Chapter 3

Literature Review

This chapter examined the literature reviewed to define and illustrate the scope, applications and advantages of e-Governance. Examples and experiences of e-Governance projects from advanced nations such as Australia, UK and USA as well as e-initiatives started in India and other Indian states have been studied and presented here. Moreover, critical issues pertaining to the development and dissemination of e-Governance in general have been described also in this chapter.

3.0 Fundamentals of e-Governance

Adding the letter e to any of today's practices has become the norm to describe a work performed electronically, so that e - electronic - now denotes use of the internet. Countries, States, businesses and individuals seek to integrate the internet into their day-to-day activities. Governments worldwide acknowledge the potential of the internet and ICT by offering efficient and effective public services, through e-Governance.

According to Hasan [1], ICT offers three processes to promote governance:

- **Automation**: computerizing clerical functions
- **Informatization**: using information systems to support decision making and to enhance communications
- **Transformation**: implementing new ICT-based information processes and process re-engineering.
e-Governance is not about implementing a new IT system only, but rather it aids to enhance and re-engineer work processes and systems for greater productivity .[2] The Organization for Economic Co-operation and Development (OECD) described ICT thus: “ICT needs to be incorporated into a package of modernization, organizational change and related reforms that challenge public governance frameworks”.[3] This chapter is one of two chapters (Chapters two and four) presenting the researcher’s findings on literature describing the fundamentals of e-Governance, the barriers to its development and diffusion and to frame a new strategy for better e-initiatives for Uttarakhand. Here, e-Governance’s definition, scope, and applications are described along with examples of e-Governance projects and experiences from all around the world, From India and other states of India. Chapter four presents a more focused literature review investigating the core issues and barriers to the uptake of e-Governance and lessons learned for the Uttarakhand situation from advanced nations’ and other Indian states’ experiences in the same domain. The ultimate aim of both chapters is to understand and use the information available in the literature base to aid in the development and implementation of a successful strategy for e-initiative adoption framework for Uttarakhand. Basically, the researcher’s conclusions regarding obstacles and solutions to e-Governance as major e-initiative project take-up from both developing like India and advanced nations’ experiences are analyzed to develop this framework.

The following section describes the basics of e-Governance, its definition, scope and applications.

3.1 Definition and Scope

Turban et al defines e-Governance as “the use of information technology in general, and E-commerce in particular, to provide citizens and organizations with more convenient access to government information and services”. [16] This definition places ICT, e-Governance, e-commerce as vital components of e-initiatives and emphasizes the close relationship between e-initiatives and e-Governance.
The OECD (2003) defines e-Governance as “the use of information and communication technologies, and particularly the internet, as a tool to achieve better government”. In this description, the internet is defined as a requirement and a possible medium for e-Governance. It also emphasizes that ICT and the internet should be viewed as tools for better government, not as goals to be achieved in their own right.

The World Bank (The World Bank Group, 2002) defines and describes the benefits of e-Governance 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.”

This definition explains different uses and the benefits of e-Governance. It also stresses that ICT, the internet and mobile computing are e-Governance tools.

From these definitions it can be concluded that e-Governance is a system that literally engages and covers every entity in its area of authority of state (i.e. citizens, businesses and public organizations). In other words, depending on the services offered, its scope includes everyone in jurisdiction of a state. In some instances, its scope can surpasses jurisdictional boundaries, where external services to people and businesses, such as tourism and foreign investment services, are provided. In addition, different levels of e-Governance may sometimes exist in larger countries like Australia and USA to accommodate for and simulate the different physical levels of government (i.e. federal, state and local). The conclusion is that e-Governance benefits extend to service providers as well as the target users. If e-Governance is
properly designed and developed, it provides all stakeholders with a winning situation, enabling savings in time, cost and effort.

According to Moon [14], e-Governance has four internal and external factors:

- Establishing a secure Intranet and a central database to enhance interactions among governmental agencies
- Developing web-based service delivery
- Implementing e-commerce applications for more efficient transaction activities
- Adopting digital democracy for more transparent and accountable government.

3.2 Applications

E-Governance offers services to those within its jurisdiction to transact electronically with the government. These services differ according to users’ needs and ICT capacity, and this diversity has given rise to the development of different applications of e-Governance, described in the following subsections. In this study e-Governance is considered as the integrative concept for several e-initiatives methods for governing the state of Uttarakhand. Governance can thus mean organizational or personal governance (see figure 2.1). The figure indicates that e-Governance is a collection of many different e-oriented sectors of the society.
3.2.1 Government-to-Citizen (G2C)

Arguably, the majority of government services lie in this application, directed towards providing citizens and others with comprehensive electronic resources to respond to individuals’ routine concerns and government transactions. With government-to-citizen (G2C) applications, the public organizations publish information and contact details, and offer regular services online (Uttara portal). The ultimate aim of this application is to give users different options and communication channels for government transactions. An example of this is the Government Online (GOL) project in Canada that provides a client-centered service delivery across different delivery channels such as the internet, in person, and by telephone (OECD, 2003). The same source also describes another case in Spain, where the Catalanian government developed a public company called “.Cat” which packages projects and programs from different public sector agencies and delivers them via multiple channels through a .Cat portal (www.cat365.net) to citizens and businesses. [4]
The best practice in e-Governance is to build systems that are designed to serve citizens’ needs and life situations rather than simulating government departments online (Like Uttara portal: http://www.uttara.in/). The National Office for the Information Economy (NOIE, 2003a), now the Australian Government Information Management Office (AGIMO), states, “Maximum value can be attained from citizen-centric e-Governance systems that follow life events, rather than being limited by agency boundaries.” A good example of such an approach can be found in Mexico’s web portal (www.gob.mx) that includes more than 1500 informative and transactional services from over 100 government institutions (OECD, 2003). Another example, Heeks [6] describes a single Point Tax Payment System that was developed in Mauritius to allow taxpayers to lodge their income taxes.

3.2.2 Government-to-Business (G2B)

This is the second major application of e-Governance. Businesses as well as individuals have transactions with the government, examples being: renewing registrations, lodging taxes, downloading tenderers’ information, and many others. This e-Governance system also serves external business inquiries. Tourism portals for Uttarakhand can be a good example of an e-Governance system that benefits both foreign and local businesses.

According to OECD (2003), the Spanish government developed a web portal (www.spain.info) to use as a tourism portal. The portal gathers its information from different public and private sector databases. The portal has a multilingual facility, to help tourists, and locals to plan and book holidays and accommodation packages with local businesses online. Tourism portals for Uttarakhand can be a good example of an e-Governance system that benefits both foreign and local businesses in future.

The government-to-business (G2B) application is as useful as the G2C system, enhancing the efficiency and quality of communication and transactions with business. Poon (2002) argued that G2B applications should be given the same focus and importance as those of G2C, and those governments should work closely with
businesses to develop effective e-initiatives strategy. This avoids system incompatibilities, and benefits government from business’ online experiences in areas such as e-marketing strategies. Moon (2003) shares this point and strongly recommends that state governments in USA try to establish strong collaborative relationships with vendors. Korea’s procurement portal (www.g2b.go.kr) and Mexico’s online procurement website (www.compranet.gob.mx) are good examples of this application. [7]

3.2.3 Government-to-Government (G2G)

Many government processes and transactions require collaboration and inputs from different public organizations. For example in Uttarakhand, business registration forms require approval from several government ministries of the state. The ultimate aim of the government-to-government (G2G) application is to enhance inter-government organizations’ processes by streamlining collaboration and coordination. [5] This application serves both internal processes and activities (between public organizations themselves) and external ones also (between government organizations, citizens and businesses). Collaboration between agencies is an important factor for seamless services but e-Governance coordinators should maintain a balance between the benefits of collaboration and the need to preserve accountability of the individual agencies.

