
UNIT 1 E-GOVERNANCE: CONCEPT AND SIGNIFICANCE

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1.0 LEARNING OUTCOMES

After studying this Unit, you should be able to:

- discuss the concept and significance of e-governance;
- explain the various stages of e-governance;
- examine the various models of e-governance; and
- analyse the issues and challenges

1.1 INTRODUCTION

Reinventing government has been a dominant theme since 1990s, wherein governments world over are attempting to improve the systems of public service delivery. Rapid strides made in the field of Information and Communication Technology (ICT) have facilitated the reinvention of governments and prepared them to serve the needs of a diverse society. In other words, the information age has redefined the fundamentals and transformed the institutions and mechanisms of service delivery forever. The vision is the articulation of a desire to transform the way government functions and the way it relates to its constituents. The concept of electronic governance, popularly called e-governance, is derived from this concern. Democracies in the world share a vision of the day when e-governance will become a way of life.

India has been at the forefront of the IT revolution and has had its effect on the public administration systems, as we would see later in this Unit. In fact, if the potential of ICTs are harnessed properly, it has a lot of opportunities, especially, in the social and economic growth of the developing world.

1.2 CONCEPT OF E-GOVERNANCE

E-governance is the application of ICT to the processes of government functioning for good governance. In other words, e-governance is the public sector's use of ICTs with the aim to improve information and service delivery, encourage citizen participation in decision-making and make government more accountable, transparent and efficient.

The Ministry of Information and Technology states that e-governance goes far beyond mere computerisation of stand alone back office operations. It implies fundamental changes in government operations; and new set of responsibilities for the legislature, executive, judiciary and citizens.

According to the Comptroller and Auditor General, UK, e-governance means providing public access to information via the internet by government departments and their agencies.

So in essence, e-governance is the application of ICT in government functioning to bring in **SMART** governance implying: simple, moral, accountable, responsive and transparent governance.

SMART GOVERNANCE

Simple- meaning simplification of rules, regulations and processes of government through the use of ICTs and thereby providing for a user-friendly government

Moral- connoting emergence of an entirely new system of ethical values in the political and administrative machinery. Technology interventions improve the efficiency of anti-corruption agencies, police, judiciary, etc.

Accountable- facilitating design, development and implementation of effective Management Information System and performance measurement mechanisms and thereby ensuring accountability of public service functionaries.

Responsive- streamlining the processes to speed up service delivery and make system more responsive.

Transparent- bringing information hitherto confined in the government documents to the public domain and making processes and functions transparent, which in turn would bring equity and rule of law in responses of the administrative agencies.

SMART governance, thus, helps in:

- improving the internal organisational processes of governments;
- providing better information and service delivery;

- increasing government transparency in order to reduce corruption;
- reinforcing political credibility and accountability; and
- promoting democratic practices through public participation and consultation.

E-governance and E-government

E-governance and e-government are often used interchangeably, so distinguishing between them at this stage is imperative. According to Thomas B. Riley government and governance are both about getting the consent and cooperation of the governed. But whereas government is the formal apparatus for this objective, governance is the outcome as experienced by those on the receiving end. . . . E-government can be more productive version of government in general, if it is well implemented and managed. E-governance can evolve into participatory governance, if it is well supported with appropriate principles, objectives, programmes and architectures.

E-government is, thus, the modernisation of processes and functions of government using the tools of ICT as to transform the way it serves its constituents. As per the World Bank, e-government refers to the use by government agencies of information technologies (such as wide area networks, internet and mobile computing) that have the ability to transform relations with citizens, businesses and other arms of government. It is the use of technology to enhance the access to and delivery of government services to benefit citizens, business partners and employees. E-governance, on the other hand, goes beyond the service delivery aspects and is seen as a decisional process. It is about the use of ICTs in the systems of governance, that is, using ICT to involve multi-stakeholders in decision-making and in making governments open and accountable.

1.3 STAGES OF E-GOVERNANCE

Different stages of e-governance are identified on certain set of criteria. These stages are:

- **Simple information dissemination** (one-way communication)- is considered as the most basic form, as it is used for merely disseminating information;
- **Two-way communication** (request and response)- is characterised with e-mail system and information and data-transfer technologies in the form of website;
- **Service and financial transactions**- is online services and financial transactions leading to web based self-services;
- **Integration** (both vertical and horizontal)- in this stage the government would attempt inter and intra-governmental integration; and
- **Political participation**- this stage means online voting, online public forums and opinion surveys for more direct and wider interaction with the government.

