Chapter 2. e-Governance and e-Governance Standards

2.1 Introduction

Governments are existed in different form since dawn of the history, and have acted as an important tool of civilization of mankind. Government is the largest entity in a country serving its citizens for delivery of public services. One of the primary factors, being considered for the remarkable developments success of human history, is quality of Governance. In a generic sense governance refers to the task of running a government [1], [2].

The Institute on Governance defines governance as ‘the process whereby societies or organizations make their important decisions, determine who has voice, who is engaged in the process and how account is rendered’ [3].

The Organization for Economic Cooperation and Development (OECD), conceptualizes governance ‘by encompassing the role of public authorities in establishing the environment in which economic operators function and in determining the distribution of benefits, as well as the nature of the relationship between the rulers and the ruled’. ‘The concept of governance denotes the use of political authority and exercise of control in a society in relation to the management of its resources for social and economic development’ [2].

In general terms governance is defined as the ability of people to take greater control over their own development.

2.1.1 Reformation in Governance

It is necessary, for the administration to get closer to its citizen. Improvement of governance is a natural objective of governments. Governments across the world have tried to introduce means of improvements in public administration
including management techniques or any other aids available at various times to improve delivery system.

‘Most developed countries have recognized the problem of non-performing bureaucracies and taken bold steps to reform the government. During the last twenty-five years successful reform efforts have been made in the UK, New Zealand, Australia, the USA, Scandinavian countries, as well as others such as Singapore and Malaysia. A reform in the functioning of the governmental machinery has improved the quality of life’ [2].

2.1.1.1 Governance Reforms in India

Administrative transformation has been on the agenda of the Government of India since independence. It can be seen from the initiatives of different committees and commissions constituted by the Governments at State and Center.

During 1949, Gopalaswami Ayyangar Committee reviewed the working of the machinery of central government. This committee dealt with the changes, improvement in caliber of personnel and improvements in methods of transaction of governmental business [4]. During 1951, Gorwala Committee made attempt to look at administrative system after ushering in of the system of planning in the country. He suggested reorganization of the administrative machinery so as to ensure greater speed, effectiveness and responsiveness [4].

During 1953, Pual H Appleby based on his survey of public administration, submitted his report [5]. He was concerned more with basic principles and concepts in administration. He also analyzed the factors responsible for weakening of administration.

Each Five Year Plan also provided clear recommendations for reforms in government administration. An Administrative Reforms Commission was appointed in 1966 by the Government of India to make a comprehensive review of the working of Indian administrative system and to make recommendations.
Similarly, over a period of time different state governments have been initiating reformation of the government functions. Several studies and reports came after the first Administrative Reforms Commission, including: [6]

- Committee on Recruitment Policy and Selection Methods (D.S.Kothari)-1976
- The Commission on Centre-State Relations (Sarkaria)-1983
- The Fourth Central Pay Commission Report-1986
- The Committee to Review the Scheme of the Civil Services Examination (Satish Chandra, 1989)
- The Economic Administration Reforms Commission
- The Fifth Pay Commission
- Committee on Civil Services Reforms
- The Sixth Pay Commission


Second Administrative Reforms Commission [8] was constituted in 2005 to ‘prepare a detailed blueprint for revamping the public administration system’. Promotion of e-Governance was one of the terms of reference of the Commission.

The commission in its reports advocated the need for introducing e-Governance tools for reforming governmental processes and bringing elements of accountability and transparency along with citizen-centricity. In its first report titled ‘Right to Information: Master Key to Good Governance’, Commission recommended that ‘In respect to electronic disclosures, NIC should provide a single portal through which disclosures of all public authorities under appropriate governments could be accessed, to facilitate easy availability of information [9].
In its second report 'Unlocking Human Capital: Entitlements and Governance-A Case Study',[10] contained complete module on 'Use of Information Technology' in implementation of the National Rural Employment Guarantee Act, 2005. The recommendations include:

- 'Blocks must be the nodal levels of government at which all information is electronic. Any information collected in non-electronic form at this or a lower level of government must be digitized at block level.
- Data from the blocks should be aggregated in central repositories in each of the states. A single data centre may be adequate for each state, and transmission to this centre from each of the blocks should be enabled. The Union Government should maintain its own data centre, aggregating data from each of the state repositories.
- A Geographic Information System (GIS) for the REGS should be developed and information that is developed through aggregation should be presented through this system as well. A zoom-able and pan-able interface should allow performance to be understood at different levels of administration from the same base data. Wherever possible, suo motu disclosures should be in GIS format also, in addition to their other means of dissemination' [10].

In Commission’s report on ‘Crisis Management’, the Commission once again put emphasis on the use of ‘Geographical Information System’ tools in order to integrate spatial data as well as non-spatial data.[11]

Fourth Report of the Commission on ‘Ethics in Governance’, commission emphasized the use of Information Technology and highlighted the need for process re-engineering in the government [12]. The Commission further discussed the use of Information and Communications Technology in its Sixth report on ‘Local governance: an inspiring journey into the future’ [13] with a view to strengthening the institutional structures and service delivery
mechanisms with reference to the third tier of government. Recommendations made in this report include:

- 'Information and Communication Technology should be utilized by the local governments in process simplification, enhancing transparency and accountability and providing service delivery of services through single window
- Local governments should become one point service centres for providing various web based and satellite based services. This would however require capacity building in the local governments' [13].

The commission published its 11th report titled 'Promoting e-Governance: The SMART way Forward' [14] during December 2008 that examines various aspects of e-Governance reforms in India. The commission made detailed recommendations for implementing new paradigm of governance in the Country. This report examines e-governance as a core issue in improving governance as a whole.

From above discussions we have seen a clear progress in the administrative reforms in India which is leading towards adoption of information communication technologies (ICT) in the transformation of the governance which is leading to e-Governance.

2.2 Electronic Governance

Many functions of the government involve delivery of information and services to its customers i.e. citizens, business, other government departments etc. The process of governance involves great deal of interaction between the citizen and the government, through its different organs like, departments, offices, etc. These organs are represented by the officials -bureaucracy- who handles the services. When the number of services increase, interaction between the government and citizen will proportionately increase.
Most of the problems that citizens face in interacting with government agencies are mainly due to the procedural complexity; difficulty in getting access to the official concerned who really decide the issue; tendency of the functionaries to ask for information piece meal; lack of transparency in the decision making process; uncertainty about the time-frame of processing the citizen’s requirement; inefficient and slow working and non communication of the action even after decisions are made. So, there is a widespread societal bureaucratic routine, paper work, cumbersome procedures and delays, over centralization, and poor service quality especially in Indian context. All such hurdles can be removed by business process re-engineering of the governments procedure and functions, bringing transparency and accountability in its operation.

Objective of good governance reformation is to address above mentioned difficulties of the citizen. e-Governance offers a new way forward, helping improvements in government processes, connect citizens, and build interactions with and within civil society. According to Heeks, [15] e-Governance has the power of Information Communication Technologies, which provides three basic change potentials for good governance such as Automation, Informatisation, and Transformation.

- **Automation**: Replacing current human-executed processes which involve accepting, storing, processing, outputting or transmitting information. For example, the automation of existing clerical functions.

- **Informatisation**: Supporting current human-executed information processes. For example, supporting current processes of decision making, communication, and decision implementation.

- **Transformation**: Creating new ICT-executed information processes or supporting new human-executed information processes. For example, creating new methods of public service delivery [15].
The power of information and communication technology has opened up with radical possibilities in decision-making, quick processing of data and information transfer. Ability of Internet and Intranets to ‘join up’ and coordinate the activities of previously disparate government services are remarkable.

e-Governance can be considered as one of the natural applications of the ICT, which has been used in many sectors especially in the electronic business to improve and enhance the services provided to the customers [16].

Due to advances in information communication technologies, new provision of efficient, responsive administration is possible through e-Governance. e-Governance attempts to take public services and the government to the doorstep of citizen through IT. e-Governance facilitates the delivery of the government services to the citizen through procedural simplicity, speed and convenience.

e-Governance is a way to ensure that citizens have equal right to be involved in the decision-making process in a manner which improves their condition and quality of life. e-Governance will transform the citizen from the role of passive consumers of services to citizens having a decisive role in deciding the kind of services they want and the structures that could best provide the same.

2.2.1 Definitions of e-Governance

According to UNESCO, ‘e-Governance is the public sector’s use of information and communication technologies with the aim of improving information and service delivery, encouraging citizen participation in the decision-making process and making government more accountable, transparent and effective’ [17].

United Nations Development Programme (UNDP) defines e-Governance as ‘a multifaceted concept that refers to the use of ICTs for improving collective governance’ [18].
This definition covers a wide range of activities, of ICT-enabled reform objectives such as:

1. ‘Facilitating access to political information and improving the means for political expression, discourse, mobilization and advocacy;
2. Enhancing the democratic quality of the political process and public administrations through more transparency, accountability, participation and disintermediation;
3. Making the internal working of public administrations more effective and efficient; and,
4. Enhancing the range and utility of public services on offer and making their delivery to citizens and business more accessible, efficient and responsive to the needs of all groups of clients’ [18]


World Bank [19] defines e-Government as ‘the use by government agencies of information technologies (such as Wide Area Networks, the Internet, and mobile computing) that have the ability to transform relations with citizens, businesses, and other arms of government. These technologies can serve a variety of different ends: better delivery of government services to citizens, improved interactions with business and industry, citizen empowerment through access to information, or more efficient government management. The resulting benefits can be less corruption, increased transparency, greater convenience, revenue growth, and/or cost reductions’ [19].

Backus [20] defines e-Governance as ‘the application of electronic means in (1) the interaction between government and citizens and government and
businesses, as well as (2) in internal government operations to simplify and improve democratic, government and business aspects of Governance’.

Goals of e-Governance are:

- Better service delivery to citizen
- Ushering in transparency and accountability
- Empowering people through information
- Improved efficiency within Government
- Improve interface with business and industry [14]

2.3 Benefits of e-Governance

According to Tripati [21], benefits of e-governance include:

✓ By reengineering of government process e-Governance can provide integrated government services through a single window.
✓ E-Governance can speed up transactions and also can bring transparency in government’s functioning.
✓ Reduce corruption and improved communication between government and citizen.

The AP First Information Technology Policy [22] of the Government of Andhra Pradesh illustrates the benefits of electronic governance as:

✓ Any-where, any-time services to citizens
✓ One-stop shop for all transactions in the G-C interface
✓ Better accountability, responsiveness and transparency of all systems.
✓ Highly efficient government machinery & systems
✓ Reduced discretion and arbitrariness.

So, the benefits of the e-Governance would lead to:

- Better access to information and quality service for citizens
- Simplicity, efficiency and accountability in the Government
- Extended reach of governance [14]
According to Heeks, [15] change potentials of ICT such as Automation, Informatisation and Transformatisation, can bring following benefits to governance for development:

Efficiency Gains:

- **Governance that is cheaper**: Produces same output at lower cost.
- **Governance that does more**: Produces more outputs at the same cost.
- **Governance that is quicker**: Produces the same outputs at the same cost in less time.

Effectiveness Gains:

- **Governance that works better**: Produces same outputs at the same cost in the same time, but with a higher quality standard.
- **Governance that is innovative**: produces new outputs.

As a clear example, the benefit of the adopting e-Governance can be observed from the cost saving in the United States. In United states it is reported that state governments are saving up to 70% by providing online services, and cost of vehicles registration in Alaska have reduced from 7.75 US Dollars to only 0.91 US Dollars by providing e-services [23]. Similarly 45% of the people surveyed in Australia have conveyed that they could save money using e-Governance services [24].

Apart from above direct benefits, many other benefits can also be delivered by applying ICT. Internally, it can provide better staff motivation, greater political control or an improved public image. Externally, it can deliver cost effective and relatively better services to those who depend on government [15].

### 2.4 Transition in e-Governance

Advancement in the Information communication technologies has impacted the e-Governance scenario. Over a period of time the concept of e-governance
has changed from the objective of web page presence to fully integrated and inter related applications, which are seamlessly integrating different organs of the government including government departments, financial agencies, and other stakeholders.

‘Transition from governance to e-Governance takes place beginning with a ‘Presence’ phase followed by ‘interaction’ ‘transaction’, and ‘transformation’ phase’ [21]. E-Governance has been identified into four stages. E-foundation stage being the first stage, basic infrastructure is set in place. During this foundation stage, primary applications like Local Area Network are implemented and information is created. In the second phase of e-Facilitation stage, participation of the stakeholders like employees, and the citizen etc happens. Desk-based transactions on the web happens during the third stage i.e. E-Business stage and the fourth being the e-commerce, where actual transaction is happening.

According to United Nations Division for Public Economics and Public Administration [25] there are five stages for the e-Government which include:

- **Emerging**: A government web presence is established through a few independent official sites. Information will be limited, basic and static in this stage.
- **Enhanced**: Content and information is updated with greater regularity.
- **Interactive**: Users can download forms, contact officials, and make appointments and requests.
- **Transactional**: Users can actually pay for services or conduct financial transactions online like online payment of fees.
- **Seamless**: Total integration of e-functions and services across administrative and departmental boundaries.

### 2.5 Types of e-Governance

One of the advantages of the technical advancement in the interconnected and networked environment is the electronic business, which include servicing
customers and collaborating with business partners and conducting electronic transactions within an organizational setup. Analogous to e-Business, e-Governance comprises categories like:

Government to Government (G2G)
Government to Citizens (G2C)
Government to Business (G2B)

Government to Government (G2G) inter-governmental exchange of information and commodities. Government to Government e-Governance can lead to higher productivity by interlinking various government offices to improve communication by sharing data and documentary resources.