Pizzella [8] describes a G2G e-Governance initiative from USA (GovBenefits.gov) that maintains a network and coordinates inputs from many federal and state governments to help users find out their eligibility for various benefit programs. According to the same source, it currently includes over 400 federal benefits programs and over 600 programs from all fifty states.
3.2.4 Government-to-Employee (G2E)

G2E is perhaps the least adopted application of e-Governance. Scholars and countries around the world usually focus on the first three applications only; others consider it as an integral part of G2G. Information and services offered by government institutions to employees and the channels by which employees interact with senior management are represented by G2E. Intranet systems developed inside government organizations like in SBI India, are a good example of this form of communication. G2E is difficult to plan and implement and can be underestimated and under-resourced. Mahler and Regan argued that despite the user-friendly progress in USA’s federal public websites, the government lags in the development of Intranets, and it provides few online services for its employees. Abramson and Marin [12] see that G2E is gaining popularity, which will be a challenge to federal government in USA. Another possible hindrance to the widespread of this kind of e-Governance application is in the low number of targeted employees when compared to external citizens or business [9]. Ho et al found that Hong Kong couldn’t enhance the adoption rate for its G2E applications despite its success in the G2C and G2B areas.

E-Governance Unit (2004) described a good G2E example adopted by many government agencies in New Zealand. According to the source, the agencies are:

- Developing and improving their intranets to help in:
- Providing tailored information to employees
- Launching electronic document management system, and
- Sharing data with other agencies.

In addition, some agencies are offering their employees mobile computing solutions to aid employees on the move to find information from the agency intranet.
3.3 Advantages of e-Governance

The internet is ubiquitous. In the past, it was mainly used for educational and information sharing purposes, but internet applications now facilitate day-to-day activities. E-Governance is an important application of the internet and is used by authorities to encourage broad use of computers and to facilitate communication and interactions with its institutions, citizens, and businesses. [11] Cutting red tape, enhancing the efficiency and effectiveness of the services offered and reducing costs for both users and the service providers are some of the aims and goals behind the adoption of this mode of service provision. Despite this, e-Governance should not be thought of as the solution for such inefficiencies but rather the tool that increases the urgency for such aims and ambitions. [14] NOIE identifies e-Governance benefits as follows:

- Improvement of service delivery and citizens’ social welfare
- Reduction of users’ and organizations’ time, effort and costs
- Increase of users’ ICT skills and knowledge
- Creation

OECD (2003) thoroughly examined e-Governance initiatives in its members’ countries (Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Spain, Sweden, Switzerland, Turkey, UK, USA), and listed the advantages of e-Governance as follows:

- Improves efficiency in processing large quantities of data
- Improves services through better understanding of users’ requirements, thus aiming for seamless online services
- Helps achieve specific policy outcomes by enabling stakeholders to share information and ideas
- Assists a government’s economic policy objectives by promoting productivity gains Inherent in ICT and e-commerce
• Contributes to governments’ reform by improving transparency, facilitating information sharing and highlighting internal inconsistencies
• Helps in building trust between governments and their citizens, an essential factor in good governance by using internet-based strategies to involve citizens in the policy process
Illustrating government transparency and accountability.

3.3.1 Objectives of e–Governance

The strategic objective of e-Governance is to support and simplify governance for all parties—government, citizens and businesses. The use of ICTs can connect all three parties and support processes and activities. In other words, in e-Governance uses electronic means to support and stimulate good governance. Therefore the objectives of e-Governance are similar to the objectives of good governance. Good governance can be seen as an exercise of economic, political, and administrative authority to better manage affairs of a country at all levels, national and local.

It is useful here to present objectives for e-democracy and e-government. The two main objectives of e-democracy are:
1. To provide citizens access to information and knowledge about the political process, about services and about choices available
2. To make possible the transition from passive information access to active citizen Participation by:

- Informing the citizen
- Representing the citizen
- Encouraging the citizen to vote
- Consulting the citizen
- Involving the citizen

Regarding e-government, the distinction is made between the objectives for internally focused processes (operations) and objectives for externally focused services.
**External strategic objectives**

The external objective of e-Governance is to satisfactorily fulfill the public’s needs and expectations on the front office side, by simplifying their interaction with various online services. The use of ICTs in government operations facilitates speedy, transparent, accountable, efficient and effective interaction with the public, citizens, business and other agencies.

**Internal strategic objectives**

In the back-office, the objective of e-Governance in government operations is to facilitate a speedy, transparent, accountable, efficient and effective process for performing government administration activities. Significant cost savings (per transaction) in government operations can be the result. It can be concluded that e-Governance is more than just a Government website on the Internet. Political, social, economic and technological aspects determine e-Governance.[11]

**3.4 Critical Issues in e-Governance**

e-Governance’s broad scope and complexity create many technical and non-technical issues that have to be closely monitored and controlled. Such issues are crucial to the successful implementation of effective e-Governance systems or to frame any strategy for e-initiatives and therefore should be planned and examined carefully. Ranging from issues internal to the e-Governance system and others with external impacts, this study pinpointed the following vital concerns.
3.4.1 e-Governance Design and Development

Planning and control are perhaps the most important issues in e-Governance and we are lacking in that area in Uttarakhand. E-Governance systems need rigorous planning to avoid partial or total failures, involving public and private parties to effectively control the design, development and integration processes. “The key question for Uttarakhand is not whether organizations, including those in the public sector, have websites, but what the quality of those sites and the scope is of services currently being provided online.” This source outlines other issues that need addressing to enhance the quality of services, such as transparency (ensuring information about government performance is continually made more accessible), accountability and e-democracy. In this regard, the authors see that the focus would shift (after 2003) from basic deployment of IT applications to the possible implementation of e-Governance, where the focus will be on citizen-centric development approaches. The point is to involve users not only in the design of e-Governance systems but also in designing the government processes, and other relevant political issues. Being more transparent, accountable and flexible with the general public will enhance user commitment and trust, and therefore increase their adoption rates of this form of government service delivery.

Funding is a major factor in the planning and development process. “Planners should be generous in estimating the time and cost of systems development and deployment.” Johnson declares that web portals “should be designed, financed, developed, deployed and managed as a capital investment”. Cost minimization should be avoided and a thorough finance and budget estimate process applied. According to OECD (2003), the UK government in 1998 created a Capital Modernization Fund to finance innovative ICT investments. Funding is allocated on competitive criteria and among the successful projects were many e-Governance initiatives. NEGP budget.