Another classification of e-governance has six stages of which the first two are similar to that of the above classification. The remaining four are:

- **Third stage**- refers to multi-purpose portals, which allow customers to use a single point of entry to send and receive information and to process transactions across multiple departments;
- **Fourth stage**- consists of portal personalisation, wherein customers are allowed to customise portals with their desired features;

- **Fifth stage-** is when government departments cluster services along common lines to accelerate the delivery of shared services and clustering of common services; and
- **Sixth and final stage-** technology is integrated further to bridge the gap between the front and back office.

After our discussion of the concept and stages of e-governance, we will now deal with significant models of e-governance that can be used in designing e-government initiatives.

1.4 MODELS OF E-GOVERNANCE

Prof. Dr. Arie Halachmi in his paper, namely, ‘E-Government Theory and Practice: The Evidence from Tennessee (USA),’ has given five important models of e-governance, which can be used as a guide in designing e-government initiatives depending on the local situation and governance activities that are expected to be performed. These models are:

- The Broadcasting Model
- The Critical Flow Model
- The Comparative Analysis Model
- The E-Advocacy/Mobilisation and Lobbying Model
- The Interactive-Service Model

We will now discuss these models individually.

- **The Broadcasting Model**

The model is based on dissemination/broadcasting of useful governance information, which is in the public domain into the wider public domain with ICT and convergent media. The strength of the model rests upon the fact that a more informed citizenry is better able to judge the functioning of existing governance mechanisms and make an informed opinion about them. Consequently, they become more empowered to exercise their rights and responsibilities. Widespread application of this model corrects ‘information failure situations’ by providing people with the relevant information relating to the governance sphere to make informed opinion and impact governance processes.

Further, the use of ICT opens an alternative channel for people to access information as well as validate existing information from different sources.

- **The Critical Flow Model**

The model is based on disseminating/channelling information of critical value to the targeted audience or into the wider public domain with ICT and convergent media.

The strength of this model is that ICT makes the concept of ‘distance’ and ‘time’ redundant when information is hosted on a digital network, and this could be used advantageously by instantly transferring the critical information to its strategic user group located anywhere or by making it freely available in the wider public domain.

- **The Comparative Analysis Model**

This model is highly significant model for developing countries and can be used for empowering people. Essentially, the model continuously assimilates best practices in the areas of governance and then uses them as benchmarks to evaluate other governance practices. It then uses the result to advocate positive changes or to influence ‘public’ opinion on these governance practices. The comparison could be made over a time scale to get a snapshot of the past and present situation or could be used to compare the effectiveness of an intervention by comparing two similar situations. The strength of this model lie in the infinite capacity of digital networks to store varied information and retrieve and transmit it instantly across all geographical and hierarchal barriers.

- **The E-Advocacy/Mobilisation and Lobbying Model**

This model builds the momentum of real-world processes by adding the opinions and concerns expressed by virtual communities. This model helps the global civil society to impact on global decision-making processes. It is based on setting up a planned, directed flow of information to build strong virtual allies to complement actions in the real world. Virtual communities are formed which share similar values and concerns and these communities in turn link up with or support real-life groups/activities for concerted action.

Hence, it creates a diversity of virtual community and the ideas, expertise and resources are accumulated through this virtual form of networking. In addition, it is able to mobilise and leverage human resources and information beyond geographical, institutional and bureaucratic barriers and use it for concerted action.

- **The Interactive-Service Model**

It opens avenues for direct participation of individuals in governance processes and brings in greater objectivity and transparency in decision-making processes through ICT. Fundamentally, ICT has the potential to bring in every individual in a digital network and enable interactive (two-way) flows of information among them.

Under this model, the various services offered by the Government become directly available to its citizens in an interactive manner. It does so by opening up an interactive Government to Consumer to Government (G2C2G) channel in various aspects of governance, such as election of government officials (e-ballots); redressing online of specific grievances; sharing of concerns and providing expertise; opinion polls on various issues; etc. (adapted from Prof. Dr. Arie Halachmi ‘E-Government Theory and Practice: The Evidence from Tennessee, USA’).

After our discussion about the models of e-governance, we will now focus on the legal and policy framework for the implementation of ICT and e-governance in the country.

1.5 LEGAL AND POLICY FRAMEWORK

The following provisions have laid down the legal and policy framework for ICT and e-governance.