Government to Citizens (G2C) e-Governance services provide easy to find, easy to use one stop point of service to the individuals. In such services public/citizen should be able to access service from the Government very quickly, in contrast to slow access in manual system. Examples of Government to Citizens (G2C) e-Governance services, which include delivery of citizen services, include Computer Aided Registration of Deeds (CARD)[27] in Andhra Pradesh and SARITA [29] of Government of Maharashtra, both are for registration of property transactions [30].

Government to Business (G2B) category of e-Governance services are characterized by the interaction between the government department and business community. G2B Services provide information pertaining to all procedures, rules and regulations pertaining to business interest of the government. ‘This will aim at reducing government’s burden on business by eliminating redundant collection of data and better application of e-business technologies for communication’ [26]. Number of countries have implemented online business registration and trade facilitation system at ports and customs to become more business friendly’ [30].
Examples of Government to Business (G2B) category of e-Governance services include e-Procurement in Andhra Pradesh [31] and computerized interstate border check posts in Gujarat [30].

2.6 e-Governance Scenario in India

As mentioned elsewhere, the administrative reform was in the agenda of the Government of India. Several reforms have taken place in the administration and governance based on the recommendations of different reforms committees, commissions etc. Accordingly governments at Centre and State have enacted different rules, regulations, policies etc. and also are making amendments and modifications in the existing rules and regulations to facilitate efficient and transparent delivery of services through e-Governance.

To facilitate increasing importance of electronics and its application the Government of India established the Department of Electronics in 1970 [14]. Major initiatives in boosting the e-Governance was establishment of National Informatics Centre (NIC) in 1977.

NIC facilitated 'e-Government' in India by networking and computer proliferation in various organs of the government and has been instrumental in steering Information and Communication Technology applications in the government departments at Central, State and District level. By the end of 1980 many government offices started using computers mainly for word processing applications. Advancement in technology further improved the reach and applications of the computers for various activities, and government offices started using computers for number of applications like tracking movement of papers and files, processing of payrolls, monitoring of development programmes, report generation etc.

In 1987 NICNET, a national satellite based computer network was formed which was main thrust for e-Governance. This was followed by launch of the DISNIC i.e. District Information System of the National Informatics Centre to computerize all district offices in the country.
In 1989, the committee on Study Group on Information Gap, constituted by the Planning Commission recommended creation of databases on Plan Information, Monitoring and evaluation in Districts. By 1990 NICNET was extended via the State capitals to all district headquarters. In the following years, with ongoing computerization, tele-connectivity and Internet penetration, large number of e-Governance initiatives, both at the Union and State levels were initiated.

National Task Force on IT and Software Development was set up by the Prime Minister's Office on May 22, 1998, under the Chairmanship of the Deputy Chairman of Planning Commission. This taskforce had a mandate to formulate the draft of a National Informatics Policy [32].

In 1999, the Union Ministry of Information Technology was created [14]. Department of Information Technology of the Government of India has a separate wing for e-Governance to take care of e-Governance related activities [27]. By 2000, a 12-point minimum agenda for e-Governance was identified by the Government of India for implementation in all the Union Government Ministries/Departments. Tax administration departments both at the Union and State levels were among the first to use ICT to improve their internal working [14].

2.6.1 National e-Governance Plan

Different departments of the Government of India as well as the State Governments have initiated steps to adopt e-Governance. The scope and target of all these e-governance initiatives are varied and these initiatives were targeted to different state or operational domains, and there was no coordinated effort to work towards a e-Governance mode with a common vision, mission and objective. Some of these projects were highly successful and few failed [33]. Experiences from the success/failure factors were the base for preparing a national strategy for the country.
It was felt that, in order to speed up the e-governance across various arms of government at the national, state and local government level, a programme approach would need to be adopted, which must be guided by a common vision, strategy and approach to objectives. Such an approach would enable huge savings in cost, in terms of sharing the core and support infrastructure, interoperability through standards etc, to have a seamless view of the Government to the citizen. The National e-Governance Plan (NeGP) was formulated by the Government in the above background, for implementation across the country. The Government of India approved the National e-Governance Plan (NeGP), on May 18, 2006 with a vision ‘to make all Government services accessible to the common man in his locality, through common service delivery outlets and ensure efficiency, transparency & reliability of such services at affordable costs to realise the basic needs of the common man’ [33].

The strategy proposed for the implementation of the projects under National e-Governance Plan (NeGP) include implementation of the projects by the line ministries and state governments are provided with opting for maximum 5 projects under this plan. In order to achieve Interoperability and for optimal utilization of infrastructure and other resources, all projects are taken as a centralized Initiative.

For the implementation of National e-Governance Plan (NeGP), an integrated approach is established in which, the Department of Information Technology is authorized to create the common and support infrastructures like nationwide or state level Wide Area Network, Common Service Centres, State Data Centres, and make suitable arrangements for monitoring and coordination. The Department of Information Technology is also authorized to prepare policy guidelines and standards, provide technical support, undertake capacity building, R&D, etc., as required, for successful implementation of e-Governance Projects.

National e-Governance Plan comprising of 27 Mission Mode Projects (MMPs) and 8 components.
Central Mission Mode Projects [33] under National e-Governance Plan are in the areas of:

i. Banking
ii. Central Excise & Customs
iii. e-Office
iv. Income Tax (IT)
v. Insurance
vi. MCA21
vii. National Citizen Database (NCD/MNIC)/ UNIQUE ID (UID)
viii. Passport, Immigration & Visa
ix. Pension

State Mission Mode Projects [33] under National e-Governance Plan are in the areas of:

i. Agriculture
ii. Commercial Taxes
iii. e-District
iv. Employment Exchange
v. Land Records
vi. Municipalities
vii. Panchayats
viii. Police
ix. Property Registration
x. Road Transport
xi. Treasuries

Apart from the above mentioned Central and State Mission Mode Projects following Integrated Mission Mode Projects are also included in the National e-Governance Plan.
i. Common Service Centers (CSC)
ii. e-BIZ
iii. e-COURTS
iv. e-Procurement
v. Electronic Data Interchange (EDI) for Trade (eTrade)
vi. National e-Governance Service Delivery Gateway
vii. India Portal

Apart from above Mission Mode Projects following are the components of the National e-Governance Plan (NeGP)

- Core and Support Infrastructure
  
  Common Services Centre (CSC)
  State Wide Area Networks (SWAN)
  State Data Centres (SDC)

- Other Components
  
  Capacity Building
  Standards
  Awareness & Communication
  Assessment

2.6.2 e-Governance Initiatives in India

Different agencies like the Central Government, State Government, Local Bodies, Non Government Organisations (NGOs) have been taking initiatives in establishing various e-Governance initiatives in the Country. An attempt has been made to analyze the features of 100 randomly selected e-Governance initiatives in the country - which also forms source for the e-governance information- as given in below table.
<table>
<thead>
<tr>
<th>Sl No</th>
<th>Name of the Initiative</th>
<th>Short Description</th>
<th>Domain</th>
<th>Implementing Agency/State</th>
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<tbody>
<tr>
<td>1</td>
<td>e-Choupal</td>
<td>E-Choupal uses IT to supplement the supply chain in agricultural marketing. It addresses the unique needs of rural Indian farmers like poor electricity supply, poor transportation connectivity, poor infrastructure, poor telecom/internet connectivity and low bandwidth. ‘Real-time information and customized knowledge provided by ‘e-Choupal’ enhance the ability of farmers to take decisions and align their farm output with market demand and secure quality &amp; productivity’ [34].</td>
<td>Agriculture</td>
<td>Government of Madhya Pradesh</td>
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<td>2</td>
<td>e-Krishi</td>
<td>e-Krishi is a Market driven agricultural initiative through IT enabled Agri Business Centres to address the existing gap in agriculture information</td>
<td>Agriculture</td>
<td>Government of Kerala</td>
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<td>No.</td>
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<td>3</td>
<td>KISSAN</td>
<td>Karshaka Information Systems Services And Networking (KISSAN) is an integrated agricultural information system. KISSAN provides different information and advisory services for the farmers of Kerala. [36]</td>
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<td>Agriculture</td>
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<td>Department of Agriculture, Government of Kerala</td>
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<td>4</td>
<td>AHEAD</td>
<td>Animal Husbandry Enterprise Administrative Depository (AHEAD) is a project of the Department of Animal Husbandry</td>
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<td>Department of Animal Husbandry, Government of Kerala</td>
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<td>Husbandry, Government of Kerala. AHEAD Suite is an ICT intervention to provide web based total solution to the Animal Husbandry sector in Kerala. AHEAD consist of facilities for managing activities related to animal price monitoring, sample survey details, health monitoring of animals, laboratory details, rearing of calves, animal breeding, stock and store, Administration, etc.[37]</td>
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<td>5</td>
<td>E-Pramanpatra</td>
<td>E-Pramanpatra is an e-Govemance project of the Government of NCT of Delhi to bring transparency and increase efficiency in the issue of certificates and to reduce paper work. Status of the application could be known on the website of the department. [38]</td>
<td>Utility Service</td>
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<td></td>
<td>GSWAN</td>
<td>Gujarat State Wide Area Network is an Network is an</td>
<td>Communication</td>
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<td>Government of Gujarat</td>
<td>Government of NCT of Delhi</td>
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<td>7</td>
<td>SAPNET</td>
<td>SAPNET is a major communication infrastructure initiative of the Department of IT &amp; C, Government of Andhra Pradesh. Objectives of the SAPNET include setting production goals, training, script coordination, scheduling coordination, single window production activity. SAPNET run television channel called MANA TV and a data channel. The primary purpose of the channels is to provide distance learning, agriculture extension, rural development,</td>
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<td>Government of Andhra Pradesh</td>
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<td>8</td>
<td>Sachivalaya Integrated Communication Network (SICN) is an e-Governance project of the Government of Gujarat started for voice, data and video communication needs [41][42].</td>
<td>Communication Network</td>
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<td>9</td>
<td>APSWAN -AP State Wide Area Network is an e-governance project of Andhra Pradesh to facilitate easy communication in the state for an anytime anywhere access. The network will enable the State Government to have video conferencing facility across government offices and also enable government offices to communicate and conference with each other over Voice over Internet Protocol [43].</td>
<td>Communication Network</td>
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<td>10</td>
<td>It is an e-governance initiative under National e-governance plan. This</td>
<td>Company Affairs</td>
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Government of Gujarat

Government of Andhra Pradesh

Ministry of Corporate Affairs,
| 11 | **E-Procurement** | E-Procurement started in 2002 by Andhra Pradesh. It enables trade between companies of different sizes, platforms and locations, provide services like eTendering, eSelling, eProcurement, , and eAuctions. It avoids the unnecessary paper work, [31]. | **E-Commerce** | Government of Andhra Pradesh |
| 12 | **E-Shishu** | e-Shishu is an e-Governance programme started Orissa Primary Education Programme with main objective of access, retention, and quality of education. It has two components such as Child Tracking System and Intervention monitoring | **Education** | Government of Orissa |
School-Net & Information system & Information system & Information system (IMIS). Child Tracking System (CTS) is a comprehensive database of children below 14 years. It includes their socio-economic as well as demographic details. Intervention monitoring & Information system (IMIS) enables online monitoring of 14 interventions under Sarva Shiksha Abhiyan

| 13 | School-Net | School-Net is an E-Governance project of the Government of Nagaland to connect all government educational institutions up to middle level schools to enable e-learning. [46]. | E-Learning | Government of Nagaland |
| 14 | TREND-Software Project | TREND (TRansmission of ElectioN Data) is an e-Governance project of Election department of Kerala. The software was developed by NIC, Kerala unit for interconnecting election counting centers. It was used in assembly | Election | Department of Election, Government of Kerala |
electations in 2006 and in parliament election 2009 for capturing table wise data from election counting centers in Kerala State. TREND was used to display the election results during different elections in the past [47].

| 15 | Computer­ized Billing of Electricity | Lower Assam Electricity Distribution Company Limited (LAEDCL) has come up with online electricity billing service where in users can get their electricity bills online on the portal or can get access to it through mobile alert [48]. | Electricity Billing | Lower Assam Electricity Distribution Company Limited Assam |