E-Governance systems development is a complex matter, involving many crucial elements. Fulton (2003) emphasized that governments should develop systems
according to their needs and requirements, rather than focusing on the latest technology. He declared “Systems development must be driven by the user and business needs, not by the hardware or software”. Collaboration and integration with other public and private organizations is also important to systems development. NOIE concluded that integration is crucial to any e-Governance system. It also suggested that development activities such as public organizations’ procurement of new or replacement equipment takes considerable time and effort and should therefore be planned very well. In this regard, Canada realized the importance of collaboration between government services. An initiative called Canadian Government Online (CGO) was developed to aid in the re-engineering and collaboration of the government services. Global enterprises require remote access to far-flung facilities. And in this we adopt the monitoring system to every secure areas because it is provide the monitoring system. [20]

Griffin and Halpin point out another design issue.[7] They argue that aggregating services from different parties around users’ needs in one portal would produce a “Digital Intermediary”. Digital intermediaries can be developed through a combination of different government services and also by interfacing services with the private sector. A good example of such combined services and collaboration between government and the private sector is the ESDLife project in Hong Kong and ICT e-chaupal in India.

According to Poon [15], ESDLife is a joint venture between the government of Hong Kong and a number of businesses. The government acts only as a user and content provider where the private organizations are investors and developers. The ESDLife portal hosts different services from different public and private organizations categorized around users’ life events. Grouscos presented another development option that works as a one-stop shop for e-Governance services. He describes a real online cross-border business (www.cb-business.com) that acts as an intermediary hub and offers informational and transactional services that could be used by any public institution instead of initiating their own.
3.4.2 Targeted Users

Perhaps the most important external factor to the success of e-initiatives for Uttarakhand is the users. Users’ requirements are a vital component of the system’s development phase, as they usually shape the layout and design of government portals, and such involvement later insures user commitment. Fulton found that technology innovation occurred only when there was a relationship between developers and users.[15]

Online services should be selected and examined according to users’ needs. The gap between supply and use of government electronic services should be minimized and e-Governance systems should be designed to be citizen focused. [13] NOIE states, “Maximum value can be attained from citizen-centric e-Governance systems that follow life events, rather than being limited by agency boundaries.” This outlines a challenge for governments to determine which services, features and options to publish on their websites, aiming to develop high-functioning e-Governance portals [10]. E-Governance is unique in this regard, compared to e-commerce applications, as the latter focuses on categories of e-commerce applications (e.g. B2C or B2B) within certain market segmentation, whereas e-Governance focuses on all categories and covers all segments of the society. Teicher and Dow stated that “Unlike businesses, which may choose to ignore some market segments, governments must attempt to serve all citizens on similar terms”. [9]

Many researchers realize the importance of users in building e-Governance. Zwane argues that governments should view their citizens as customers because e-Governance is not about technology; it is about people making e-Governance happen. “Uttarakhand Government must treat public first as citizens and then as consumers of government services. [13] Viewing citizens as customers means that governments should seek to satisfy the users’ needs. Lin (2003) proposes three main scales to determine customers’ satisfaction: first to know customers’ needs, second to know customers’ values and third to know customers’ costs. Collinge urges authorities to
research their customer base carefully to prevent a possible e-Governance system that cannot attract sufficient online users. [3]

3.4.3 Culture

The task of understanding users’ needs requires consideration of the factors that shape those needs and how they differ from one user to another or from one state citizen to another. These needs and expectations are heavily influenced by the culture of each user.

“Culture is difficult to study partially because it is not an easy concept to define”.

Robbins defines national culture as “attitudes and perspectives shared by individuals from a specific country that shape their behavior and the way they see the world”. Hofstede’s seminal work in 1980 opened the gate for researchers to examine his work and consider national culture for further research in different fields. In Hofstede’s early book (Hofstede, 1980); he identifies four dimensions, which categories cultural patterns into: power distance, individualism-collectivism, uncertainty avoidance and masculinity-femininity. Low states that there are many definitions for culture, a cause of considerable confusion, but suggests that cultural familiarity is an essential project management skill. Chang identifies different determinants of culture: social structure, religion, language, education, economic philosophy and political philosophy. [5]

The Commonwealth Telecommunications Organisation, argued that e-Governance systems need solid planning and vision, that IT should be viewed as the means not the desired end, and importantly, it should match the local environment’s culture, values and needs. On the other hand, Weisinger, argue that culture should be viewed as people’s behavior rather than people’s thinking. They present many examples of cross-cultural IT management conflicts and draw the following implications:

- Goals can be accomplished by formal means in one culture and informally in
another
- Essential IT management practices in one culture can be viewed offensive or unnecessary in another
- IT management practices accepted in one culture can sometimes be used to solve IT management problems in another.

### 3.4.4 Infrastructure

E-Governance infrastructure like hardware, network access equipments, software is another crucial issue that can sometimes be costly to build and manage. Infrastructure construction can be outsourced to alleviate the heavy finance burden on governments but this can be the least preferred option for some governments that prefer to retain control of internet development and the internet flow of information. [6]

Security and online legislation, which could be considered as basic infrastructure requirements, are also important factors for e-Governance. “If implemented properly, security is a way of life”. Governments must ensure high security in their websites in order to earn users’ trust and continuous willingness to use the services. For instance, 32 per cent of 395 IT professionals interviewed in USA claimed that most e-Governance programs are not adequately secured against external misuse, a factor that negatively affected adoption rates. [3] Legislation pertaining to online transactions and business activities is also crucial. France is a pioneer in establishing such legislation. According to OECD (2003), on the 6th of January 1978, France developed a law that recognizes security and privacy rights for individuals in the automatic processing of personal data by either the public or private sector. This legislation grants the right for individuals and organizations to demand information and access to any of the person’s private data, either directly or indirectly, to be able to rectify faulty data, to refuse permission for storage of data if permitted by law, and to choose to be erased from the system also as permitted by the law.
3.4.5 E-readiness

A society’s e-readiness is another issue that should be closely planned and measured to ensure that e-Governance systems are used by the majority of potential users. Alsawafi and Sridhar point out that “E-Governance vision requires a community that is information and technologically literate to access the information they require.” [15] Bui define e-readiness as “the aptitude of an economy to use information and communications technologies to migrate traditional businesses into the new economy.” According to the same source also, e-readiness can be measured by eight main factors: [2]

- Knowledgeable citizens
- Skilled workforce
- Macro economy
- Digital infrastructure
- Industry competitiveness
- Culture
- Ability and willingness to invest, and
- Cost of living.

This emphasizes the importance of measuring the society’s e-readiness as part of a government’s main IT strategy, and to construct a profile of those segments of the community that are more likely to be able and willing to use online systems and ICT in general. In addition, continuous e-Governance monitoring is crucial to identify minor defects before they can cause a major failure. Government policy makers measure e-commerce and e-Governance performance worldwide, with the OECD working to provide measurement indicators for e-commerce readiness (Working Party on Indicators for the Information Society, 1999). Despite OECD’s massive effort, it
has been argued that its readiness indicators are very much technically oriented. De Graaf and Muurling extend OECD’s readiness framework to include mindset indicators that describe the attitudes of stakeholders toward e-commerce. These indicators are an initial attempt to address the effects of cultural factors on e-commerce.[8] Chapter 3 is focus to measure the e-readiness for Uttarakhand using secondary and primary data sources.

3.5 e-Governance models

The three main target groups that can be distinguished in e-Governance concepts are government, citizens and businesses/interest groups. The external strategic objectives focus on citizens and businesses and interest groups, the internal objectives focus on government itself.