- **Information Technology Act 2000**

The Action Plan endorsed by the Conference of Chief Ministers in 1987 had already addressed the pertinent issues of accountable and citizen friendly administration; and

transparency and right to information. In pursuance of these issues, the Information Technology Act was promulgated in 2000. The objective of the Act is “to provide legal recognition for transactions carried out by means of electronic data interchange and other means of electronic communication, commonly referred to as ‘electronic methods of communication and storage of information’; to facilitate electronic filing of documents with the Government agencies; and further to amend the Indian Penal Code, the Indian Evidence Act, 1872, the Banker’s Book Evidence Act, 1891 and the Reserve Bank of India Act, 1934 and for matters connected therewith or incidental thereto.”

Both e-commerce and e-governance transactions are covered under the ambit of this Act, which facilitates acceptance of electronic records and digital signatures. The Act, thus, stipulates numerous provisions. It aims to provide for the legal framework so that legal sanctity is accorded to all electronic records and other activities carried out by electronic means. The said Act further states that unless otherwise agreed, an acceptance of contract may be expressed by electronic means of communication and the same shall have legal validity and enforceability.

CHAPTER III of the Act details about ‘Electronic Governance’ and provides interalia amongst others that where any law provides that information or any other matter shall be in writing or in the typewritten or printed form, then, notwithstanding anything contained in such law, such requirement shall be deemed to have been satisfied if such information or matter is:

- i. rendered or made available in an electronic form; and
- ii. accessible so as to be usable for a subsequent reference.

- **Report of the Working Group on Convergence and E-governance 2002-07**

Report of the Working Group on Convergence and E-governance proposed the need for administration to transform itself from a passive information and service provider to a platform/forum for the active involvement of citizens. This Report primarily concerned itself with public investments. It could not visualise the extent of private initiative that could be expected to come forth in the convergence area or in e-commerce or allied segments.

It felt the need to set up a central body for taking stock of the total IT picture in the country. This central body could be a ‘Council for E-governance’ or an adhoc ‘Commission on Re-engineering Administrative Procedures for E- governance.’ Another alternative it suggested was to set up a National Institute of Smart Governance.

- **Common Minimum Programme**

The importance of e-governance has been recognised in the Common Minimum Programme of the UPA Government, which inter-alia states that e-governance will be promoted on a massive scale. It made a solemn pledge to the people of the country with a government that would be corruption free, transparent and accountable; and an administration that would be responsible and responsive at all times.

- **National E-Governance Plan**

Three important elements of the National E-Governance Plan, which form the core infrastructure for effective service delivery are- Data Centres, State Wide Area

Networks and Common Service Centres. The 10-point agenda of the Department of Information Technology announced for growth of ICT in the country includes expeditious implementation of a 'National E-Governance Plan' to bring about transparency and citizen centric approach in administration.

- **Expert Committee**

An expert committee had also been constituted for the amendments in the IT Act 2000 to include the technological developments post IT Act 2000. The Expert Committee completed its deliberations and submitted its report in August 2005. Now the Expert Committee's recommendations have been put on the website of the Department of Information Technology for inviting public views and suggestions. The Committee, during its deliberations, analysed some of the relevant experiences and international best practices. The Committee, while formulating its recommendations, kept in view the twin objectives of: (i) using IT as a tool for socio-economic development and employment generation; and (ii) further consolidation of India's position as a major global player in IT sector.

- **Right to Information Act 2005**

The Right to Information Act 2005 confers on the citizens the right to:

- i. inspect works, documents and records of the government and its agencies;
- ii. take notes, extracts or certified copies of documents or records;
- iii. take certified samples of material; and
- iv. obtain information in form of printouts, diskettes, floppies, tapes, video cassettes or in any other electronic mode.

This has ensured a transparent and accountable government to the people. It has also established a two-way dialogue between the citizens and the government. It has enabled citizens to make well-informed decisions. Further, it is an important step towards tackling corruption and has ensured better monitoring of services provided by the government.

1.6 SIGNIFICANCE OF E-GOVERNANCE

ICT applications impact upon the structures of public administration systems. Technological advancements facilitate the administrative systems by enabling:

- Administrative Development; and
- Effective Service Delivery

We will now discuss them individually.