<p>| 16 | RACE | RACE (Revenue Administration through Computerized Energy billing): A client-Server software for revenue administration for “Bihar State Electricity Board (BSEB). They are providing billing to more than 3 lakhs consumers through RACE running at its | Electricity Billing | Electricity Board, Bihar |</p>
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<tr>
<td>17</td>
<td>PowerDesk</td>
<td>PowerDesk is an e-Governance project of Maharashtra electricity board. It is an integrated consumer relationship management and energy accounting system, for efficient management control of power utilities. [50].</td>
<td>Electricity Billing</td>
</tr>
<tr>
<td>18</td>
<td>Akshaya</td>
<td>Akshaya is an E-literacy project of Kerala. It’s started in Malappuram district in 1999. Currently it offers e-payments, E-ticketing (Railway Ticket Booking), e-Filing of tax returns by traders of Kerala for sales tax department, e-Krishi, sale of BSNL products like mobile recharge coupons LIC’s Micro Insurance Policy etc. Training for personnel and payroll management system using SPARK programme, Intel learn,</td>
<td>E-literacy and Utility Services</td>
</tr>
<tr>
<td>19</td>
<td>e-Literacy among Masses &amp; Elected Representatives</td>
<td>e-Literacy among Masses &amp; Elected Representatives is an e-Governance project of the Government of Nagaland to create a pool of IT-trained manpower for better employment opportunities. [46].</td>
<td>E-Literacy</td>
</tr>
<tr>
<td>20</td>
<td>Community Information Centres (CICs)</td>
<td>Community Information Centres (CIC) was launched by the Government of India. CICs are set up to spread Information Communication Technology awareness among the people both at rural and urban levels. The main objective is to spread the use of computers in various aspects of daily life, to promote the use of the</td>
<td>E-Literacy</td>
</tr>
<tr>
<td>21</td>
<td>VISP</td>
<td>VISP (Vidyal Information Service Provider) is an e-Governance and empowerment programme started by the Activists for Social Alternatives (ASA) - a registered public trust working. The main objectives of the projects are to empower the weaker sections of the rural community through the use of ICT, ensure equal digital opportunities to the</td>
<td>E-Literacy</td>
</tr>
</tbody>
</table>
have-nots in the villages, and build a vibrant rural economy by becoming a rural ITES provider. The project also provides services like provision of price information of agricultural products, information on horoscopes, educational services, rural market places, healthcare services matrimonial services, provision of government forms, etc. [53],[54]

| 22 | Web Based Employment Exchange | Web Based Employment Exchange is an e-Governance project of the Government of NCT of Delhi to easy availability of information about employment. User can register and renew their registration at any employment exchange. [55]. | Government of NCT of Delhi |
| 23 | Online Employment Exchange | Online Employment Exchange is an e-governance project of | Government of Tamil Nadu |
| 24 | Rojgar Wahini | Rojgar Wahini is a web portal developed for the Department of Employment and Self-Employment (DE & SE), Government of Maharashtra. | Exchange the Department of Employment and Training, Government of Tamil Nadu. The Professional Employment Exchange Office (PEEO) caters to the employment needs of professionals registered in Tamil Nadu for the entire state. The objective of the exchange is to develop a databank of professionally qualified candidates and facilitate employability of candidates by providing access to private employers. The online web portal provide online information on application deadlines, hot track careers and future trends in employment etc [56]. |
Maharashtra. Through this portal Department of Employment and self-Employment (DE & SE), offers various services to assist the unemployed persons. The portal offers services like vocational guidance, announcement of job opportunities, and guidance on self-employment to the job seekers [57].

<p>| 25 | Tender Notice Information System (TNIS) is an e-Governance project of the Government of NCT of Delhi commissioned during February 2003 by the Information Technology Department to publish all the tender notices at one location. It also enable the citizen to get the details of civil work projects being undertaken in their locality, without making any application or request under Delhi Right To Information | E-Tendering | Government of NCT of Delhi |
| 26 | Khajane: Online Treasury Project | Act. With the implementation of this contractor, can download the tender documents without visiting the department concerned. Tender Notice Information System (TNIS) reduces the problems like slow tender process, manipulation in dates of sale of tender document; non availability of tender information on right time etc. [58]. |
| 27 | KOSHVA | KOSHVAHINI is an e-Finance project of the Government of Karnataka. [59]. Due to automation of the procedures and internal controls, Khajane project has strengthened the financial controls and promoted accountability and resulted in huge expenditure and efficiency gains [60]. |</p>
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<tr>
<th>Page</th>
<th>Project/Program</th>
<th>Description</th>
<th>Department</th>
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<tbody>
<tr>
<td>28</td>
<td>ECS</td>
<td>ECS (Electronic Clearance System) is another e-Governance project of the Principal Accounts Office (PAO) of the Government of NCT of Delhi for faster E-Stamping is a computer-based</td>
<td>Finance, Government of NCT of Delhi</td>
</tr>
<tr>
<td>29</td>
<td>e-Stamping</td>
<td>Governance project initiated by the Finance department of the Government of Maharashtra with objective to facilitate easy flow of up to date financial information required by different government departments. Koshavani provides detailed data on payments and receipts, different report generation etc. It also facilitates the computerized accounting system having the work right form accepting the bill up to payment and generation of accounts through Local Area Network [61].</td>
<td>Finance, Department, Government of Maharashtra</td>
</tr>
<tr>
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<td>application and a secure electronic way of stamping documents instead of the existing physical stamp paper. It is introduced by the Department of Finance, Government of Kerala. E-Stamping also facilitates easy accounting of the revenue of the Government.</td>
<td>Kerala</td>
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<tr>
<td>30</td>
<td>PATRAM</td>
<td>PATRAM (Postal Accounts TRAnsaction Maintenance) is a software developed by NIC Chennai for reporting and accounting the activities of the cash certificates section of the Postal Accounts Office. First it was developed in Tamil Nadu as a pilot site for replication in other states [62].</td>
<td>Finance</td>
</tr>
<tr>
<td>31</td>
<td>SWAGAT</td>
<td>State Wide Attention on Public Grievances by Application of Technology (SWAGAT) is an e-governance</td>
<td>Grievances Redressal</td>
</tr>
</tbody>
</table>
Computerization of Hospitals is an e-Governance project of the Department of Health & Family Welfare, Government of NCT of Delhi to quick retrieval of data and better management of the resources of the hospital. Both the citizens and the Government departments are beneficial through this project. [64].
<p>| 33 | Hospital Management Information System (HMIS) | Hospital Management Information System (HMIS) [65] is an E-Governance project of the Government of NCT of Delhi commissioned in September 2000. The project was implemented to solve problems like delay or non-availability of reports and records, illegible information on OPD cards &amp; Lab reports, delays in compilation of statistical reports of post medical record data. Main objectives of this project include internal efficiency improvement, better record management, faster processing of application, easy availability of information, quick preparation of reports etc. in hospital system. The services are Computer generated OPD card, Computerized summary sheet, | Government of NCT of Delhi |
| 34 | HMIS | Hospital Management Information System (HMIS) is an e-Governance project of the Department of Health and Family Welfare, Government of Gujarat. It was started to ensure the quality health care by providing standard clinical and diagnostic tools, hospital management tools and integration of management information at the state level so as to ensure online review and monitoring. It also helps to assist the doctors and medical staff to improve health services with ready reference patient data, workflow enabled less-paper process and parameterized alarms and triggers during patient treatment cycle. | Hospital Management | Government of Gujarat |
| 35 | Multi-purpose Household Survey (MPHS) | Multi-purpose Household Survey (MPHS) is an e-Governance project of Andhra Pradesh and implemented in the entire 1,125 Mandals of 23 Districts of Andhra Pradesh. This project developed a database with the basic socio-economic data of all residents of the state and land records having 76.5 million records. This database is used to issue Caste Certificates, Birth Certificates, Nativity Certificates etc. Through implementation of this project is claimed to have reduced the time taken for issuing of the certificates has come down from 15 days to 15 minutes [67]. | Household Database | Government of Andhra Pradesh |
| 36 | Tharangam | Total Housing Activity Reconciliation And New Generation Application Management (THARANGAM) is an e-Governance project of Kerala started in 2008. | Housing | Government of Kerala |
| 37 | Land Acquisition Management System | Land Acquisition Management System is an e-Governance project of the Land and Building Departments of Government of NCT of Delhi. It enables to know the status of application for alternative plot allotment &amp; government house allotment for employees. [69]. | Housing | Government of NCT of Delhi |</p>
<table>
<thead>
<tr>
<th>38</th>
<th>Modernization of Information &amp; Public Relation Functions</th>
<th>Modernization of Information and Public Relation functions is part of E-Governance plan of the Government of Nagaland for providing better publicity &amp; transparency about Government activities and projects. 11 offices and state directorate are to be equipped with computers, content management software. Dissemination of Government information through various medias including the Nagaland Online, IntraNaga Portal, district Portal, DRDA Portal and Block Community Portal etc. are also included in this initiative [46].</th>
<th>Information &amp; Public Relation</th>
<th>Government of Nagaland</th>
</tr>
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<tbody>
<tr>
<td>No.</td>
<td>Initiative</td>
<td>Description</td>
<td>Department</td>
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<tr>
<td>40</td>
<td>e-Delivery</td>
<td>e-Delivery is an e-Governance project of the Government of Nagaland as per the proposed e-governance plan of the state. This project aims to deliver the information, services and professional services through CICs’, Web, Kiosk, IVRS, ICSC and Call Centres. The requests is proposed to route to the specialists/experts in the respective field [46].</td>
<td>Information &amp; Publicity</td>
<td></td>
</tr>
<tr>
<td>41</td>
<td>Computerization of Land Records</td>
<td>Computerization of Land Records is an e-Governance project of the Government of NCT of Delhi to manage the large number of public data handled, and also to maintain the accuracy in title / boundary management and for efficient, accountable and transparent delivery.</td>
<td>Land Record Management</td>
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Government of Nagaland

Government of NCT of Delhi
mechanism. The main objectives of the project are internal efficiency improvement, better record management, faster processing of application, easy availability of information, quick preparation of reports etc. [71].

<p>| 42 | e-Dhara | e-Dhara - Land records online is an e-Governance project of the Gujarat. Due to cumbersome and difficult process in managing the land records manually, this project envisage to enable access and maintenance of village land records in an easy, transparent and secure manner. E-Dhara converts physical village land records into digital land records. Copies of land records and related services are provided through E-Dhara Kendra at Taluka level and E-Grams centres in the | Government of Gujarat | Land Record Management |</p>
<table>
<thead>
<tr>
<th>No.</th>
<th>Project</th>
<th>Description</th>
<th>Government</th>
</tr>
</thead>
<tbody>
<tr>
<td>43</td>
<td>Dharitree</td>
<td>Dharitree is an e-Governance project of Assam to digitize the land records. Land records computerization was first started in Assam in the Sonitpur district as a pilot project in the year 1991. Project is undertaken in association with National Informatics Centre (NIC), Assam under the sponsorship of the Department of Information Technology (DIT) Government of India. Objectives of this project include online mutation process, up-to-date correction and maintenance of land records, online access to up-to-date land records for citizens, linking of cadastral maps with plot data, issuing the essential certificates and reports to the land owners and citizens. Objective of this also</td>
<td>Land Record Management</td>
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</table>
include promptness, making the land mutation processes faster, and up-to date, correct, through online mutations etc [74].

<table>
<thead>
<tr>
<th>44</th>
<th>HALRIS</th>
<th>Haryana Land Records Information System (HALRIS) is an e-governance project of Haryana to digitize land records. Land record related information is made available through <a href="http://jamabandi.nic.in">http://jamabandi.nic.in</a> [75].</th>
<th>Land Record Management</th>
<th>Government of Haryana</th>
</tr>
</thead>
<tbody>
<tr>
<td>45</td>
<td>CARD</td>
<td>Computer-Aided administration of registration department (CARD) is an e-governance initiative undertaken by the Government. of Andhra Pradesh. It offers services like sale deed, mortgage deed, gift, lease, collection of stamp duty, and transfer of property and verification of encumbrance on the property [27],[28].</td>
<td>Land Record Management</td>
<td>Government of Andhra Pradesh</td>
</tr>
<tr>
<td>46</td>
<td>SARITA</td>
<td>SARITA (Stamps and Registration Information Technology based Administration) is a project of Government of Maharashtra. SARITA aims to design, develop, and implement a computerized application for registration of documents, which are submitted in various sub-registrar office. This aims for provision of updated data on timely basis to their respective Joint District Registrars and higher offices under the purview of Department of Registration, Pune, Maharashtra State [76].</td>
<td>Land Record Management</td>
<td>Government of Maharashtra</td>
</tr>
<tr>
<td>47</td>
<td>Computerization of Sub Registrar Office</td>
<td>Computerization of Sub Registrar Office is an e-Governance initiative of the Government of NCT of Delhi. This project envisages to develop user friendly system and facilitate transparency in valuation of properties and calculations of Land Record Management</td>
<td>Government of NCT of Delhi</td>
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<td>stamp duty and registration. Objective of this also include enhancement of the speed, reliability and consistency in the system and also improve efficiency in record management system. This also generate exceptional report for the purpose of auditing [77].</td>
<td>KAUVERI</td>
<td>KAVERI (Karnataka Valuation and E-Registration) is one of the early online property registration projects in India. C-DAC developed software called KAVERY for this automation and operates by public-private-partnership. It offers services like property valuation, Stamp duty calculation, Payment of duty, receipt generation capturing witness details etc [27],[78].</td>
<td>Land Record Management</td>
<td>Government of Karnataka</td>
</tr>
<tr>
<td>48</td>
<td>Mandals Online is an e-Governance project of the Government of Andhra Pradesh</td>
<td>Mandals Online</td>
<td>Land Record Management</td>
<td>Government of Andhra Pradesh</td>
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<tr>
<td>49</td>
<td></td>
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</table>
Andhra Pradesh. Each of the 1,124 Mandal Revenue Offices (MROs) has been computerized. These MROs are now able to deliver online statutory certificates to individuals in a few minutes. A database of land records for every owner is being created so that certificate of ownership also can be issued across the counter [79].

| 50 | Bhoomi | Bhoomi is an e-Governance project of Karnataka for on-line delivery and management of land records. It has reduced the discretion of public officials by introducing provisions for recording a mutation request online. Citizen can access the database and are empowered to follow up. A printed copy of the RTC can be obtained online by providing the name of |
| Land Record Management | Government of Karnataka |
the owner or plot number at computerized land record kiosks in taluk offices, for a fee. [80].

e-Nibandhan is an online land record management system established by the Department of Registration, Government of Jharkhand. E-Nibandhan facilitate the registration process, in the state of Jharkhand having a central monitoring approach. The e-Nibandhan portal (http://210.212.20.87/jars/website/) is intended to provide various utility services related with the different functions of the registration department. This provide facility for stamp duty calculation, searching of objectionable lands, online non-encumbrance certificate processing, etc [81].