Abbreviations such as B2B (business to business) and B2C (business to consumer) are used, like in e-commerce, to shortly describe which of the main groups are interacting. The most common group interactions in e-Governance are presented schematically in Table 3.1. The three abbreviations in the figure, G2C, G2B and G2G are explained in Figure 3.2.

<table>
<thead>
<tr>
<th>Table 3.1: Main group interactions in e-Governance</th>
</tr>
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<tbody>
<tr>
<td>e-democracy</td>
</tr>
<tr>
<td>External</td>
</tr>
<tr>
<td>G2C: Government to Citizen</td>
</tr>
<tr>
<td>G2B: Government to Business</td>
</tr>
<tr>
<td>Internal</td>
</tr>
<tr>
<td>G2G: Government to Government</td>
</tr>
</tbody>
</table>
As mentioned before, e-governance is more than a government website on the Internet. What are the opportunities and possibilities of e-Governance in the future, and what services are delivered at this moment?

Gartner, an international e-business research consultancy firm, has formulated a four-phase e-Governance model. This e-governance model can serve as a reference for governments to position where a project fits in the overall evolution of an e-governance strategy.

In most cases, governments start with the delivery of online information, but soon public demand and internal efficiency ask for more complex services. Of course this change will take effect gradually; some services will be online earlier than other services. In some cases the public demand is the driving force; in other cases cost saving aspects for the government are leading.

According to Gartner, e-Governance will mature according the four-phase e-Governance maturity model. These phases have been defined based on experiences with e-commerce and e-Governance in Europe and other Western regions.

**E-Governance Maturity Model (Gartner)**

<table>
<thead>
<tr>
<th>Phase</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>Early 90’s</td>
<td>Information Presence</td>
</tr>
<tr>
<td>Mid 90’s</td>
<td>Interaction Intake process</td>
</tr>
<tr>
<td>Present</td>
<td>Transaction Complete transaction</td>
</tr>
<tr>
<td>Future</td>
<td>Transformation Integration and organizational changes</td>
</tr>
</tbody>
</table>
In each of the four phases, the delivery of online services and use of ICTs in government operations serve one or more of the aspects of e-Governance: democracy, government, business.

Figure 3.3: E-Governance Maturity Model (Gartner, 2000)

The model does not mean that all institutions have to go through all phases and all at the same time. On the contrary, in the Western world government institutions are in phase 1, 2 or 3. The differences can be huge: the tax department can be in phase 3, while the department of public works is just in an early stage of phase one. It all depends on where the advantages are highest. [11]

Another remark must be made. This model shows four phases for different e-Governance (e-democracy and e-government) solutions. The assumption is made that the government has already defined an overall vision and e-policy. In the chapter “Implementation of e-governance”, this remark will be further explained.
Phase 1: Information

In the first phase e-Governance means being present on the web, providing the external public (G2C and G2B) with relevant information. The format of the first government websites is similar to that of a brochure or leaflet. The value to the public is that government information is publicly accessible; processes are described and thus become more transparent, which improves democracy and service.

Internally (G2G) the government can also disseminate information with static electronic means, such as the Internet. This phase it is all about information. From a 1-page presence website to a site with all relevant government information available to the public, in order to improve transparency in democracy.

<table>
<thead>
<tr>
<th>Examples of information that Government ...</th>
</tr>
</thead>
<tbody>
<tr>
<td>... wishes to disseminate</td>
</tr>
<tr>
<td>press notices</td>
</tr>
<tr>
<td>consultation papers</td>
</tr>
<tr>
<td>policies</td>
</tr>
<tr>
<td>white papers</td>
</tr>
<tr>
<td>news</td>
</tr>
<tr>
<td>health and safety advice</td>
</tr>
<tr>
<td>benefits and entitlements</td>
</tr>
<tr>
<td>applicable regulations</td>
</tr>
</tbody>
</table>

Figure 3.4 : Examples of government information

Phase 2: Interaction

In the second phase the interaction between government and the public (G2C and G2B) is stimulated with various applications. People can ask questions via e-mail, use search engines for information and are able to download all sorts of forms and documents. These functionalities save time. In fact the complete intake of
(simple) applications can be done online 24/7. Normally this would have only been possible at a counter during opening hours.

Internally (G2G) government organizations use Local Area Networks (LAN), intranets and e-mail to communicate and exchange data. The bottom line is that more efficiency and effectiveness is achieved because a large part of the intake process is done online. However, you still have to go to the office to finalize the transaction, by paying a fee, handing over evidence or signing papers. The use of electronic communications tools speed up the internal government processes.

**Phase 3 : Transaction**

With phase three the complexity of the technology is increasing, but customer (G2C and G2B) value will also be higher. Complete transactions can be done without going to an office. Examples of online services are filing income tax, filing property tax, extending/renewal of licenses, visa and passports and online voting. Phase three is mainly complex because of security and personalization issues – e.g., digital (electronic) signatures are necessary to enable legal transfer of services. On the business side the government is starting with e-procurement applications.

In this phase, internal (G2G) processes have to be redesigned to provide good service. Government needs to create new laws and legislation that will enable paperless transactions with legal certification. The bottom line is that now the complete process is online, including payments, digital signatures etc. This saves time, paper and money.
Phase 4: Transformation

The fourth phase is the transformation phase in which all information systems are integrated and the public can get G2C and G2B services at one (virtual) counter. One single point of contact for all services is the ultimate goal.

The complex aspect in reaching this goal is mainly on the internal side, e.g. the necessity to drastically change culture, processes and responsibilities within the government institution (G2G). Government employees in different departments have to work together in a smooth and seamless way. In this phase cost savings, efficiency and customer satisfaction are reaching highest possible levels.
<table>
<thead>
<tr>
<th>Phase</th>
<th>Information</th>
<th>External: G2C</th>
<th>External: G2B</th>
<th>Internal: G2G</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase Information</td>
<td>Local / Departmental / National information (mission statements and organisational structure, addresses, opening hours, employees, telephone numbers, laws, rules and regulations, petitions, government glossary, news)</td>
<td>Business information, addresses, opening hours, employees, telephone numbers, laws, rules and regulations</td>
<td>Knowledge base (static intranet), knowledge management (LAN)</td>
<td></td>
</tr>
<tr>
<td>Phase Interaction</td>
<td>Downloading forms on websites, submitting forms, online help with filling in forms (permits, birth/death certificates), intake processes for permits etc., e-mail newsletters, discussion groups (e-democracy), polls and questionnaires, personalised web pages, notification</td>
<td>Downloading forms on websites, submitting forms, online help with filling in forms (permits), intake processes for permits etc., e-mail notification, interactive knowledge databases, complaint handling tools</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phase Transaction</td>
<td>License applications/renewals, renewing car tags, vehicle registration, personal accounts (mytax, myfines, mylicences etc.), payment of property taxes, payment of tickets and fines, paying utility bills, registering and voting online</td>
<td>License applications and renewals via website, payment of taxes, procurement, inter-governmental transactions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phase Transformation</td>
<td>Personalised website with integrated personal account for all services</td>
<td>Personalised website with integrated business account for all services</td>
<td>Database integration</td>
<td></td>
</tr>
</tbody>
</table>

Figure 3.5: Overview e-Governance solutions for each phase
Based on E-Governance Maturity Model (Gartner, 2000) some other e-Governance model are also studied:

- Broadcasting Model
- Critical Flow Model
- Comparative Analysis Model
- E-Advocacy / Mobilization and Lobbying Model
- Interactive-Service model

3.6 e-Governance experiences review

3.6.1 Worldwide e-Governance Experiences review

Many e-Governance systems have been adopted around the globe. Advanced nations as well as developing countries are seeking best practice solutions to build effective systems. Despite these efforts, major problems confronting e-Governance developers – described in detail in chapter three - resulted in many projects experiencing total or partial failure. This section describes the e-Governance initiatives of several governments. It begins by presenting experiences from advanced nations and then moves to projects from the Arab world. The ultimate aim is to identify factors and lessons that may assist e-Governance adoption and dissemination and survey the development strategies used.

