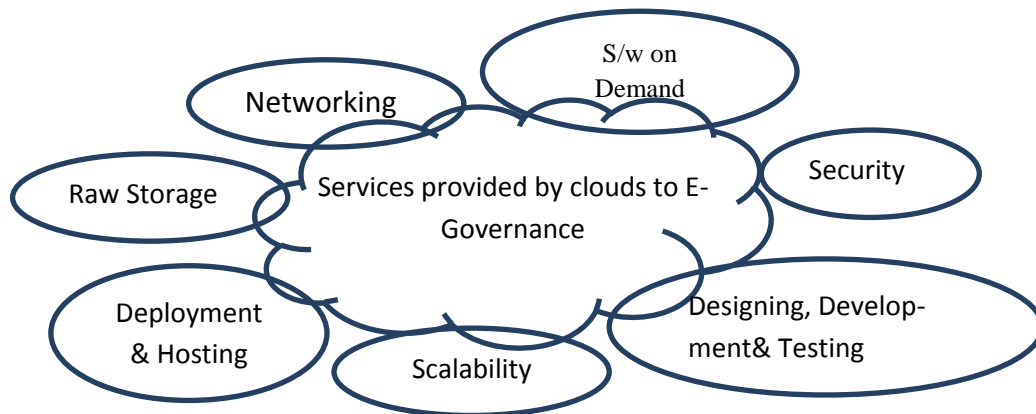


Fig3: Cloud services

3. Data recovery: - clouds provides an excellent way of data restoring facility which might be lost due to floods, earthquake or from any other disaster.
4. Performance and Efficiency: - An efficient e-governance is that in which lakhs of access can be done easily without decreasing the performance.
5. Systems Integration and Legacy Software:-Not only are the applications that are already providing services to be moved to the cloud, but also integrate with applications deployed in the cloud. Cloud is built on SOA principles and can offer excellent solutions for integration of various applications [10].
6. Migration to New Technologies:-Technology migration is the biggest challenge.Moving todifferent versions of software, applying application and security patches is the key to maintaining a secure data center for E-Governance. Cloud architecture efficiently enables these kinds of requirements, by co-existing and co-locating different versions and releases of the software at the same time [11].
7. Environment Protection:-Air conditioner, power usage, heat generated by powerful machines and electronic wastage by different data centered up to the pollution. This pollution can be minimized to much extend by having centralized database inspire of distributed. This is all what cloud computing do in going green.

6.2.2 Benefits of cloud computing

- On-demand self-sufficient service
- network access
- Location independent resource
- Rapid elasticity

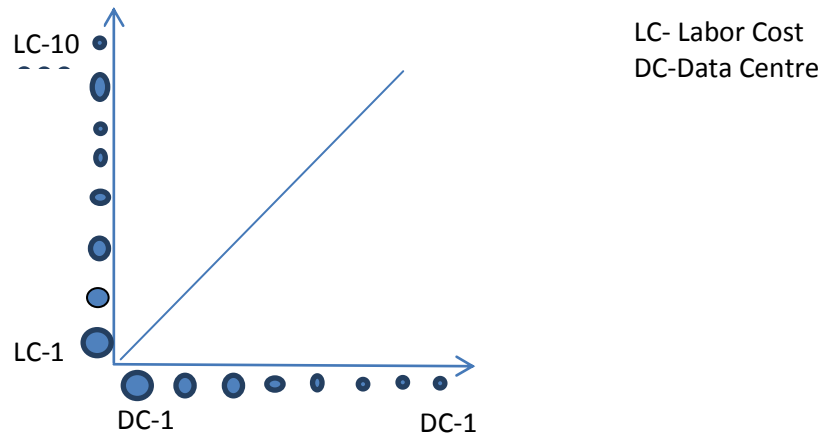


Fig5: Data center vs. labor cost graph

Table 1: State wise websites for e-governance

CHHATTISGARH	
WEBSITES	DETAIL
http://agridept.cg.gov.in/	For agriculture
http://siccg.gov.in/	For any kind of information
http://ahd.cg.gov.in	For animal husbandry
http://ahd.cg.gov.in	For women and child development
http://www.cgdterapur.ac.in/	For education
http://nagarnigamraipur.com/	Roads cleaning, ,propertyrecords,tax payment
http://www.cgsird.gov.in/	For rural development and panchayat
http://comtax.cg.nic.in/comtax/	For collecting income tax
http://cg.nic.in/transport/	For transport
http://health.cg.gov.in/ehealth/welcome.htm	For health
HARYANA	
http://jamabandi.nic.in/	For land records