Land Record Management

Government of Jharkhand
<table>
<thead>
<tr>
<th>Page</th>
<th>Project</th>
<th>Description</th>
<th>Law and Order</th>
<th>Responsible Agency</th>
</tr>
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<tbody>
<tr>
<td>52</td>
<td>CVC-e-Governance</td>
<td>CVC e-Governance through Control of Corruption is an e-Governance project of the Central Vigilance Commission of the Government of India. This portal provides facilities for online complaint lodging and its status monitoring along with several other functionalities [82].</td>
<td></td>
<td>Central Vigilance Commission, Government of India</td>
</tr>
<tr>
<td>53</td>
<td>E-COPS</td>
<td>E-COPS is an e-governance project of the Police Department of Government of Andhra Pradesh, initiated in 2002. Through this public can file their FIR, they can know the status of their complaint by using the unique FIR number, it also computers records from police stations to Police headquarters [83].</td>
<td></td>
<td>Department of Police, Government of Andhra Pradesh</td>
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<tr>
<td>54</td>
<td>CAPS</td>
<td>CAPS (Computer Aided Police Service) is an e-Governance project of Government of Kerala. CAPS brings all police</td>
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<td>Government of Kerala</td>
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<td>Page</td>
<td>City/Department</td>
<td>Details</td>
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<td>55</td>
<td>Thiruvananthapuram City Police Portal</td>
<td>It is a collaboration and interaction portal developed by the Thiruvananthapuram City Police. The portal facilitate many online services like online complaints, online discussion forum etc [85].</td>
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</tr>
<tr>
<td>56</td>
<td>Kolkata Police Intranet &amp; Computer Network</td>
<td>Kolkata Police Intranet and Computer Network is an e-Governance Project of the Kolkata Police Department, West Bengal. This initiative aims to increase efficiency of the existing operations in the Thana offices and Battalion, more effective Crime Control. This also used for enhanced control of day-to-day</td>
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<td>Law and Order</td>
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<td></td>
<td>Trivandrum City Police, Kerala</td>
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<td>Law and Order</td>
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<td></td>
<td>Kolkata Police Department, West Bengal</td>
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<td>Operation of the police and close liaison with Lalbazar Higher officials. With the support of Webel Technology Limited 45 police stations of Kolkata Police and 5 Divisional Offices and 30 other offices of Battalion and AC's are networked as part of this Project [86].</td>
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<td>FISHNET- ReAL Craft is an e-Governance project of the department of fisheries, Kerala. It was developed by NIC, Kerala. This has a knowledge based web portal and having facility for online registration and licensing of the fishing vessels, permit for other state vessels etc [87].</td>
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<tr>
<td>Licensing and Registration</td>
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<td>Department of Fisheries, Government of Kerala</td>
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<p>| Web Based Blood Banks Information System is an E-Governance project of the Department of Health and Family Welfare, Government of NCT of Delhi |
| Medical Information Services |
| Department of Health and Family Welfare, Government of NCT of Delhi |</p>
<table>
<thead>
<tr>
<th>59</th>
<th>Dr. SMS</th>
<th>Dr. SMS is an e-Governance project of the Health Department of the Government of Kerala. This project enables people to access the health related information like availability of hospitals in a specific location, facilities available in the hospital, information about hospitals having expertise in various medical specialties, doctors in the locality etc. To avail the facility the user has to send an SMS to a specific number, and the information will be sent back to the user via SMS [89].</th>
<th></th>
<th>Medical Information Services</th>
<th>Department of Health, Government of Kerala</th>
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<tbody>
<tr>
<td>60</td>
<td>Aadhaar</td>
<td>This an e-governance initiative of the Government of India to Unique Identification Authority of</td>
<td></td>
<td>Unique Identification</td>
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<td></td>
<td>E-Mantra Applications</td>
<td>This is an e-governance initiative by the General Administration Department, Government of Maharashtra to improve internal efficiency, monitoring and to bring Transparency. This provides facility for online file tracking, online monitoring of attendance, meeting management, pay roll generation, etc [91].</td>
<td>MIS</td>
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<tr>
<td>61</td>
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<td></td>
<td>Excise Management Information System</td>
<td>Excise Management Information System is an e-Governance project of the Government of NCT of Delhi for internal efficiency improvement and easy availability of</td>
<td>MIS</td>
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<tr>
<td>62</td>
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<tr>
<td></td>
<td>KM-ATOM-File Management System</td>
<td>IDEAS</td>
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<tr>
<td>63</td>
<td>KM-ATOM-File Management System is an e-Governance Project of the Government of Andhra Pradesh implemented in departments and in the district collectorates. It helped the officials to do their works more effectively and reduces the time involved in all services. It provides an effective MIS for improving accountability in office environment. In order to satisfy the aim for paperless offices this project process all files electronically [93], [94].</td>
<td>IDEAS is a file tracking system, which is an e-Governance project coordinated by the Kerala State IT Mission and the National Informatics</td>
<td>MIS</td>
</tr>
<tr>
<td></td>
<td>Government of Andhra Pradesh</td>
<td>Kerala State IT Mission, Government of Kerala</td>
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</tbody>
</table>
Centre-Kerala. IDEAS acts as a web based file management system to track that records details of the documents that come to government office, like petitions or complaints received from public, or communications received from other departments called ‘Tapal’s etc. ‘IDEAS has been implemented in the offices of ministers and the various administrative departments in the Government Secretariat under the Secretariat Internet Communication System’ [95].

65 Release Order System

Release Order System is an E-Governance project of the Government of NCT of Delhi commissioned in March 2005 for auto Generation of Release Order for publication units. The problem of non availability of proper database of

MIS

Government of NCT of Delhi
publications published and circulated in Delhi was solved with the initiative. It reduces the processing time from 1 hour to 5 minutes [94].

<table>
<thead>
<tr>
<th>66</th>
<th>RD-Net</th>
<th>RD-Net is an e-Governance project of the Government of Nagaland for rural development activities. NIC developed applications like Ruralsoft, RuralBazaar, Priasoft, BPL, DRDA Portal, etc. for online monitoring of centrally sponsored schemes. Priasoft facilitate fund management by Rural Local Bodies and RuralBazar strengthening marketing needs of the products produced by rural people.</th>
<th>MIS</th>
<th>Government of Nagaland</th>
</tr>
</thead>
<tbody>
<tr>
<td>67</td>
<td>IWDMS</td>
<td>Integrated Workflow and Document Management System (IWDMS) is an e-Governance project of the Science and Technology Department</td>
<td>MIS</td>
<td>Science &amp; Technology Department, Government of Gujarat</td>
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</table>
of the Government of Gujarat, to improve the accountability, transparency & effectiveness in government administration. Integrated Workflow & Document Management System provides knowledge management and collaborative working environment. This also facilitates document management, workflow management, and also delivers an electronic workplace [97].

| 68 | Mukhya Vahini | Mukhya Vahini is a project under the IT Millennium Policy of the Karnataka state government. It's a Decision Support System for the Chief Minister of the state to monitor citizens' grievances, performance of various departments, progress of investment proposals etc. Mukhyavahini facilitates | MIS | Government of Karnataka |

|  |  |  |  |  |
The web portal of Home Department is an e-Governance portal of the Home Department, Government of Gujarat. It covers total 70 individual websites, including that of the Home Department, all its HODs like Anti-Corruption Bureau, Prohibition & Excise, IG Prisons etc., and Gujarat Police, Port and Transport Department, Commissioner Transport, RTOs and Multiple Government of Gujarat.

Through Mukhyavahini, the automated functioning of the Chief Minister's secretariat, the basic modules in this project include constituency pending with the government of India, budget ATR, cabinet affairs, proposals management system, pending with the performance of various departments, response to public grievances etc. can be improved [98].

<table>
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<tr>
<th>Portal of Home Department</th>
<th>Multiple Government of Gujarat</th>
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<tr>
<td>Web Portal</td>
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<tr>
<td>Home Department</td>
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<tr>
<td>Governance portal of the</td>
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<tr>
<td>Home Department</td>
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</tbody>
</table>
Mahiti-Shakti is an e-Governance project of Gujarat, that is a citizen service portal for citizen. Users can access information related to all aspects of the government's functioning, various benefit schemes and services like getting ration cards, sanctioning old age pension etc. are also available [100]. Information on seeds, details of fertilizers,
pesticides insecticides, and organic manure etc also available.

<p>| 71 | TARAhaat | TARAhaat [101] is an e-Governance project which is implemented by an NGO called Development Alternatives which was started in 2000. TARAhaat is a connecting gateway to the villages with the information, services, entertainment and also to various markets, through a network of networked franchisee centers [102]. This initiative is using Information Technology as an empowerment tool for social development. Main objectives of the project is changing the attitudes, informing the people, demolishing myths, developing human capacity, creating support groups, etc. using IT. Major services of this projects includes agri advisory, | Multiple Services | Development Alternatives |
|   | SUWIDHA | SUWIDHA (Single User-friendly Window Disposal Helpline for Applicants) project was initiated in August 2002 at Fatehgarh Sahib in Punjab. Now the project replicated in all districts. The project is being executed in all Deputy Commissioners’ offices. The objectives of the project include: ‘providing service level convenience to the citizens, re-engineering of government processes to provide quality and timely services to citizens, to integrate SUWIDHA Back-end Services (SUBS) with front-end to reduce the | Multiple Services | Government of Punjab |
| 73 | Employee Personal Information System | Employee Personal Information System is an e-Governance project of the Government of NCT of Delhi. Main objectives of the project include internal efficiency improvement, better record management, faster processing of application, easy availability of information, quick preparation of reports, collaboration and sharing of information, providing service through internet. The main feature is that applicants can find the status of their... | Personnel Management | Government of NCT of Delhi |</p>
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<th>Page</th>
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<tr>
<td>74</td>
<td><strong>IntraNaga Portal</strong>&lt;br&gt;IntraNaga Portal is an e-Governance initiative of the Government of Nagaland proposed in the e-Governance Plan of Nagaland. This portal would capture all requirements catering to the employees of govt. departments [46].</td>
</tr>
<tr>
<td>75</td>
<td><strong>Allotment of Personal ID Numbers</strong>&lt;br&gt;Allotment of Personal ID number is an e-Governance project of the Principal Accounts Office (PAO) of the Government of NCT of Delhi. This initiative proposes to bring uniformity in all service matters. An identification number is allotted to employees, this unique personal ID number can be referred in transfer posting, salary payment, advance/withdrawal, personal information management, pension etc [105].</td>
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<td>76</td>
<td>SPARK</td>
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<td>TETRAPDS</td>
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<td>79</td>
<td>VATsoft</td>
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Karnataka. VatSoft has been developed for processing and monitoring the tax collection under VAT. VATSoft facilitates to download the VAT 505 forms, request and download the CST forms, upload the sales, purchase and export invoices details. VATSOFT has helped the department in improving the tax administration and is also assisting the department in detecting the tax evasion cases. VATonline system is online system wherein the dealers can file their returns and other documents to the department through web-based system [110],[111]

MAHA-MAHAVIKAS is an e-Governance project of the Finance Department, Government of Maharashtra to facilitate file return online to Tax Administration

Finance Department, Government of Maharashtra
| 81 | Tele Medicine | Government of West Bengal has started in Telemedicine in 2003. Through this telemedicine initiative Purulia district hospital is linked with the medical colleges like NRS Medical College and Burdwan Medical College to provide specialized health care services to the distantly separated patients and doctors. It uses Internet for communicating between the doctors and patients [86]. | Telemedicine | Government of West Bengal |
| 82 | Computerised Bus Pass System (CBPS) | Computerised Bus Pass System (CBPS) is an e-Governance project of the Government of NCT of Delhi to computerize the records and thereby reduce the time taken in issue of passes to bus | Transportation | Government of NCT of Delhi |
| 83 | IMPRESS/CONCERT | Electronic Ticketing in Indian Railways. Indian railways offer a host of ticketing services to the travelers. IMPRESS is a railway reservation system started in 1980's which was developed by CMC. Which has undergone several changes to network all railway nodes. Currently Indian Railway is using CONCERT Software which is implemented by the Centre for Railway Information Systems (CRIS)[27],[114]. | Transportation | Government of India |
| 84 | Automatic Vehicle Tracking System Pilot System | Automatic Vehicle Tracking System Pilot System is an e-Governance project of the Government of NCT of Delhi commissioned | Transportation | Government of NCT of Delhi |
| 85 | AP Online | AP Online is a single window e-Governance gateway for the Government of Andhra Pradesh to offer multiple services to its citizens. AP Online is comprehensive in scope and it has informative and interactive features. It offers payment and other services to citizens [116], [117] |
| 86 | VOICE | Versatile Online Information for Citizen Empowerment (VOICE) is an e-Governance project of the Vijayawada Municipal Corporation in Andhra Pradesh. It brings together Andhra bank, e-Seva counters and a set of mobile tax collection vans. VOICE |
E-Sampark provides different civic services like payment of dues like taxes, issue of various licenses like Trade license, building permits, birth and death certificates etc [118].

e-Sampark is an e-Governance project of the Government of Chandigarh aiming to provide services of the departments through one window. Services includes payment of taxes, utility bills, phone bills, birth/death certificate, passport application, sale of stamp paper etc through e-Sampark Centres spread across the City and Gram Sampark Centres in the villages [119].