Australia:

Some Australian e-initiatives instances follow NOIE (2003):

**E-tax (ato.gov.au):** was launched in 1997 by the Australian Taxation Office (ATO) to help taxpayers to prepare and lodge their income tax returns. It assisted in the reduction of the ATO’s processing time from 8 weeks to 2 weeks and reduced its costs by a million dollars Australian per year for five years.
Centrelink (www.centrelink.gov.au): is a government agency that represents 20 public agencies in Australia, servicing over 6 million people. Centrelink launched an online system at a cost of AUD$600,000 in 2001 to facilitate communication with users. The system provided convenience and timesaving for its clients and Centrelink’s transaction savings amounted to AUD$5 millions over three years.

Job Search (www.jobsearch.gov.au): is an online employment services system that was introduced in late 1996 by the Australian Government’s Department of Employment and Workplace Relations. The system provides national exposure to job vacancies and is offered through the internet and over 2400 touch screen kiosks throughout Australia.

E-visa (www.immigration.gov.au/e_visa): is an online system launched in December 2000 by the Australian Government’s Department of Immigration and Multicultural and Indigenous Affairs to enable people around the world to lodge visa applications online. Only low-risk countries’ citizens can use this feature and they can pay fees, receive email notification and download medical forms online. Even during peak times, the system can deliver standard visa approvals in only 20 minutes from the time of submitting application.

Business Entry Point (www.business.gov.au): was developed by the Department of Industry, Tourism and Resources in Australia to act as a one-stop-shop for businesses. It enables business to register and acquire an Australian Business Number in addition to performing more than 2900 different transactions with government agencies, including information about tenders.

E-filing (www.efiling.fedcourt.gov.au): was created by the Federal Court of Australia in October 2000 to enable litigants and the general public to lodge case applications and supporting documents online. It helped to cut travel time for people from rural areas and acted as a good example for the promotion of the court’s and the country’s image in general as an “advanced high tech place to do business in”.

Commonwealth Electronic Tender System (www.tenders.gov.au): was first published in June 2002 with eight participating agencies, and more then 140 by end of 2005. It allows agencies to advertise their ‘Request for Tenders’ and enables users to submit responses online through a secure tender process.

Australian Bureau of Statistics (www.abs.gov.au) offers statistical data and indicators on an annual subscription basis.

AskNow! (www.asknow.gov.au): is managed by the National Library of Australia. It is an online reference chat service that enables librarians to reply to people’s inquiries in real-time.

Radar e-Service (www.bom.gov.au/weather/radar/): is maintained by the Bureau of Meteorology. It provides users with information of current weather, which is updated every 10 minutes. It offers a radar e-service that records about 6 million hits a day.

Austria:

According to Rupp (2002), the eAustria portal that contains both e-Governance and e-business elements, was established in 1994 by the Austrian Chamber of Commerce. Government organizations can access the portal through an Intranet system where private sector businesses have extranet access. The portal also provides information about Austrian products in 19 languages and business information on other countries. The researcher also studied other Austrian e-Governance initiatives:

eJob-Room similar to the Australian Job Search project previously described, providing employment services online

The Electronic Legal Communication (ELC) that handles communication and transactions between courts and different parties
The Administration Gateway of the City of Salzburg that manages tax payments online.

The national Austrian government e-Governance portal named HELP, designed for its citizens needs such as marriage licences, passports, and childbirth registrations.

Hong Kong:

Hong Kong has a uniquely designed and implemented e-Governance model that combines public and private elements in a citizen-oriented approach. Poon [15] describes the ESDLife initiative in Hong Kong as a joint venture between the government as a contents provider and private organisations as Electronic Service Delivery (ESD) providers in the one portal. Poon reports that this initiative places the Hong Kong government as a user rather than an owner of ESDLife, which results in the following advantages:

Less implementation difficulties as the system development and equipment procurement responsibility is shifted to the private sector

Government services are placed with those from the private sector, which enable users to access both at the same time

The system was developed according to the commercial interoperability standards, eliminating the public-private sector interaction implementation phase.

Japan:

Japan is a good example of governments that focus on disabled citizens’ access to their e-Governance portals (OECD, 2003). It has developed guidelines for website developers to facilitate disabled people accessing government’s websites by converting the web content into many forms such as sound and images. Despite this,
Japan was initially slow in adopting e-Governance concepts. [16] According to this source, an e-Japan strategy was launched in June 2001 outlining guidelines and tasks, and allocating budgets for different projects. A comprehensive government portal (www.e-gov.go.jp) was established in April 2001 to connect all government homepages and provide single point of entry to access all online services. [16]

**New Zealand:**

According to E-Governance Unit (2004), government agencies in New Zealand are utilizing the internet to offer wide range of information and services to the general public. The same source outlines that a single government portal (www.govt.nz) was developed to connect users to all government agencies’ services and information, achieving connection between more then 300 agencies with over 1500 online services. The source has also categorized the top performers in e-Governance such as the Inland Revenue (www.ird.govt.nz) that provides tax information and services to users similar to the e-Tax initiatives in Australia, and Statistics New Zealand (www.ird.govt.nz) that offers comprehensive statistics and indicators of many aspects of the country.

**Singapore:**

According to Ke and Wei, Singapore’s government portal (e-citizen) initiative is achieving an annual saving of $14.5 millions to the government. The source also outlines that Singapore was able to offer 92 per cent of its services online by end of 2001. The hits of the e-Citizen portal increased dramatically since 2001 of 240 thousands hits a month to 14.4 million hits per month in 2003 (IDA, 2005). This source also describes a nation-wide personal authentication structure called SingPass that allows residents above 15 years old to transact online with all government e-services using a single identification and password. Businesses can also transact conveniently with the government using the G2B portal (IDA, 2005a). According to the same source, businesses can utilize the portal to incorporate new companies, submit building plans and to set new entertainment outlets.
United Kingdom:

The office of the e-Envoy was established in 1999 as part of the UK’s prime minister’s delivery and reform team in the cabinet office (Office of the e-Envoy, 2005). It aims to provide all government services through the internet by 2005. Some of the key initiatives of this project are:

**e-Democracy** (www.e-democracy.gov.uk): aimed at utilizing new technology to increase British people’s awareness and participation in local decision making

**Government gateway** (www.gateway.gov.uk): was first introduced in 25 January 2001 (Office of the e-Envoy, 2005a) to enable users and organizations to register for online government services. The gateway features open standards that enables different government departments with different systems to communicate with each other through the gateway.

**Directgov** (www.direct.gov.uk): is the main UK government portal that provides directory information and transactional services to the general public. Users are able to search for services either by audience groups such as disabled or by topics like tax.