Administrative Development

Administrative reforms, often, have focused on procedural details and restructuring of systems and processes of government organisations. The basic objective of these reforms is to enhance capacities of the systems. ICTs can be used and are being used now to give further impetus to the process. They help in the following manners:

- **Automation of Administrative Processes**

A truly e-governed system would require minimal human intervention and would rather be system driven. While initially the solutions that were offered were quite primitive with poor information layout, inadequate navigation provisions, occasional disruption in services, periodic outdated content and little or no 'back office' support. However, technological advancements and increased pressure from citizenry have prompted improvements in these areas. Now administrative departments are computerised and connected through network. Software has been built and designed around government departments ensuring efficiency in operations. The departments have launched individual websites carrying information of their respective departments. This has enabled online carrying of operations and file movements. Budgeting, accounting, data flow, etc. has become easy. This has increased the efficiency of office operations and processes and has reduced unnecessary delays.

- **Paper Work Reduction**

An immediate impact of automation would be on the paperwork. Paperwork is reduced to a greater extent with communication being enabled via electronic route and storage and retrieval of information in the electronic form. All this has led to emergence of 'less paper office'. This concept is defined as an office situation where all the information (file and mail) amongst various functionaries is distributed online. In the words of Dubey, less paper office is the implementation of effective electronic communication processes that enable elimination of reproductive works and unnecessary papers. The concept is where files and mails (information) are transmitted over wires to small computers at each employee's desk. Office work, such as, file movements, notings, etc. is computerised and documentation, report preparation, databases are now maintained in computers. Due to interconnectivity through LAN, transfer of information and files take place online, thus reducing the physical movements and consumption and storage of huge piles of paper.

- **Quality of Services**

ICT helps governments to deliver services to the citizens with greater accountability, responsiveness and sensitivity. Quality of services improves, as now the people are able to get services efficiently and instantaneously. As volumes of transactions and information can be electronically handled and delivered over a wider area through the net and web, qualitative services become possible in least time, in least cost, in least difficulty and in greater convenience.

By ensuring online redressal of grievances the accountability of officials is ensured. They have become sensitive to the issues affecting people. Monitoring by way of video teleconferencing has further facilitated central monitoring, reporting and face to face communication that has assured effective service delivery by the officials.

- **Elimination of Hierarchy**

ICT has reduced procedural delays caused by hierarchical processes in the organisation. Through Intranet and LAN, it has become possible to send information and data across various levels in the organisation at the same time. Computerisation and communication patterns facilitated by ICT have increased efficiency and have led to the involvement of all levels in decision-making.

- **Change in Administrative Culture**

Bureaucratic structures have been plagued by characteristics aptly described by Victor Thompson as ‘bureau-pathology’. From the days of New Public Administration, efforts have been made to find ways to deal with the pathological or dysfunctional aspects of bureaucratic behaviour and to make delivery of public services effective and efficient. With e-governance, public actions coming under public glare would certainly induce norms and values of accountability, openness, integrity, fairness, equity, responsibility and justice in the administrative culture. Rather, administration would become efficient and responsive.

Effective Service Delivery

ICTs play an important role in effectively delivering services to the people. ICTs ensure:

- **Transparency** by dissemination and publication of information on the web. This provides easy access to information and subsequently makes the system publicly accountable. Also as web enables free flow of information, it can be easily accessed by all without any discrimination.

- **Economic Development**

The deployment of ICTs reduces the transaction costs, which makes services cheaper. For example, rural areas suffer on account of lack of information regarding markets, products, agriculture, health, education, weather, etc. and if all this could be accessed online would lead to better and more opportunities and thereby prosperity in these areas.

- **Social Development**

The access to information empowers the citizens. Informed citizenry can participate and voice their concerns, which can be accommodated in the programme/ project formulation, implementation, monitoring and service delivery. Web enabled participation will counter the discriminatory factors affecting our societal behaviour.

- **Strategic Information System**

Changing organisational environment and increasing competitiveness have put pressures on the performance of the functionaries. Information regarding all aspects need to be made available to the management at every point to make routine as well as strategic decisions. ICTs effectively enable putting such strategic information systems in place.

After the above-mentioned discussion on the significance of ICTs in governance, we will now highlight certain measures that will enable its effective implementation.

1.7 SUGGESTIONS

The above discussion highlighted the important role of ICTs in governance. In order to harness the benefits of ICTs maximally, we need to develop sufficient and adequate infrastructure, provide sufficient capital and investment, enable easy and wider accessibility and generate ample and skilful human resources. These are some of the immediate and pertinent challenges to effective implementation of ICT and e-governance. We will now discuss these issues individually.