Citizen Service Bureau is an e-Governance project of the Municipal Corporation of Delhi (MCD) commissioned in March 2003. Through this booking of community hall and Utility Services

Government of Chandigarh

Utility Services

Government of NCT of Delhi
<table>
<thead>
<tr>
<th>#</th>
<th>Program/Service</th>
<th>Description</th>
<th>Utility Services</th>
<th>Government/Corporation</th>
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<tbody>
<tr>
<td>89</td>
<td>eCity (AMC)</td>
<td>eCity (AMC) is an e-Governance project of Ahmedabad Municipal Corporation in Gujarat. It facilitates the municipal services like issue of birth and death registration, building plan, city cleanliness, primary health and education, sewage, water supply, road, street-lights, parks and garden through e-governance to citizens of the city. Citizen can avail services from any of the centers [100].</td>
<td>Ahmedabad Municipal Corporation, Gujarat</td>
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<td>90</td>
<td>SUGAM</td>
<td>SUGAM is an e-Governance project of the Government of Himachal Pradesh; SUGAM center has several counters for delivery of service to the citizens. SUGAM Centre also provides</td>
<td>Utility Services</td>
<td>Government of Himachal Pradesh</td>
</tr>
<tr>
<td>91</td>
<td>BangaloreOne</td>
<td>BangaloreOne is an e-governance project by Government of Karnataka. BangaloreOne provides a number of government services. Services like electricity bill payment, payment of municipal taxes, water and sewage charges, motor vehicle tax, passport application, telephone bills etc. BangaloreOne provide various</td>
<td>Utility Services</td>
<td>Government of Karnataka</td>
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<td>information on daily market rates (AGMARKNET), job vacancy announcement, bus time table, search of blood donors, pensioners help line, e-tracking of the already submitted application/letters in the state secretariat, examination results, daily case list of various courts, electricity bill payment, hotel reservation, online complaint registration, etc [121].</td>
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<td></td>
<td>Gyandoot</td>
<td>Gyandoot is an e-Governance project of Madhya Pradesh started in 2000 with the installation of a low cost rural intranet covering 20 villages. It offers services like agriculture produce auction centers rates, copies of land records, online registration of applications, online public grievance redressal, village auction site, transparency in government etc [27], [123].</td>
<td>Utility Services</td>
<td>Madhya Pradesh</td>
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<tr>
<td>93</td>
<td>Integrated Citizen Service Centres (ICSC)</td>
<td>Integrated Citizen Service Centres (ICSC) is an e-Governance project included in the e-Governance plan of the Government of Nagaland to provide a single counter to the citizens for making bill payments, submission of applications, obtain statutory certificates, to get details about</td>
<td>Utility Services</td>
<td>Government of Nagaland</td>
</tr>
</tbody>
</table>
government programmes and schemes, also to access other special services etc [46].

| 94 | Gramdoot | Gramdoot is an e-Governance project of Rajasthan started with Optical fiber manufacturing company ABL to help bridge the digital divide between rural India and the rest of the world. Objectives of the Gramdoot, include provision of Internet, cable TV, telephone connectivity to Gram Panchayats and also for developing a business model in rural broadband connectivity. Major services offered through Gramdoot include submission of complaints to the Tehsil or district headquarters, filing of application to obtain various certificates like caste, domicile, income certificates, etc. [123]. | Utility Services | Government of Rajasthan in collaboration with ABL |
| 95 | SETU | The Integrated Citizen Facilitation Centres (SETU) is an e-Governance initiative of the Government of Maharashtra. SETU is established as a common service center for different services which were facilitated individually by different departments and offices. Services offered through SETU include issue of certificates, permits, authentication, affidavits and several other services [76], [124]. | Utility Services | Government of Maharashtra |
| 96 | LokMitra | LokMitra is an urban centric e-governance project of Government of Rajasthan. It started in 2002 as a twin project of e-Mitra. Services offered under LokMitra are payment of utility bills, online bus ticketing, issue of birth and death certificate, payment of various dues/fee, payment of phone bills etc. [125]. | Utility Services | Government of Rajasthan |
| 97 | Coimbatore Municipality Portal | e-Governance in Coimbatore Municipal Corporation offers various services of different government departments through a single portal. It’s services include property tax payment, utility bills payment, building plan approval, issue of certificates, Auditorium booking etc [126]. | Utility Services | Coimbatore Municipal Corporation, Tamil Nadu |
| 98 | E-Seva | E-Seva is an e-governance initiative of the Government of Andhra Pradesh to facilitate the public utility services like payment of property taxes, electricity, water supply, telephone bills, income tax payment, passport application, booking of train and bus ticket, etc. It is started in 2001 and currently offering number of services through e-Seva Centres constituted in different parts of Andhra Pradesh [27]. | Utility Services | Government of Andhra Pradesh |
| 99 | FRIENDS | FRIENDS (Fast Reliable Instant Efficient Network for Disbursement of Services) Janasevana Kendram is an e-Governance imitative of the Government of Kerala. FRIENDS is a 'Single Window Mechanism' which facilitate payment of different types of taxes and other payments to the government like electricity bills, telephone, water, university fees etc. At present FRIENDS Janasevana Kendrams are located in various parts of the state. Railway reservations can also be made in some centres like Wayanad, Pathanamthitta and Malappuram [127]. | Utility Services | Government of Kerala |
| 100 | Chennai Metro Water Supply & | Chennai Metro Water Supply and Sewage Board (CMWSSB) initiated computer based | Utility Services | Chennai Metro Water Supply and Sewage Board, |
Sewage Board (CMWSS B) system to improve the collection of payments from citizens. Through an electronic delivery of service (EDS) 20 area offices, 70 depot offices, and 22 branches of Canara Bank, people can pay the bills. Citizen can make payment online using credit card [128].

<table>
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<tr>
<th>Sewage Board (CMWSS B)</th>
<th>Tamil Nadu</th>
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<td>system to improve the collection of payments from citizens. Through an electronic delivery of service (EDS) 20 area offices, 70 depot offices, and 22 branches of Canara Bank, people can pay the bills. Citizen can make payment online using credit card [128].</td>
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### Table 2.1 Examples of e-Governance Initiatives in India

#### 2.6.3 Legal and Policy Framework of e-Governance in India

Any implementation of the e-Governance initiative is based on its legal framework as each e-governance applications will be revolving around the policies, rules, regulations introduced time to time by the Government. Importance and commitment of e-Governance can be noticed from role played by different Governments in India in formulating appropriate rules and regulations.

United States of America (USA) had passed E-Governance Act in its 107th Congress held during 2002 [26] and Electronic Communications and Transaction Act enacted by the Parliament of the Republic of South Africa during 2002 [26] are examples among many such initiatives globally. Similarly, India also have provided legal framework for e-governance [26].

Following sections illustrate the legal/policy level developments, which facilitate and support the applications of Information Communication Technology (ICT) in the functioning of the government at various levels including that in central, state and local level.
2.6.3.1 The Information Technology Act

One of the major initiatives in support of electronic governance was the ‘The Information Technology Act, 2000’ ‘to provide legal recognition for transactions carried out by means of electronic data interchange and other means of electronic communication’. [26].

The Information Technology Act, 2000 [129], provides legal recognition for electronic records and digital signatures. It also emphasises the use of electronic resources and digital signature in government and its agencies. It may be noted that a working group on ‘Legal Enablement of ICT Systems’ was established by the NIC. Justice Somasekhara Banavar was given the responsibility of working out Standards and Guidelines for implementation of various e-Governance projects under the National e-Governance Plan (NeGP) [33] of DIT. This working group is having the following terms of reference [130]:

1. ‘Focus on legal impediments & hurdles in adoption of e-Governance and suggest legal and procedural remedies.

2. Examine the existing legalisations in all areas touching upon the sectors relating to the Mission Mode Projects with a view to identify the legal impediments and hurdles in adoption of e-Governance in those sectors.

3. Organise group of experts in each legal wing of the Courts and Government for checking use and misuse of e-Governance periodically and as when necessary.

4. Examine outmoded laws like RTI & Consumer protection Act, Accessibility Rights and Intellectual property Policy etc and suggest new laws with respect to e-Governance applications.

5. Examine if existing legal infrastructure is adequate to adopt e-Governance standards/applications and suggest methodologies to create a robust legal framework in the area of e-Governance.
6. May suggest adopting and applying international standards, best practices in legal e-Governance to suit international methods and standards to achieve uniformity.

7. Aide and advice government and other legal bodies in coordination with other working groups.

8. Help create a knowledge base, which can be referenced by all Governmental bodies, department and institutions for the concerns to their challenges concerning the legality and legal implementation of e-Governance in their respective institutions.

9. To make the modifications to the TOR as may be appropriate during the course of development. The Group may co-opt other experts from academia, industry, consulting professionals and government [130].

The Information Technology Act, 2000, was further amended with the Information Technology (Amendment) Act, 2008 [131]

Above initiatives indicate that e-governance is going to be implemented in a big way in the country and appropriate legal requirements are being considered.

2.6.3.2 The Companies (Amendment) Act 2006

The Companies (Amendment) Act 2006 [132] published in the Official Gazette of India on 30th May 2006 provided legal validity to the Ministry of Company Affairs –21 project (MCA-21). Which would provide electronic filing of documents and records of a company including registration, adaptation of all statutory forms for electronic filing, scanning and digitization of permanent records, annual returns and balance sheets. This e-governance initiative was installed to facilitate the public, corporate entities and other stakeholders an easy and secured on-line access to corporate information at any time and from anywhere [132].
2.6.3.3 The Right to Information Act

In 2005, Government of India passed the Right to Information Act for providing right to information for citizens to get access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority.

Above act discusses the obligation of the Public authorities to provide easy access to Information. As per the Act ‘every public authority shall- maintain all its records duly catalogued and indexed in a manner and the form which facilitates the right to information under this Act and ensure that all records that are appropriate to be computerised are, within a reasonable time and subject to availability of resources, computerised and connected through a network all over the country on different systems so that access to such records is facilitated’ [133]

Hence, Right to Information Act is also supporting the computerization of the facilities, ultimately which can be achieved by means of e-Governance.

2.6.3.4 National Identification Authority of India Bill, 2010

Government of India has initiated process of issuing Unique Identification number called ‘aadhaar numbers’ to the citizens for the purpose of identifying them and reducing the duplication of data about the individuals residing in India. The Cabinet approved the proposal for introducing the National Identification Authority of India Bill, 2010 in Parliament to provide a legal backing for the authority.

The Bill proposes to constitute a statutory authority to be called the National Identification Authority of India and lay down the powers and functions of the Authority, the framework for issuing UID numbers called ‘aadhaar’ numbers, major penalties and other related matters through an Act of Parliament.

The Bill seeks to establish the National Identification Authority of India for the purpose of issuing ‘aadhaar’ numbers to individuals residing in India and
to certain other classes of individuals [90]. Eventually ‘aadhaar’ number might be useful in interoperation between individual details in various e-governance applications.

2.6.3.5 Information Technology Policies of State Governments

Information Technology is impacting whole walk of life including that of administration, democracy and governance. India being one of the leaders in the Information Technology in the world, Government of India and different State Governments have taken keen interest in promoting IT initiatives. In order to facilitate the holistic applications of IT, different State Governments have brought out Information Technology Policies. Such policies highlight government’s vision and mission for improving IT Infrastructure, Human Resource Development, and Industry Promotion etc.

A close analysis of Information Technology policies of different state governments shows that all State Governments are committed to offer e-Governance and provide citizen centric services to the mass using IT. Many state governments have set apart a portion of their budget for computerization or application of e-governance in government departments. Similarly, state governments are eagerly promoting the IT industry and enhancing the human resources base by setting up technology parks and IT related educational Institutions. Several governments undertaking initiatives for IT Literacy to common man and also to the government employees will boost the application of IT in government and its usefulness to the citizen.

Several State governments and its departments are institutionalizing the promotion of IT Application/e-Governance by forming different task forces, or empowered committees with appropriate roles and responsibilities. Many state governments have taken initiatives in formulating related policies like IT Security Policy, Audit Policy, ITES Policy etc to enable IT based applications including online transactions. Similarly, State governments are amending appropriate rules and acts for facilitation of IT applications including e-governance. A study of IT policies in the context of e-governance is given
below to give an overall picture of the IT policies and how different
governments have prioritized implementation of IT in governance.

Many State governments have been implementing e-Governance applications
based on the policies they formulated. Those initiatives are mentioned
separately.

2.6.3.5.1 IT Policy of the Government of Andhra Pradesh

Andhra Pradesh has emerged as one of the leading states in India in e-
governance applications. Accordingly, in 1998 Andhra Pradesh constituted the
first Department of Information Technology in the country [21]. Government
of Andhra Pradesh also prepared a submission paper for the National
Information Technology Task Force, highlighting policies and initiatives that
were essential for India to gain leadership position in the IT age.

AP First: Information Technology Policy of the Government of Andhra
Pradesh, published way back in 2000 [22] itself made an endeavor to put in
place the overall framework necessary for achieving the e-governance
objectives of the state. According to the Information Technology Policy of the
Andhra Pradesh ‘e-Governance is one of the pillars of the edifice of IT’ and
gives a very detailed description of its strategy towards e-governance. Along
with the detailed survey of the e-governance initiative, the policy also
discusses the approach on computerization of departments, local language
initiatives, security policy, internet and email policy, along with the cyber law
to ensure overall legal regime in consonance with the requirements of
transactions and interactions in the electronic medium.