United States of America (USA):

Many e-Governance initiatives have been developed in all levels of the government in USA. The following are a few examples from the federal level:

**Firstgov.gov (2005):** is the official internet portal for the US government. It provides a single point of entry to all US government services and allows users to
search by government levels (federal, state, local) or user type (citizens, business, government, federal employees).

**Business.gov (2005):** enables small businesses to interact better with the federal government through the provision of valuable information about government rules and regulations, and online transactional services.

**GovLoans.gov (2005):** is a single entry point to all US government loans developed by five major federal agencies. It aims to direct users to the federal loans that best suit their needs. There are mainly five types of loans: agriculture, business, education, housing, and veterans.

### 3.6.2 e-Governance Experiences in India

#### 3.6.2.1 National level e-initiatives

Recognizing that e-Governance shall be a major part of e-initiatives and shall play an increasingly important role in modern Governance, various agencies of the Government and civil society organizations have taken a large number of e-initiatives across the country. Indicated below are some of the key e-initiatives taken in the country across some of the important citizen/business related departments:

**Customs and Excise (Government of India)**

- 98% of export and 90-95% of import documentation computerized
- Electronic filing through ICEGATE at 3 locations (Mumbai, Delhi, Chennai)
- 80% of Service Tax returns electronically processed

**Indian Railways (Government of India)**

- Anywhere to Anywhere reservation from Anywhere
- Electronic Booking of tickets on select sectors
• Online Information on Railway reservation on Internet

Postal Department (Government of India)
• Direct e-credit of Monthly Income Scheme returns into the investors accounts
• Dematerialization of Savings Certificate (NSC) and Vikas Patras (KVP), offering full portability

Passport / Visa (Government of India)
• 100% passport information computerized
• All 33 Regional Passport Offices covered
• Machine readable passports at some locations

AP Online (State Government of Andhra Pradesh)

An Integrated Citizen Services Portal providing citizen centric services such as: Birth/Death Certificates, Property Registration, Driver’s License, Govt. Applications & Forms, Payment of taxes / utility bills etc.

Bhoomi – Automation of Land Records (State Government of Karnataka) It provides computerized Record of Rights Tenancy & Crops (RTC) - needed by farmer to obtain bank loans, settle land disputes etc. It has also ensured increased transparency and reliability, significant reduction in corruption, exploitation and oppression of farmers. This project has benefited 20 million rural land records covering 6.7 million farmers.

CARD – Registration Project (State Government of Andhra Pradesh)

Computerization Administration of Registration Department (CARD) impacting 10 million citizens over a period of 3 years. It has completed registration of 2.8 million titles with title searches made in 1.4 million cases. The system ensures transparency in valuation of property and efficient document management system. The estimated saving of 70 million man-hours of citizen time valued at US$ 35 million (investment in CARD - US$ 6 million). Similar initiatives in other states like SARITA
(State Government of Maharashtra) STAR (State Government of Tamil Nadu), etc. have further built upon this initiative.

**Gyandoot: Intranet in Tribal District of Dhar (State Government of Madhya Pradesh)**

This project offers e-Governance services including online registration of applications, rural e-mail facility, village auction site etc. It also provides services such as Information on Mandi (farm products market) rates, On-line public grievance redressal, caste & income certificates and Rural Market (Gaon ka Bazaar).

**LOKMITRA (State Government of Himachal Pradesh)**

Offers e-Governance services:

- Online registration of applications,
- Rural e-mail facility, village auction site etc.

**Key services provided to citizens**

- Information on Mandi (farm products market) rates
- On-line public grievance redressal
- Sending and receiving information regarding land records, income certificates, caste certificates and other official documents.
- Market rates of vegetables, fruits and other items

**e-Mitra - Integrated Citizen Services Center (State Government of Rajasthan)**

- Implemented using a PPP (Public Private Partnership) model
- Private partner paid by the government department / agency
- G2C services like:
  - Payment of electricity, water, telephone bills
  - Payment of taxes
  - Ticket Reservations
  - Filing of Passport applications
  - Registration of birth/death
• Payment by cash/cheque/credit card

The above cases of e-initiatives are only illustrative. Many of the State Governments have successfully implemented several such e-initiatives. This has positively impacted the quality of life of citizens. Hence e-Governance as a major e-initiative affords an excellent opportunity for India to radically improve the quality of governance and thereby:

• Allow for two-way communication between government and citizens not only for service delivery but also to receive opinions of citizens on policies and government performance
• Provide greater access to excluded groups, who have few opportunities to interact with government and benefit from its services and schemes
• Include all sections of the society in the mainstream of development
• Enabling rural and traditionally marginalized segments of the population to gain fast and
• convenient access to services in their own neighbourhoods.

The National e-Governance Plan (NeGP)

Taking note of the potential of e-Governance to improve the quality of life of the vast population of the country, the Government of India has formulated a national program – the National e-Governance Plan (NeGP). This plan attempts to cover all the important areas relating to e-Governance – Policy, Infrastructure, Finances, Project Management, Government Process Reengineering, Capacity Building, Training, Assessment and Awareness etc. across the Central and State Governments. NeGP is a comprehensive “programme” of the Government of India and is designed to leverage capabilities and opportunities presented by ICT to promote good governance across the country. One of the learning that is at the core of the NeGP is the emphasis on implementation of such projects with clear timelines and responsibility allocations – in a “Mission Mode”. The Plan initially extends over a 4-year period at an estimated cost of over USD 3 billion. NeGP is aimed at introducing
e-Governance systematically through 25 Mission Mode projects, which would touch the lives of more than 1 billion people.

The vision of NeGP is to make all Government services accessible to the common man in his locality through common service delivery outlets. The implementation strategy envisages clear definition of service goals and metrics for each project and structured stakeholder consultations with all stakeholders including citizens and civil society organizations before the service goals of each project are firmed up. Even at the stage of formulation of the NeGP, its vision and proposed strategy, consultations were held with various stakeholders including state governments, ministries/departments, IT industry representatives and civil society organizations.

The focus of the plan includes the following sectors/projects:

**Agriculture**

E-Governance projects in the agricultural sector can provide benefit to farmers and the rural people and also enhance the lives of urban poor. There are numerous sub-projects pertaining to provision of timely expert advice to farmers, food security, marketability and commercial information relating to agricultural products, enhancing crop productivity, enhancing the reach of and ease of access to micro-credit, etc.

**Municipalities**

The coordinating agency is the Ministry of Urban Development. The main programs relevant to vulnerable and marginalized groups are registration of births and deaths, grievances and suggestions, health programs, etc.

**Gram Panchayats (elected village administration)**

The important programmes being implemented by the Ministry of Rural Development for poverty reduction are employment generation, provision of basic services, infrastructure development etc. The objective is to increase participation of rural population in the government and women empowerment.
**Common Service Centres (CSCs)** is one of the integrated projects envisioned in NeGP. The CSCs provide assisted community access points – a necessity in a country with relatively low levels of literacy and ICT penetration in rural areas. These centres are very effective in providing multiple services provided by different departments at a single location. For a common citizen, it is often confusing and time-consuming to have to visit different departments and identify the right official or office to avail of some service. This one stop shop is also helpful in increasing accessibility, enabling faster service delivery, curbing corruption and reducing difficulties faced by vulnerable and marginalized groups. Under this program, it is aimed to establish 100,000 CSCs predominantly in the rural areas to serve the needs of the traditionally underserved areas.