- **Infrastructure**

The foundation of e-governance is based on the telecommunication services. To develop telecommunication, infrastructures are to be created so that the end-user is able to access the services promptly and effectively. To strengthen the infrastructure, 'The National Task Force on Information Technology and Software Development' in 1998 recommended broadband connection (also known as 'the last mile') linkage for IT Applications Service Providers (ASPs), Internet Service Providers (ISPs) and IT promotional organisations, either by fibre optics or by radio communication, with the aim to 'boost efficiency and enhance market integration' through Internet/Intranet for sustainable regional development.

- **Capital**

A high rate of investment in IT capital and a supportive environment is necessary to achieve digital economy. In view of the resource crunch with the government, there is need to generate resources from the market and private sector. Public-private partnership may be beneficial in this regard, as the private sector can participate and contribute with capital and expertise support.

- **Access**

At present, there are more than 10 million users of internet in the country. But the irony is that more than 75 percent of these users are in urban India. Internet has still to reach the rural and disadvantaged sections. However, efforts are being made to expand ICT connectivity into rural areas through involvement of Gram Panchayats. NIC has developed a comprehensive web-based software for panchayati raj and rural applications, which is being implemented in states like Andhra Pradesh. With most of the panchayats getting computerised, accessibility to various services has become easy.

- **Utility of Information**

There is a need to provide information, which is useful. The content of the information should be such that it should be interesting, beneficial and appealing to the people. In this regard, Government of India and some of the state governments have prepared a vision document for e-governance keeping in mind the needs of the citizens. Though Citizens' Charters of many departments are available on the net, further publicity of such facilities is required to enable the public to access the necessary information.

- **Human Resource Development**

Despite the ascending growth rate observed in employment in IT sector, there is dearth of quality manpower. There exists a demand and supply gap in the IT manpower market. India apparently needs to have more technical institutes to impart education and training to build a pool of human resources in the field.

- **Capacity Building**

Service delivery will be effective if there is a trained manpower. Though computer training is being imparted to all the basic public functionaries, except in few cases, an effective use of ICT is yet to be seen. Moreover, there is an immediate need to launch a nation wide 'Train the Teachers Programme' (3T Programme). This should be done at all levels including

schools and colleges. A combination of physical and virtual training also needs to be imparted.

- **Changing the Mindset of Government Functionaries**

To accept the change there is a need to change the mindset of service providers and receivers. The government functionaries need to be made aware that they are there to serve the clients as per the policies and programmes and that technological advancement is only a facilitator to solutions of problems faced by people and not a solution in itself. To change the mindset of the service providers there is a need to impart orientation and training programmes to them.

- **Language**

Success of e-government also depends on communication with the people in their local languages. Currently, the most widely used language is English for e-government. But given the Indian social conditions, unless we develop interfaces in vernacular languages, it would remain out of reach of many people who are not capable of accessing these services in English. In this context, it is essential that a clear strategy be formulated to provide access to local level databases maintained in regional and local languages as well as to use appropriate interfaces to aggregate such data. However, it may be mentioned here that organisations like Centre for Development of Advanced Computing (CDAC) has developed multilingual software for the purpose.

- **Standardisation in Data Encoding**

Once multiple access points maintained in various languages at various levels are established, there is a need to update them in conformity with similar standards for data encoding-an application logic for a common horizontal application and data dictionary. This is also important for finding aggregates in the national context.

- **Grievance Redressal Mechanism**

The mechanism planned for various functions need to make provision for grievance redressal as well. Interactive platforms on the internet may speed up the process and may be useful in this regard. The BMC-Praja Foundation's joint initiative of the Online Complaint Management System (OCMS) is perhaps the world's first in citizen-government partnership for solving public grievances in municipal services. Inaugurated in April 2003, the OCMS has been receiving grievances on behalf of citizens availing services of municipalities in Mumbai. It uses IT as a tool to bring in efficiency and effectiveness into the system. One can register his/her complaint online regarding various municipal services and the Municipal Corporation will redress this complaint in the time stipulated in the Citizens' Charter adopted by the Corporation.

Central Vigilance Commission has also provided such a platform for people to register their complaints against corrupt officials. Such sporadic instances need to be made broad-based and effective, though it may be conceded that more and more public service agencies are now providing or contemplating such facilities.