In order to provide legal backing of the e-governance and electronic
transactions the Information Technology policy of Andhra Pradesh envisages
to examine all the state level legislations and statutes so as to ensure the
necessary harmonization and is to provide a transparent, simple and
enforceable set of laws, which shall facilitate e-business and all other IT-
enabled activities.
2.6.3.5.2 IT Policy of the Government of Assam

Government of Assam issued its latest Information Technology Policy of Assam [134] during August 2009, replacing its previous policy, which was issued in 2000 with the objective, among others, of improving delivery of the government services to the citizens of the state.

The Information Technology Policy lays down the various strategies and enablers to achieve its broad objectives, which include [134]:

i. Government to Government (G2G) Strategies
ii. Government to Business (G2B) Strategies
iii. Government to Citizen (G2C) Strategies
iv. ICT Interventions in Education Sector
v. National e-Governance Plan (NeGP)
vi. Strengthening of Government Institutions
vii. IT Infrastructure Development and Growth Strategies
viii. Security Policy
ix. Implementation of the IT Act, 2000
x. GIS and Mapping Policy
xi. Data Mining and Data Warehousing Policy
xii. Free and Open Source Software Policy
xiii. Anti Piracy Policy
xiv. Investment Promotion Policy

As per the IT Policy the government earmarks special budget allocation of at least 5% of plan fund allocation to the government departments every year to complete their computerization programmes, and implementation of the various components and strategies outlined in its IT Policy.

Computerisation of the government departments, action plan for implementation of e-Governance project within the overall framework of the National E-Governance Plan (NeGP), connectivity among all govt. offices to link to a State Wide Area Network with suitable bandwidth, promotion of the
use of e-Commerce, plastic money, payment gateways etc. to enable online transactions are also highlighted in the Policy to facilitate the e-governance in Assam.

Assam Electronics Development Corporation Ltd. (AMTRON) has been nominated as implementation agency for programmes under National e-Governance Plan (NeGP) in Assam.

As government proposes to rely extensively on Information Technology to provide its services, the state is in the process of formulating IT Security Policy as per ISO 17799 security standard and prevalent Cyber laws of India. This will emphasize the need for the departments to monitor their electronic operations, and conduct regular security audit of the IT systems and software.

IT Policy of Assam also describes its policy on Data Mining and Data Warehousing to assure that government data are easily accessible to the Government, staff, beneficiaries and citizens in Assam. As per this policy [134]:

- All users and departments within the Government will follow a well defined practice to prepare data so that the same can be shared, viewed, queried across the Government whenever and wherever required.

- Metadata will be collected and reviewed at all the three critical stages-data preparation, data modeling, and deployment – to classify as Transactional Data, Purchased Data and Collected Data for Data Mining process within the Government.

- The Government shall strive to build a robust Information System (IS) based on Metadata and Digital content.

**2.6.3.5.3 IT Policy of the Government of Bihar**

Bihar Government in its draft Information Technology Policy (2008) [135] envisioned to become one among the top 5 e-governed states in India. With
specific objective of using e-governance to implement government’s agenda of good governance, to take all necessary steps to gain the maximum advantage under the National e-Governance Plan and the resources available therein for enhancing e-Governance in Bihar State and also to provide anywhere anytime cost effective services to the citizen.

According to the policy Bihar government intends to provide connectivity, access and services from secretariat to the village level. 3% of the total plan outlay is earmarked for IT sector and all departments in the state nominate a nodal officer responsible for implementation of e-governance initiatives.

In order to provide interoperability of the systems and services the proposed policy envisage to formulate standards, templates and data formats in consultation with IT, academic and domain experts. Policy also envisages implementing IT in all points of contacts of the citizen to government by 2009-10 and shall target 100% IT literacy among its employees.

2.6.3.5.4 IT Policy of the Government of NCT of Delhi

IT Policy of the Government of NCT of Delhi [136] is governed by e-Governance, equality, education, employment, economy and entrepreneurship. The policy envisions the e-Governance as a tool to deliver a government that is more proactive and responsive to its citizens.

In order to implement the policy, it was proposed to form a high level committee under the chairmanship of the Chief Minister and formation of different core groups in various key areas including that of e-Governance. As per the policy government reinvent the government process to make its functions citizen centric, transparent and efficient. Government has identified nine departments to go online such as revenue, transport, sales tax, excise, education, social welfare, co-operatives, health and labour. It also envisions providing most of the government services online, over Internet.

Delhi Government has also come up with an IT Security and Audit Policy.
2.6.3.5.5 IT Policy of the Government of Goa

IT Policy of the Government of Goa (2005) proposed to set up a task force for Good Governance under the chairmanship of the minister to lay down the policy framework for achieving the objectives of good governance, including e-Governance. Ensuring the flow of sufficient funds for e-Governance activities is the responsibility of the task force. [137]

As per the IT policy, Goa government propose to optimally utilize Information Technology to restructure government-citizen interface with the objective of providing good governance, Goa government envisage to offer all its services through e-Governance applications.

In order to boost the e-governance activities of the state, IT policy propose to provide a one-time honorarium to every member of the department that successfully implements the e-Governance application completely on schedule. The members of Project Leadership Committee shall be entitled to an additional increment along with honorarium.

2.6.3.5.6 IT Policy of the Government of Gujarat

Key policy highlights of the IT Policy of the Government of Gujarat include:

Directions to all line departments for earmarking of up to 3% of their plan outlay for implementation of e-Governance initiatives.

In order to accelerate the e-governance initiatives important personnel management initiatives are also highlighted in the IT Policy [138], including:

- IT Training for all government employees
- All Class III employees as well as Class I & II employees will be required to pass ‘CCC’ and ‘CCC+’ level certification respectively in order to avail their future promotions.
• Gujarati language software standardization to help improve interoperability of software / database among various government departments.

• Amended recruitment rules made computer skills compulsory for all future direct recruitments to Class I to III cadres in the State Government.

2.6.3.5.7 IT Policy of the Government of Haryana

Information Technology policy of the Haryana government envisioned to replace traditional delivery system of public services by IT based systems for the cost-effective and better functioning of government services to meet requirements of the citizen [139].

In order to achieve accountability and efficiency in administration, the policy proposed to establish information databanks for all government departments as a mandatory requirement.

The policy proposes to undertake intensive re-engineering and administrative reforms, in order to facilitate adaptation to information technology. This process includes ‘removal of redundancies, resource optimization and rationalization of rules and procedures to bring about transparency in working and enhancing efficiency and productivity’ [139]. The policy also proposed to provide a single window point of contact for all electronic service of the state by integration of various projects across departments.

Policy proposed to generate fund for e-Governance with contributions from profit making state PSUS, co-operative institutions and other public sector organisations. ‘The fund shall be utilised for developing replicable and reusable models of e-Governance, IT innovations in administration reengineering, IT supported resource optimization, decision support systems, MIS, intranets and other applicable enabling technologies’[139].

IT Policy of Haryana also proposed standardization of the hardware and software for procurement by adopting the specifications laid by the Hartron
which shall be the sole agency of the state government. It also proposed standardization of the data to the feasible extent. Above efforts will facilitate the manageability, portability, and inter-operability of the systems.

As per the policy the government shall implement an IT Literacy Plan to achieve 100% IT literacy in the government and propose to have IT cell in each departments to be headed by Chief Information Technology Officer (CITO) who shall co-ordinate and supervise implementation of e-Governance. Senior and middle level functionaries in the departments shall be trained in relevant IT applications and management techniques apart from achieving minimum defined proficiency level.

A State Level Steering Committee called IT PRISM headed by the Chief Secretary shall oversee computerisation and application of IT in public domain.

2.6.3.5.8 IT Policy of the Government of Jharkhand

Information Technology Policy of the Jharkhand state proposed to computerize and network all major departments over a period of time so as to provide government services over electronic media and thereby achieve speedy, transparent and accountable governance [140].

Policy also proposed to provide training for all government employees in use of Information Technology. In order to facilitate such training special training institutes are proposed. It also proposed to introduce e-mail and internet access in all Govt. districts offices and take steps to initiate computerisation of all its major functions.

2.6.3.5.9 IT Policy of the Government of Kerala

IT Policy of the Government of Kerala (2007) [141] discusses the importance of IT in Government and government’s commitment in implementing e-Governance. It also says ‘The State will try to make maximum use of ICT in governance, to provide the best possible services to the citizen’.
As per the IT Policy of the Government of Kerala ‘The State will structure its e-governance projects based on the National e-Governance Plan and suggestions given by the National Knowledge Commission, in addition to locally relevant factors’.

Above Policy throws light on the need for interoperability among different application. According to this policy a data inventory is to be setup for sharing of data between government agencies and to avoid duplication of work. Data standards including data structures would be adopted / created to ensure interoperability. Creation of standardized spatial data set will be a priority area’ [141].

2.6.3.5.10 IT Policy of the Government of Maharashtra

In Maharashtra the state government announced its first IT Policy in 1998. It was followed by the IT and IT Enabled Services Policy in 2003. Both were followed by the IT/ITES Policy 2009. Above policies provide comprehensive support for IT sector in Maharashtra [142],[143].

The IT Policy of Maharashtra (1998) itself had stressed on the importance of IT in Government sector ‘to improve the quality and productivity of services rendered by Government, make Government more transparent and bring IT to the common man’. IT policy proposed to computerize the department having more citizen interaction like sales tax, revenue, health, education, irrigation, PWD. The Policy also proposes to set up measures for disseminating information instantly using various means like bulletin board and Public Tele InfoCentres. It was also proposed to replicate the Varananagar project in other regions of the State. Application of IT for government process monitoring for speedy implementation of the projects and programme for increasing the IT literacy among government employees was also proposed [142].

Based on above mentioned policies different e-governance initiatives have been taken by Maharashtra Government in the past few years. Maharashtra IT/ITES Policy published in 2009 [143] highlights to make the e-governance initiatives in bilingual in English and Marathi in order to maximize its
benefits. Initiatives will be undertaken to standardize Marathi language software so as to ensure interoperability. The policy proposes to introduce Unicode in government offices.

2.6.3.5.11 IT Policy of the Government of Manipur

Government of Manipur has formulated its IT Policy with a clear vision of transforming Manipur to an Information Technology driven economy and society. One of the objectives of the policy is to use e-Governance to upgrade the standard and quality of administration, and to provide citizen oriented, efficient and cost effective government [144].

Along with other measures of institutionalizing the implementation of the policy, it proposed to set up Core Groups in each of the key areas of the IT Policy such as e-Governance, IT human resources development, e-commerce, IT enabled services, software industry development and telecommunication infrastructure development to provide regular recommendations for successful implementation of the IT Policy in their respective areas.

Role of e-Governance and IT for the masses are key component, in the IT Policy of Manipur. For smooth transformation to e-Governance, policy proposes to reform the government administration and re-define its role and re-structure its functioning of its administrative departments to facilitate adaptation to IT.

IT policy proposes to earmark 3% of each departments and corporation’s budget for IT applications. This budget shall be spent for complete transition to e-Governance.

IT policy of Manipur proposes to standardize the hardware and software for procurement by adopting the specifications laid by the IT department. It also proposes standardization of the data to the feasible extent. Such standardization will bring compatibility on all systems which will reduce future costs of IT applications. As per the IT policy the government shall implement an IT Literacy Plan to achieve 100% IT literacy in the government [144].
2.6.3.5.12 IT Policy of the Government of Mizoram

Mizoram Government announced its Information Technology Policy, which recognizes IT as the fastest and the most advanced vehicle of change for all-round progress and development of Mizoram. Mizoram IT policy has clear objective to improve efficiency and productivity in governance and to improve transparency and responsive-attitude in governance etc among other objectives [145].

IT Policy of the government proposed to constitute a task force for the implementation of the Policy and to formulate action plan so as to achieve objective of the policy. It also proposed to establish a department of IT to entrust the works of co-coordinating IT matters and implementing IT projects. IT Policy endeavor to set up electronic governance and citizen facilitation to provide better services for improved quality of governance. IT Task Force shall identify government departments and set priority for introducing electronic filing facility in the departments on phased manner.

Government proposes to introduce IT literacy as compulsory for recruitment to government services and those who join without IT proficiency should compulsorily acquire it within one year.

IT policy proposes to make a yearly special budget allocation to complete its IT program by setting aside a budgetary allocation of 2%, for the development of IT in their respective department.

2.6.3.5.13 IT Policy of the Government of Orissa

Information Technology Policy of the Orissa Government published in 2004 envisages helping IT reach the common citizen so as to reduce the digital divide. The policy also aimed to provide inexpensive access to government services and there by provide information transparency in governance practice [146].
Orissa Government has constituted a State Information Technology Services Board (SITSB) to oversee the ICT sector and for strengthening state’s IT Implementation. Policy also emphasis on re-engineering the process and use of ICT tools for attaining speed, transparency and effectiveness in governance process.

2.6.3.5.14 IT Policy of the Government of Punjab

Information Technology Policy of the Punjab Government (2001) was formulated by the Information Technology Vision Group constituted by the Government of Punjab [147]. Providing citizen-centered governance as one of the objective of the policy, the IT policy of Punjab seeks ‘to facilitate the deployment of IT in the state through creation of IT infrastructure, human resource development, proliferation of IT industry and implementation of e-governance in collaboration and with the participation of private sector in e-transition of Punjab’ [147].