Core Infrastructure such as State Wide Area Networks, Data Centres, Gateways, etc. forms another critical element of the NeGP. Approximately 15% of the total program outlay is earmarked for common core and support infrastructure that is shared across projects, excluding the cost of infrastructure that is created specific to, and as a part of, individual projects.

It is clear that e-Governance has many advantages to offer to all arms of government. Despite this, many critical issues must be faced in the adoption and diffusion of e-Governance, most of which are non-technical in nature with wide impact and require thorough planning. Advanced nations in addition to developing ones are struggling to cope with and tackle such factors. Consequently, this study aimed to investigate primarily non-technical barriers to the adoption and diffusion of e-Governance and propose solutions. In the next chapter (Chapter three: Research Design), the scope, questions, architecture and design of the study are illustrated. In addition, data collection methodologies and the adopted strategies for data analysis are presented.
3.7 Study of ICT

3.7.1 Fundamentals of ICT

There is no exact definition for ICT till now, However the work of Ian Foster et al in the paper ICT and Grid Computing 360-Degree Compared, provided a general definition of ICT:

“A large-scale distributed computing paradigm that is driven by economies of scale, in which a pool of abstracted, virtualized, dynamically-scalable, managed computing power, storage, platforms, and services are delivered on demand to external customers over the Internet.” (Foster et al., 2008)

Another definition given by (Vaquero et al., January 2009):

“ICTs are a large pool of easily usable and accessible virtualized resources (such as hardware, development platforms and/or services). These resources can be dynamically reconfigured to adjust to a variable load (scale), allowing also for an optimum resource utilization. This pool of resources is typically exploited by a pay-per-use model in which guarantees are offered by the infrastructure Provider by means of customized SLAs.”

A ICT system consists of 3 major components such as clients, datacenter, and distributed servers. Each element has a definite purpose and plays a specific role.

Clients

End users interact with the clients to manage information related to the ICT. Clients generally fall into three categories:

Mobile: Windows Mobile Smartphone, smartphones, like a Blackberry, or an iPhone.
**Thin:** They don’t do any computation work. They only display the information. Servers do all the works for them. Thin clients don’t have any internal memory.

**Thick:** These use different browsers like IE or mozilla Firefox or Google Chrome to connect to the Internet ICT.

Now-a-days thin clients are more popular as compared to other clients because of their low price, security, low consumption of power, less noise, easily replaceable and repairable etc.

**Datacenter**

Datacenter is nothing but a collection of servers hosting different applications. A end user connects to the datacenter to subscribe different applications. A datacenter may exist at a large distance from the clients. Now-a-days a concept called virtualization is used to install a software that allow multiple instances of virtual server applications.

**Distributed Servers**

Distributed servers are the parts of a ICT which are present throughout the Internet hosting different applications. But while using the application from the ICT, the user will feel that he is using this application from its own machine.
3.7.2 ICT architecture

ICT architecture mainly consists of three layers called IAAS, PAAS, and SAAS. These three layers are helpful to serve the variety of services to their customers from ICT vendors.

**IAAS:** Infrastructure as a service is a provision that offers from the ICT vendors to their clients through the sources like storage, hardware, severs, networking components. The maintenance of these hardware resources are maintained by ICT vendors. Usually in this case, the clients using this kind of ICT resources need to pay money only for their needs, and they do not need to pay after their work gets finished. The ICT clients can resize or extend this kind of service from their ICT vendors, so the ICT suppliers resize or ad-hoc the services to their clients based upon the user needs. The IAAS facility is offered with the help of virtualization, there are two different kinds of virtualization:
1. **Full virtualization:** when one system or installed software from one machine can run another entire virtual system by its own emulation in it.

2. **Para virtualization:** This is a kind of extension from full virtualizations, but it differs only to enable and run many operating systems at a same time.

   **SAAS:** Software as a service, the name itself implies that the software’s like word processors are offered to their customers through the ICT for almost free or low cost. So the ICT users need not waste huge amount of money on get licence to use certain software applications. In some cases, certain software applications like excel, the users are even able to access in offline mode, and the data processed in that application are synchronized in ICT once they come to online.

   **PAAS:** Platform as a service which offers the development environment for building, testing and delivering software applications or any other services through ICT without any download or installs applications in ICT user’s machine. (Al-Jumeily et al., 2010)

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![Cloud Architecture Diagram](image-url)

**Figure 3.7:** ICT architecture

ICT clients may use one or more services of ICT based on their business needs. There are plenty of ways to access ICT through various forms of clients. Hardware devices like PDAs, mobile phones, regular PCs, notebooks, and software applications like regular web browser are such examples to access ICT from various clients. ICT becomes most popular on all business sectors nowadays because it helps a lot to reduce the cost of use of software applications and hardware usage. ICT helps
to reduce the processor and memory usage through its online backup and applications. The clients may get online memory space on demand from ICT vendors with minimal cost while the real physical memory depends on their work needs. Many online applications like spreadsheet and software applications are helpful to clients to use the applications at minimal cost or free on demand and it helps to avoid purchase the license to use real time software applications. In some cases, some software applications like spreadsheet have offline support also from ICT vendors, in this case the process in offline mode get synchronized once it gets refreshed in an online mode.

There are plenty of multi-national companies now offering best ICT solutions, like as Google, Amazon, IBM, Yahoo, and Microsoft. Google’s API is best example for the ICT applications; Google offers plenty of software applications with the help of ICT such as YouTube, Google apps, Picasa. The main advantage of ICT is that one need not worry about client machine, because all our data is stored safely in online ICT. But still ICT have few disadvantages, such as subscription fee for the access ICT sources may become costlier for long term use, and it is always recommended for clients to use more than one client vendors to avoid data loss in case of any problems affected to ICT vendors like bankruptcy. (Pocatilu et al., 2010)

3.7.3 Different types of ICT

ICT have four different ICTs which vary on their modes of deployment of computing:

Public ICT: Public ICT is conventional way of ICT, where the third party vendors are provide the IAAS, SAAS, and PAAS. In this methodology, the user can have the access to these services on an ad-hoc basis through the ICT.

Hybrid ICT: Hybrid/enterprise ICT has both In-house and third party providers. In these kinds of ICTs, some portion is private where it can be accessed only internal and the remaining portion is public which can be accessed externally.
Private ICT: This is an internal ICT which maintains and owns the services like PAAS, SAAS, and IAAS by the company. But still this ICT can be accessed by other ICT users through a private network.

Community ICT: This is an external private ICT which is shared by many companies having the similar requirements. Third party ICT vendors offer this ICT, but this can be accessed by the companies who operate in the community.

3.8 ICT based e-Governance

ICT based e-Governance is the sub division of ICT on educational field for e-Governance systems. It is the future for e-Governance technology and its infrastructure. ICT based e-Governance has all the provisions like hardware and software resources to enhance the traditional e-Governance infrastructure. Once the educational materials for e-Governance systems are virtualized in ICT servers these materials are available for use to students and other educational businesses in the form of rent base from ICT vendors. ICT based e-Governance architecture is explained in the following figure:

![Figure 3.8: Architecture of e-Governance ICT (Laisheng et al., 2011)](image-url)
ICT based e-Governance architecture is mainly divided into five layers called hardware resource layer, software resource layer, resource management layer, server layer and business application layer.