Main benefit of cloud computing is that it reduces IT laborcost [16]. In cloud computing, labor cost is almost reduces to half as compared to traditional IT approach as here database is centralized and not distributed.

http://haryanaforms.nic.in/transport.asp	For transport
http://haryanaforms.nic.in/bd.asp	For birth and death registration
http://haryanaforms.nic.in/revenue.asp	For caste, ,land,income and rural certificate
http://haryanaforms.nic.in/ph.asp	For sewage and water connection
http://haryana.gov.in/employee/emp.asp	For employee
CHANDIGARH	
http://chandigarh.nic.in/how_know-rj.htm	For any kind of legal issue
http://chandigarh.nic.in/how_know-prop.htm	For property details
http://mcchandigarh.gov.in/	For municipality
http://chdeducation.gov.in/	For education
http://chandigarh.nic.in/dept_agri.htm	For agriculture
http://chandigarh.nic.in/dept_hlt.htm	For health
http://sampark.chd.nic.in/pls/esampark_web/	For any kind of bill payments
GUJRAT	
http://www.gujaratinformatics.com/	For any kind of information
http://www.egovamc.com/	For land,tax,property,roads
DAMAN AND DIU	
http://daman.nic.in/flood_control/index.asp	For flood disaster
daman.nic.in/citizen_charters/agriculture.pdf	For agriculture
http://daman.nic.in/citizen_charters/cdpo.pdf	For child development
http://daman.nic.in/citizen_charters/education.pdf	For education
http://http://daman.nic.in/citizen_charters/directorate-Medical-&-Health-citizen-charter.pdf	For health
http://daman.nic.in/citizen_charters/2012/transport-citizen-charter.pdf	For transport
HIMACHAL PRADESH	
http://causelists.nic.in/hp/index1.html	For legal issues
http://admis.hp.nic.in/himpol/Citizen/OnlineComplaints.aspx	For police complaints
http://hpseb.com/mybill/	For payment of electricity bills
http://hrtc.gov.in/hrtctickets/	For transport
http://himachal.gov.in/jobportal/	For employment

ORISSA	
http://www.agriorissa.org/	For agriculture
http://www.orissa.gov.in/RD/index.htm	For rural development
http://www.orissa.gov.in/revenue/index.htm	Revenue and disaster mgmt.
http://www.orissa.gov.in/health_portal/index.html	For health
http://www.orissa.gov.in/commerce&transport/	For transport
TAMIL NADU	
http://www.tn.gov.in/services/services_default.html#Agriculture	For agriculture
http://www.tn.gov.in/services/services_default.html#Health	For health
http://www.tn.gov.in/services/services_default.html#Higher	For education
http://www.tn.gov.in/services/services_default.html#Housing	For urban and rural development
UTTAR PRADESH	
http://gis.up.nic.in:8080/srishti/	For district information
http://bhulekh.up.nic.in/	For land records
http://koshvani.up.nic.in/	Provides state financial health
http://rahat.up.nic.in/	For disaster management

7 CONCLUSION

In this paper, we have given a framework and application of E-Governance along with a list E-Governance projects run by state and central governments. We have also proposed future technology for E-Governance with pictorial representation of working of E-Governance with new technology. We have also proposed benefits of clouds with a graph showing how clouds reduce labor cost. Implementing E-Governance without cloud computing and open source is an old technology. Cloud computing and open source is a hottest buzzword in IT sector and we should make best possible use of these emerging technology. There are number of reasons which make cloud and open source technology so famous in E-Governance. These technologies not only provide organization, technical benefits but also provide economical benefits. E-Governance with open source is very popular in west countries but in India it is still an emerging technology. NIC is providing the network backbone and a wide range of ICT (Information and Communication

Technologies) services to government organizations throughout India. Several drafts have also been passed by IT department to implement E-Governance with these technologies so that working, efficiency, transparency and security can be increased in E-Governance

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