As a strategy Information Technology Policy of Punjab envisioned to create world class IT infrastructure and connectivity to facilitate e-Governance, e-Education and proposed to implement a comprehensive action plan to promote IT for the masses in a big and visible way. Policy also proposed to utilize 5% of the state budget for induction of IT and proposed to establish Information and Service Kiosks for single point delivery of all government information and services. The Policy also proposed to make all utilities and services citizen-friendly. Also aims to provide an IT interface to the citizens for all their needs by deploying internet based e-Governance applications.

The government proposed to create authenticated databases on citizen databases, business databases, property databases and all government services are proposed to be provided on-line on the basis of these databases. Apart from the ‘IT Vision Group’ a Departmental Committee on IT and Empowered Committee on Computerization (ECC) monitor the implementation of IT activities including e-Governance initiatives of the state at various levels [147].
2.6.3.5.15 **IT Policy of the Government of Sikkim**

The Government of Sikkim place Information Technology high on its agenda and IT Policy of the state revised in 2006 with the earlier policy notified during 1999. Objectives of the policy, among others, include empowering citizen and making life easier for them through e-Governance; improving productivity of the departments through computerization, etc. are indication of the initiative of the Sikkim Government in adoption of e-Governance [148].

The policy proposed to establish an e-Governance Steering Committee headed by the Chief Secretary to direct and monitor e-governance initiatives under National e-governance Plan (NeGP). Similarly Departmental Nodal Officers liaise with the Information Technology Department for implementing computerization in their respective Departments. Policy also proposed to computerize land records, property registration, taxation, treasuries, municipalities, panchayath, employment exchanges, and each government office will be equipped with Internet facility. Policy also highlights process re-engineering of the department functions and integrate with the department functions. They would be supported with modernized, standards-based information systems which provide smooth flow of information.

2.6.3.5.16 **IT Policy of the Government of Tamil Nadu**

Government of Tamil Nadu has taken several policy initiatives in implementing e-Governance. Tamil Nadu had announced policy for IT in 1997. Thereafter, executive orders were issued to make the announcements in the policy operation [21]. Policy Note 2009-10 of Information Technology Department highlights Tamil Nadu Government’s initiatives in e-Governance. IT Department of the state is actively involved in over 15 departments to build IT applications for delivering citizen centric services throughout Tamil Nadu [149].

Tamil Nadu e-Governance Agency (TNeGA) would act as the support agency of the Government of Tamil Nadu in all areas of e-Government to draw up the big picture and standards, high-level planning of core projects and Capacity
Building. "The mission of TNeGA is to achieve a factor enhancement in the quality and pace of implementation of e-government program in the state through creation of a virtual forum for integration of efforts of the government agencies, the ICT industry and the academic world. The vision of TNeGA is to establish itself as a centre of excellence in e-government and to become the focal point of major e-government activities in the State of Tamil Nadu"[149]. "It will also ensure that a statewide strategic architecture and groundwork is in place, in line with the national agenda so that they can play a robust and effective part in developing a national environment for electronic governance" [149].

2.6.3.5.17 IT Policy of the Government of Uttar Pradesh

In order to bring Uttar Pradesh (UP) to the thresholds of a new knowledge economy several policy level initiatives were taken since 1999. During 1999, an I.T and Electronics Policy was approved by the Cabinet and declared. In 2004, Uttar Pradesh Information Technology Policy – 2004 was published which emphasis to bring IT to the masses as one of its objectives. UP proposed to generate an IT pool fund for e-Governance with contributions from the government, profit making state PSUs, co-operative institutions and other public sector organizations. As per the policy the fund shall have an initial corpus of Rs.5 Crores and shall be administered by a Governing Body headed by the Industrial Development Commissioner, Government of UP [150].

Technical Committee of the Department of I.T. and Electronics was entrusted to ensure interoperability of the Systems, portability and integration of resources created in Uttar Pradesh, procurement of hardware, software and networking equipments etc. This committee will lay down standards and specifications for the above items.

The policy also envisages making all its employees IT literate in a time bound manner. It also stress on implementation of special applications like Smart Card, GIS application for planning etc [150].
2.6.3.5.18 IT Policy of the Government of West Bengal

West Bengal Information Technology Policy 2000 was revised and a new policy came to existence during 2003. The policy envisages leveraging the capacity of IT for the public. Accordingly state policy envisions interconnecting Gram Panchayaths and Municipalities across the state [151].

During 2000 goals were set to be implemented in the state, including establishment of state wide delivery back bone for e-governance, e-commerce, distance education; transit to an IT enabled government by adopting e-governance appropriately. Government is initiating different activities to increase the IT literacy level of the citizens and also that of the government employees. Many of the office centric e-governance initiatives are proposed to be web centric where users/general public can operate the facility online, including online transaction.

‘The state government intends to move towards accepting payments online along with the acceptance of digital certificates in lieu of signatures for the submission of various government forms / applications. The government will also issue all government notifications online and through the gazette simultaneously’ [151].

2.6.3.5.19 IT Policy of the Government of Jammu and Kashmir

The primary objectives of the Information Technology Policy of Jammu and Kashmir Government include providing Simple, Moral, Accountable, Responsive and Transparent (SMART) governance to its citizens using IT in Government operations [152].

It also proposed to strengthen Information Technology in the overall goal of improving healthcare; empowering women, rural and tribal communities as well as economically weaker sections of society thereby enhancing social equity and justice to all citizen. In order to facilitate above, the IT Policy proposed to address the computerization of the activities having citizen interface, and its hardware, software and manpower needs. It proposed to
computerize the core activities of the government including that of land records, land acquisition, registration of deeds, police services etc.

Social services such as family pension, old age pension, registration of licenses, ration cards, birth certificate, death certificate, caste/tribe certificate, driving license, tax collection, public utilities etc are also proposed to be covered under the e-government plan [152].

2.6.3.5.20 IT Policy of the Government of Karnataka

IT Policy of the Karnataka state acted as a catalyst in the development of IT Sector in the state. 1st IT Policy of Karnataka was announced in 1997. Later the refocused Millennium IT Policy called Mahithi was announced with one of the objective as 'using e-governance as a tool to deliver government services more proactive and responsive to its citizen'. Different departments are using computers for their operations. Committees constituted under the secretaries to the government are entrusted to take decisions on computerization of the departments. The Apex Committee constituted under the Additional Chief Secretary lays down the general guidelines for this effect.

Millennium IT Policy proposed to establish a Centre for e-Governance to facilitate use of IT for common man. This centre also provides technical support to government departments in their IT Projects. This center proposed to develop common systems like pay roll processing, Personnel Information System, etc and to standardize them so as to use uniformly in different government departments. The Centre would connect all district and Taluk headquarters [153].

2.6.3.5.21 IT & ITES Policy of the Government of Chhattisgarh

The Information Technology & ITES Policy of the Government of Chhattisgarh envisioned 'to provide all citizens widespread and easy access to government services, in the local language effectively addressing the existing digital divide and promoting entrepreneurs'. One of the principle objectives of the policy include leveraging Information Technology for the improvement of the governance in the State of Chhattisgarh. The policy also proposed to
facilitate access to government services in local language, with an affordable cost by way of establishing Integrated Service Delivery Centres in various parts of the state.

Policy also encouraged to undertake Government Process Re-engineering (GPR), which is fundamental to any automation process. The policy directed to clearly spell out proposal for process reengineering, by departments. As per the policy the state government is emphasizing for the computerization of the departments and aiming at creating an integrated government service delivery portal to provide all government services under one portal. With this common delivery portal, the state also seeks to effectively address issues related to interoperability between departmental applications. As per the policy the state recognizes the importance of Public Private Partnership in the implementation of e-Governance solutions and appropriate guidelines are also provided in the policy [154].

2.6.3.5.22 IT Policy of the Government of Himachal Pradesh

IT policy of Himachal Pradesh is based on 6 E’s i.e. Education, Employment, Entrepreneurship, Electronic Governance, Economy and Equality and its objective, among other, include e-Governance ‘to use IT in the process of government functioning to bring about Simple, Moral, Accountable, Responsive and Transparent (SMART) governance to its citizens’.

In order to facilitate and to promote e-Governance in the state, an autonomous Society called Society for IT and E-Governance is established. The Chief Minister is the Chairman of the Society and Secretary IT is the Chairman of the Executive Committee of this Society. An Apex Committee on e-Governance headed by the Chief Secretary has also established to facilitate the inter-departmental coordination.

In order to enhance the e-governance and IT implementation activities in different departments several measures are envisaged in the IT policy. Knowledge of computer is made compulsory for the category of steno-typists, passing of the test in computer proficiency of a specified level is made
mandatory, provision of appropriate training for the existing staff. As per the policy the government proposed to take up e-governance initiative in areas in which where citizens interaction with government is more. Government is proposing to set up Electronic Kiosks and Public Tele Information Centers as a common access point for government service/information. The electronic governance wing of the government is responsible for furthering the use of IT in government [155].

2.6.3.5.23 IT Policy of the Government of Madhya Pradesh

Vision of the Information Technology Policy of the Madhya Pradesh Government includes use of Information Technology to achieve/improvement in the life of the common man leveraging the strengths of e-Governance.

One of the salient features of the policy (1999) was the computerization of the government departments and that agencies must be the engines of growth of IT/ITES in Madhya Pradesh.

In order to strengthen the IT implementation the government strategy to enhance e-Governance includes development of websites and its content management. Accordingly government plans to have both English and Hindi versions of the websites for easy access to the citizen in a way they find easier. Strategy also includes computerisation of departments, which are not been covered under the central government’s mission mode projects [156].

2.6.3.5.24 IT Policy of the Government of Meghalaya.

Improved performance in governance and administration is one of the objectives of the IT policy of the Meghalaya Government. The objective of the policy includes IT in governance and administration for harnessing the advantage of using IT for the citizens, for managing and addressing the security issues, process re-engineering, establishment of integrated e-Governance system and facilitation of data interchange between departments by establishing data centers and data hubs. The policy propose to offer citizen services in the areas like basic citizen service, utility bill payment interface,
business service interface, government to government internetworking interface etc [157].

2.6.3.5.25 IT Policy of the Government of Nagaland

The objectives of the IT Policy of the Government of Nagaland include encouraging electronic governance for bridging transparency in government, improving efficiency and effectiveness for faster information dissemination and for better financial management.

IT policy proposes the state to become a SMART state. In order to achieve this goal the policy proposes to establish a IT Task Force in each department under the Chairmanship of the Secretary. Each department shall prepare a Five-Year IT Plan and develop websites with various user-friendly contents. Suitable training on computer be provided to the government employees. For all direct recruitment from April 2005 government proposed to make computer knowledge a desirable qualification. It is proposed to interconnect the government directorates through network connectivity, district headquarters with video conferencing [158].

2.6.3.5.26 IT Policy of the Government of Rajasthan

The IT policy of the Government of Rajasthan highlights that Rajasthan would leverage Information & Communication Technology (ICT) as a tool for improving governance by facilitating the e-delivery of services to the public. The IT Policy also aims to make the Government more accessible to citizens while improving governance through the use of IT and thereby enhancing the quality of services to public.

For strengthening the e-governance in the state some of the key policy initiatives being envisaged through the IT policy which include, strengthening of the ICT infrastructure for e-governance including that of state data center, establishment of State Wide Area Network, common service centers, CARISMA for wireless networking of Panchayath Raj Institutions etc.
Policy also proposes to increase the budgetary outlay for IT expenditure on a year-on-year basis and separate budget head has been earmarked for IT in the state. The Government envisaged earmarking up to 3% of their plan outlay for implementation of e-Governance initiatives.

An e-Governance Council under the chairmanship of the Chief Minister, State level Apex committee under the Chairmanship of Chief Secretary and the State e-Mission Team under the Chairmanship of the Principal Secretary, IT&C will monitor e-governance activities of different departments. As part of the policy the state government strives to provide a framework to promote the use of public private partnership in rolling out of e-Governance programs.

Other areas covered under IT Policy to strengthen e-governance include activities to increase penetration of IT to society, use ICT for right to information, use of GIS for long term planning, IT ennobling of Government to employee interface, business process re-engineering, development of government websites, capacity building programmes, application of open source software, etc [159].

2.7 Problems in e-Governance

In day-to-day experience of the citizens, they need to approach various government departments for applying for different services offered by them like land registration, electricity, water, ration, security, insurance, telephone, tax, revenue, provident fund, labor welfare, Internet service, quality control, fuel supply, birth/death registration, election, passport etc. It is very much clear that in almost all of the services citizens need to provide information. Large portion of such information is repetitive in nature. This is happening due to isolated nature of each department, which is generally functioning manually.

As e-governance applications are being developed by different corners including that of Central Government, State Government, Local Bodies etc., it is important to have a standardized approach for such initiatives and provide
integrated ‘single window service’. Such standardized approach will facilitate interoperability of the applications at various levels. Interoperability calls for similar applications/service or formats etc so that services can be seamlessly ‘communicate’ with each other or interoperate. This necessitates need for uniform patterns of applications/services or formats, which in turn can be achieved by adopting Standards.

In Indian context compartmentalization of the e-government initiatives in becoming a serious issue. According to Sadagopan [27], every state has an independent land records project, property registration project, electricity billing software or a website development team. Often, there is no coordination in the use of technology (operating system, DBMS, Middleware, or application development tools), documentation or testing, leading to a situation where every state faces the same set of problems when it comes to scaling and sustainability’ [27]. Due to such compartmentalization approach it is becoming difficult to interact between these systems. At the same time these e-governance initiatives generate large amount of information/data having similar nature and represented heterogeneously in different formats for effective and seamless functioning of the government and its data interoperation. This information should be managed effectively. This calls for the standard representation of data in a commonly accepted format. Such a standardized data/metadata framework is yet to be available in Indian context.