1) **Hardware resource layer:** This is the bottom most layer in the ICT service middleware where it handles the essential computing things like physical memory and CPU for the total system. This layer is most important for the total infrastructure of the system. With the help of virtualization, physical servers, network and storage are grouped and called it as upper software platform. To offer the uninterruptible power to the ICT middleware services for the ICT based e-Governance systems, physical host pool is expanded dynamically and memory is scalable at any time to add additional memory.

2) **Software resource layer:** This layer is created with the help of operating systems and middleware. With the help of middleware technology, many software solutions combine to offer the grouped interface for the software developers. So, software developers can create many applications for e-Governance system and able to embed those in ICT, which helps the ICT users to compute those applications through ICT.

3) **Resource management layer:** This layer plays an important role on get loose coupling of software and hardware resources. With the help of virtualization and scheduling idea of ICT, it brings the uninterrupted on-demand software distribution for different hardware resources.

4) **Service layer:** Service layer is divided into three levels namely IAAS, PAAS, and SAAS. These service layers help to ICT customers to use the various forms of ICT resources for their products like software resource, hardware resource, and infrastructure resource.

5) **Business application layer:** Business application layer differs from all other layers in ICT based e-Governance architecture, because this layer acts as important business logic of e-Governance, and frames the expansion of group of components for e-
Governance. Business application layer mainly consists of content creation, content delivery, education platform, teaching evaluation and education management.

3.9 ICT Architectural Approaches

Due to different device capabilities in ICT environment, e-Governance content adaptation and transformation need to be implemented before the content is presented to the user.

From an architectural point of view, four categories should be mentioned that represent the most significant distributed solutions for content adaptation like:

i) client-side approaches,
ii) server-side approaches,
iii) proxy-based approaches and
iv) service-oriented approaches.

3.9.1 Client–side approaches

In a client-side approach, the transcoding process is the responsibility of the client application, as next Figure shows the use of client side approaches:

Figure 3.9: Use of client side approaches
Client-side solutions can be classified into two main categories with different behaviors:

1. the clients receive multiple formats and adapt them by selecting the most appropriate one to play-out, or
2. the clients compute an optimized version from a standard one.

This approach suggests a distributed solution for managing heterogeneity, supposing that all the clients can locally decide and employ the most appropriate adaptation to them.

### 3.9.2 Server-side approaches

In a server-side approach, the server (that provides contents) performs the additional functional of content adaptation [13] [18] (next Figure). In such an approach, content adaptation can be carried out in an offline or on-the-fly fashion.

![Figure 3.9.1: server-side approach](image)

In the former, content transcoding is performed whenever the resource is created (or uploaded on the server) and a human designer is usually involved to hand-tailor the contents to different specific profiles. Multiple formats of the same resources are thus stored on the server and they are dynamically selected to match client specifications. In all the on-the-fly solutions, adapted contents are dynamically produced before delivering them to the clients.
3.9.3 Proxy-based approach

In *proxy-based* approaches, the adaptation process is carried out by a node (i.e. the proxy) placed between the server and the client [16]. In essence, the proxy captures replies by the server to the clients requests and performs three main actions:

1. It decides whether performance enhancements are needed.
2. It performs content adaptations.
3. It sends the adapted contents to the client.

To accomplish this task as a whole, the proxy must know the target device, the user capabilities (this information must be received from the client) and a “full” version of the original contents (this data must be received from the server). As a consequence, the use of network bandwidth could be intensive in the network link between the proxy and the server.

3.9.4 Service-based approach

The dynamic nature of adaptation mechanisms together with emerging opportunities offered by the new Web Service technologies, now provide a new approach of *service-oriented* content adaptation [15].

The philosophy at the basis of these approaches is fundamentally different from those previously discussed, since the transcoding and the adaptation activities are organized according to a service-oriented architecture. Indeed, the number of content adaptation typologies, as well as the set of multiple formats and related conversion schemes is still increasing. This dynamism is one of the reasons that
makes it difficult to develop a single adaptation system that can accommodate all the types of adaptations; therefore, third-party adaptation services are important.

![Service based approach](image)

**Figure 3.9.3 : Service based approach**

The Internet Content Adaptation Protocol (iCAP) [37] is closely related to this approach. ICAP distributes Internet-based content from the origin servers, via proxy caches (iCAP clients) to dedicated iCAP servers. For example, simple transformations of content can be performed near the edge of the network instead of requiring an updated copy of an object from an origin server, such as a different advertisement by a content provider, every time the page is viewed. Moreover, it avoids proxy caches or origin servers performing expensive operations by shipping the work off to other (iCAP) servers. However, it only defines a method for forwarding HyperText Transfer Protocol (HTTP) messages, i.e. it has no support for other protocols and for streaming media (e.g. audio/video) and only covers the transaction semantics and not the control policy.

**User interface:** The study indicate that a suitable user interface is a prime design goals for any Web OS, user interface should be in a form that include using minimal screen space by combining applications and standard Web pages into a single tab strip, rather than separating the two. Designers should consider a reduced window management scheme that would operate only in full-screen mode. Secondary tasks would be handled with "panels": floating windows that dock to the bottom of the screen for tasks like chat and music players. Split screens can be used for viewing two pieces of content side-by-side. We propose the use of search and pinned tabs as a way to quickly locate and access applications after review some web OS. [18]
Importance of E Governance

The importance of e-government is closely inter-related with importance of good government in country. Governments across developing nations worldwide have more challenges and responsibilities to bring their nations at par with the developed nations. To face such challenges, government can bring in e-Governance reforms.

E-Governance offers a new way forward, helping improve government processes, connect citizens, and build interactions with and within civil society. we can see that good government as in exercise of administrative, political and economic authority to manage affair and transaction of country in each and every level. The main importance of e-government is to support and simplify e-governance for all parties, government, citizen and business

3.10 Use of ICT for Women Literacy In rural Areas

ICT does not mean the Internet alone; it also includes radio, wireless phone, computer connected (or not) to the Internet, electronic brail writer, and a wide variety of software, hardware or tools such as operating systems, databases, emails or office productivity applications, networks, etc..

They are not to be used instead of other tools, but complement what exists to achieve a goal, be it better food distribution or health care access, or eLearning, entertainment, etc. In today’s world, the most prevalent ICT device is the mobile phone, with almost 3.5 Billion users around the world.

E-Learning System for Rural women’s It is very useful for women are who has not literate and it is access the information of all types like computer, Agriculture, cooking etc... Government launched the many of projects for literacy in rural areas with the help of Information and Communication Technology. It is very useful for rural women’s. With the help of ICT government take the many people educated in
rural areas. It is very effective for all people in India. Development and design Much of the content on the Internet has not been developed to address the needs of women and girls in developing and developed countries nor is it available in the languages they speak. Digital technology has also been used for Harassment and sexual exploitation of women and girls in the form of pornography, trafficking and predatory e-mails. While gender sensitive men have done much to promote gender equitable content design, fully addressing these issues can only be done when more women become software engineers, content producers and entrepreneurs filling the large need for these resources.[19]

There is a growing commercial market, yet significantly underserved in the developing world.
References