Exploring the interoperability issues in government, Lallana [160] also confirms that number of governments, agencies are deploying new ICT systems with specifications and solutions relevant to their particular needs but without adequate attention to the need to connect, exchange and re-use data with other agencies’ ICT systems. The result is a patchwork of ICT solutions that is not always compatible with each other and an e-government programme that does not meet its goals.
2.8 Global Scenario in e-Governance

Governments are moving forward in e-government development around the world [161]. According to UNPAN as many as 182 out of 192 countries have adopted their e-Governance projects and other countries are in the process of doing so to achieve the economic growth and improvements of lives of the citizens [161].

'A large number of governments the world over has launched e-Government initiatives. Significant among them include Singapore, Malaysia, United Kingdom (UK), Australia, Canada, New Zealand and the United States’ [21].


In European Union, as per the eEurope 2002 Action Plan, member states agreed to provide all basic services online by the end of 2002 itself. The eEurope 2005 Action Plan envisaged that Europe should have modern online public services, e-government, e-learning services, e-health services, a dynamic e-business environment by 2005 [162].

United States has setup a single window interface for all government information and services through a single interface for all its activities at 'http://www.usa.gov/' [163].

Keeping in view the wide spread application of e-governance Presidential Directive No 6/2001 on telematics, was issued in Indonesia [164]. Based on this, e-government was officially introduced to public administration by which the government of Indonesia is using telematics technology to support governance.
Several countries are in different stages of e-governance implementation. United Nation’s Global e-Government Surveys [161], [165] illustrates the e-government developments of different countries.

According to above survey differences between the five regions in terms of e-government readiness is analysed, in which Europe is leading with 0.6227 points and having a clear advantage over the other regions. Europe is followed by the Americas with 0.4790 points and, Asia with 0.4424, Oceania with 0.4193 and Africa with 0.2733 points. As per the survey Asia and Oceania are below the world average of 0.4406 [165].

In the e-Government Readiness ranking of the UN in it’s 2008 survey [161], Sweden took the first position with 0.9157 index points. The Scandinavian countries took the top three spots in the 2008 Survey, Denmark with 0.9134 and Norway with 0.8921 in second and third place respectively in the index points. Top 35 Countries in the 2008 e-Government Readiness Index [161] is given in the below table.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Country</th>
<th>Index</th>
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<tbody>
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<td>1</td>
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Top 35 Countries in the 2008 e-Government Readiness Index

In the Global e-Government Survey 2010 [165] the Republic of Korea got high-ranking with index point of 0.8785. Top 20 countries in the e-government development Index is given below.
<table>
<thead>
<tr>
<th>Rank</th>
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<td>1.</td>
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<td>20.</td>
<td>Estonia</td>
<td>0.6965</td>
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</tbody>
</table>

Top 20 Countries in the E-Government Development Index 2010 [165]

Many countries progress in their e-governance activities and are becoming more and more web centric. Their web presence in the context of e-governance is in different stages with respect to the level of e-governance services offered through the websites of the governments world over. Many countries are in the initial stages of their web presence called ‘emerging presence’ with independent websites, generally static in nature. Countries with ‘enhanced presence’ have content with relatively more of dynamic and specialized information that is frequently updated. Such sites often linking to other official pages.
Some of the countries are having ‘interactive presence’ on Internet with access to wide range of government services and government organizations. Such web presence is having more sophisticated level of formal interactions between citizens and service providers and are having more interaction facilities like email, feedback service, specialized database search, forms download and online application etc.

Some countries are in more advanced stage of e-governance called ‘Transactional Presence’ and their e-governance web presence is marked by the fully secured transactions like online payment of fees for licenses, utility service bill payment, tax processing, issue of visa, passport, birth and death records, online procurement using digital signatures etc. Such transactional e-governance service calls for the requirement of integration between different department and organizations in the government setup and external agencies. Such interlinking demands for the interoperability of application so as to further extend the services for the seamless or fully integrated stage of e-governance [25].

Many countries have their own ‘single entry’ portals, which assists citizen to access e-governance applications. Some of the leading portals include:

- India www.india.gov.in
- France www.service-public.fr
- Canada www.canada.gc.ca
- Singapore www.gov.sg
- Republic of Korea www.kois.go.kr
- New Zealand www.govt.nz
- Ireland www.irlgov.ie
- Brazil www.redegoverno.gov.br
- Mexico www.precisa.gob.mx
- Finland www.eduskunta.fi
- Spain www.la-moncloa.es
- New Zealand www.govt.nz
2.9 Standardisation in e-Governance

2.9.1 Definitions of Standards

There are many definitions of a 'standard'. Very generally, a standard might simply be defined as 'a set of rules for ensuring quality' [166].

According to the British Standards Institution [167] a Standard is 'a published specification that establishes a common language, and contains a technical specification or other precise criteria and is designed to be used consistently, as a rule, a guideline, or a definition.'

'Standards are designed for voluntary use and do not impose any regulations. However, laws and regulations may refer to certain Standards making compliance with them compulsory [167]'.

Mudd [168] defined standard as 'a technical specification that is widely used. It may be a formal specification developed or approved by a formal or industry standard body like the International Standards organization (ISO)'.

2.9.2 e-Governance Standards

Department of Information Technology, Government of India in its “Institutional Mechanism for e-Governance Standards Formulation”[169] lists out the aim of standards formulation for e-Governance applications, which is reproduced as follows:

a) "To ensure smooth flow of information between citizen, business and Governments (State and Central) by having interoperable systems which are scalable for future transaction volumes and frequencies;"
b) To make requirements and specifications available in the public domain,
c) To promote reduction of effort (cost by variety reduction) and risk leading to economic solution;
d) To protect consumer interests by facilitating adequate and consistent quality of Information and Services with human centric design of systems;
e) To provide users a common terminology and a framework for communicating technologies across different domains;
f) To avoid Vendor lock-in'.

According to Davies, J et al [170] 'standards are the means by which electronic government can achieve interoperability across departments and agencies, improve their management of supplier contracts, and ensure that key data remains accessible over time'.

According to Janardhan, Sekar, and Bilugu [171] e-Governance standards address three basic questions such as

- 'What information is required to deliver services to the stakeholders?
- How to package this information to facilitate interoperability?
- How to deliver the services to the service seekers?'

Traditional approach to answer above questions include standardization of the technology, databases and applications. Along with the above, e-Governance standardization would include standardization of the information elements covering the data standards definition, metadata framework, standards and operational specifications, and generic information model. Standardization will also help in reduction of redundancy, enhancement of clarity and will also facilitate re-usage of data elements across government departments [171].
2.9.3 Different Dimensions of Standardization in e-Governance

According to Prasad [172] standardization in the field of e-governance could be considered from various dimensions such as the following:

*Activity Standardization:* All activities including processes, procedures, forms, reports, etc. could be easily standardized.

*Content Standardization:* This include standardization of contents including application forms, reports, processes, archive structure, etc.

*Connectivity Standardization:* Connectivity standardization includes standardization of the communication connectivity, logical connectivity, database connectivity, etc. of an acceptable solution.

*Security Standardization:* The security measures play an important role as to protect the information from unauthenticated and/or intentional destruction or intrusion in the interest of the nation and its citizens.

*Standardization of Grouping of Solutions:* All departments undertaking similar activities could be kept under one logical grouping. For instance, all universities can form one logical group; all armed forces or para-military forces could form respective logical groups.

*Standardization of Organization of Solutions:* Standardization of Organization of Solutions could be further classified in two ways. i.e (i) horizontal where information flow across different departments and (ii) vertical where flow of information could be within the same department but in different levels.

*Standardization of Technology Support:* Software including application software, system software, hardware, tools for testing, documentation, support etc comes under the standardization of technology support group.
Terminology/Vocabulary Standardization: All terminology and vocabularies etc of different, processes, tools, etc. used in bringing out the total solution could be standardized.

2.10 Government of India Initiatives in Standardization and Interoperability

Standards are identified as component of the National e-Governance Plan (NeGP) of the Government of India [33]. In order to facilitate Interoperability of e-Governance applications, Government of India has setup an institutional mechanism for formulation of standards through collaborative efforts of stakeholders like National Informatics Centre (NIC), Department of Information Technology (DIT), Standardization Testing and Quality Certification (STQC), Bureau of Indian Standards (BIS), other government departments, technical and domain experts, academia, industry, NGOs etc. STQC is a constituent of DIT that is responsible for release of approved standards, and their versions control.

In order to co-ordinate formulation of e-Governance standards in India, different committees and bodies are assigned by the government, which include apex body, Working Groups, Expert Committee, Specialist Committee, and Task Force/Core Group, with specific roles and responsibilities [173],[169].

Apex Body oversees the entire process and designs the broad policy framework for setting standards. There are Working Groups [173] formed in the following areas:

- Network and Information Security Standards
- Meta Data and Data Standards for Application Domains
- Localization and Language Technology Standards
- Quality & Documentation Standards
- Technical Standards and e-Governance Architecture
- Legal Enablement of ICT Systems

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Apart from the above, Expert Committees for below areas also formed with specific terms of reference [173].

- Technology Standards to map with IFEG
- MDDS for Person Identification and Land Region Codification
- Digital Signature
- Biometrics
- Indian Languages
- Information Security

Similarly, Specialist Committees are assigned for National Policy on Open Standards and Task Force/ Core Groups on Identity & Access Management, e-Forms and Web Accessibility Standards.

For publishing and collaborating on e-governance standards, an e-Governance standards portal [173] http://egovstandards.gov.in was developed. This portal acts as a platform for sharing knowledge, ideas etc. among the stakeholders and with public. This portal also facilitates publication of the draft standards for public review.

2.10.1 Published e-Governance Standards

Based on the recommendations of the institutional framework for the e-Governance Standards, following standards are already published.

2.10.1.1 Font Standard for e-governance: ISO/IEC-14496-OFF (Open Font Format)

Due to lack of Information in local languages, application of Information Communication Technology and its benefit was not reaching to the common man. So, 'Localization and Language Technology' is a major area addressed by the government under the standardization. Accordingly Department of Information Technology, Government of India notified the ISO/IEC-14496-OFF (Open Font Format) as the font Standard, for e-Governance applications for all 22 Indian languages w.e.f 27th November 2009. This standard is based on International Standard and complies with Unicode for data storage.
standard ensures data portability across various applications and platforms [174].

2.10.1.2 Character Encoding Standard: UNICODE 5.1.0

UNICODE 5.1.0 was approved as Character Encoding Standard. UNICODE is recognized globally for representing multilingual text including Indian Languages. This will ease localization of applications for all constitutionally approved Indian languages. Department of Information Technology, Government of India wide notification No 2(32)/2009/EG-II dt. 27-11-2009 notified UNICODE 5.1.0 and its future versions as the standard for e-Governance applications w.e.f the date of its notification [175].

2.10.1.3 Metadata and Data Standards for Person Identification and Land Region Codification

Considering the immediate need for Data and Metadata Standards for generic elements like name, address etc which are common across e-Governance applications, competent authority set up by the Government of India has approved Metadata and Data Standards for Person Identification and Land Region Codification [176] for exchange of data between e-governance applications. Standardization of generic data elements and their formats to describe a person’s identification and land codification was done.

Department of Information Technology, Government of India wide notification No 2(32)/2009/EG-II dt. 22-12-2009 notified the use of above standards for data exchange between e-Governance application, w.e.f the date of its notification [177].

This is a specification standard with mandatory obligation. Standard specification of this standard specifies its scope as identification of generic data elements and standardization of their metadata (business formats, validation checks, values, declarations, version, and ownership etc.). The e-governance applications would adopt metadata of these generic data elements for designing the databases to ensure seamless interoperability while interchanging data [176].
2.10.1.4 Face Image Data Standard for e-Governance Applications in India

Face Image Data Standard for e-Governance Applications in India deals with usage of face image data for human visual inspection and verification, with the objective of interoperability among various e-Governance applications. This standard includes capture and storage specifications of face images for human visual inspection and verification of the individuals in Indian e-governance applications [178].

2.10.1.5 Fingerprint Image and Minutiae Data Standard for e-Governance Applications in India

This standard deals with usage of fingerprint image data and minutiae data for identification and verification of an individual. The purpose of this standards document is ‘to standardize the specifications for fingerprint devices, fingerprint image, storage/transmission and minutiae specifications to ensure interoperability among various fingerprint sensors and algorithms by which the fingerprint images are captured/stored’ [179].

2.10.2 Standards Under Development

Several e-governance standards are under different stages of development process including public and closed review etc. Such standards include [44]

- Iris Image Data Standard for e-Governance Applications in India
- Technical Standards for Interoperability Framework for e-Governance in India (IFEG) - Phase – I
- Information Security Standards for Indian e-Governance Applications
- Draft Keyboard Layout Standard for Indian Languages
- Drafts for Biometric Standards
2.11 Conclusion

This chapter discusses about the concept of governance and its transformation to e-Governance with a special emphasis to e-Governance in India illustrating the developments and initiatives undertaken by different states governments along with supporting legal and policy frameworks. This also covers the concept of e-governance standards and different dimensions in the standardization in e-governance, efforts of Government of India in standardization and interoperability are also reviewed.

2.12 References


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