- **Cyber Laws**

The government needs to enact appropriate laws, especially those, which are necessary to

enable transactions over the internet. Safety concerns regarding use of credit cards or other modes of payment stops the consumers from using such facilities. The Mahanagar Telephone Nagar Limited, Delhi for example has provided the online facility for payment of telephone bills, but not even one percent of its consumers are making use of this provision. Hence, security has to be ensured for generating confidence in the system.

1.8 CONCLUSION

According to Traunmuller and Lenk, e-governance is a global phenomenon today and it is the most recent paradigm in public administration. The speed and transparency associated with e-governance has the potential to make public administration responsive and effective. As the development of e-governance gets past the phase of pilot projects, it becomes apparent that sustainable development of e-governance will depend on an adequate institutional framework that will enable public administration to manage and harmonise the emerging multitude of technical and organisational changes at all levels of government....

The time has come to focus on the challenges in implementation, especially those related to cross-level applications and institutional framework, which would enable to bring in broader changes in governance.

1.9 ACTIVITY

- 1) Form a group and discuss in detail the provisions of the IT Act 2000 and Right to Information Act 2005.
- 2) Let us know about some of the measures that you can suggest to make the Right to Information Act effective.

1.10 KEY CONCEPTS

E- governance	: use of technology to enhance the access to and delivery of government services to benefit citizens, business partners and employees.
ICTs	: are the information and communication technologies such as, radio, computers, Internet, Intranet, Websites, and satellites; providing database, knowledge database, expert systems, Geographic Information System, Management Information System, video and audio teleconferencing.
State Wide Area Network	: networks linking the state headquarters right up to the block level through National Informatics Centre Network.
National E-governance Plan	: seeks to implement 25 Mission Mode Projects at the Centre, State and integrated service levels so as to create a citizen-centric and business-centric environment for governance, create governance and institutional mechanisms, set up core infrastructure, formulate key policies and channelise private sector technical and financial resources into the national e-governance efforts.

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UNIT 2 INFORMATION AND COMMUNICATION TECHNOLOGY: CONCEPT AND COMPONENTS

Structure

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 - 2.2.4 Computer Hardware
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 - 2.2.8 Satellite
 - 2.2.9 Very Small Aperture Terminal
 - 2.2.10 Ham Radio
- 2.3 Conclusion
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- 2.5 Key Concepts
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2.0 LEARNING OUTCOMES

After studying this Unit, you should be able to:

- explain the concept of ‘information,’ ‘communication’ and ‘information and communications technology’; and
- describe the various types of technologies used in information dissemination, communications and delivery of services.

2.1 INTRODUCTION

Webopaedia defines ‘information’ as a word, which has many different meanings in everyday usage and in specialised contexts, but as a rule, it is a concept that is closely related to data, instruction, knowledge, meaning, communication, representation and mental stimulus. Information is knowledge derived from data/ data placed within a context. It is a message, something to be communicated from the sender to the receiver. Information in an organisation is the collection of expertise, experience and database that individuals and workgroups use for discharging their responsibilities. It is produced and stored by individual minds, or implicitly encoded and documented in organisational processes, services and systems. It is required for better planning and control. Shannon and Weaver define information as the amount of uncertainty that is reduced when a message is received.

‘Communication,’ on the other hand, is the process of information, usually via a common system of symbols. Communication can be interactive, transactive, intentional or unintentional; it can also be verbal or nonverbal.

‘Information and Communication(s) Technology’ (ICT) is then about use of technology in information processing and communication. In particular, it deals with the use of electronic computers and computer software to convert, store, protect, process, transmit and retrieve information. ICT may be discussed in terms of all the uses of digital technology that already exist to help individuals, businesses and organisations use information. ICT covers any product that will store, retrieve, manipulate, transmit or

receive information electronically in a digital form. For example, personal computers, radio, ham, telephone, broadband, digital television, email, robots etc. are all equipment, which can be classified as ICTs. Importantly, it is also concerned with the way these different uses can work with each other.

In this Unit, we will be discussing some of the important technologies that are used in information processing and communication.

2.2 TECHNOLOGIES FOR INFORMATION AND COMMUNICATION

Various technologies have been developed over the years in terms of information and communication. Some of them had many versions as well. However, the feasibility of technology is to the extent it is cost effective to its users and it survives till it is taken over by an alternative far more superior and cost effective technology.

Some of the important and useful technologies used for information and communication are discussed as below:

2.2.1 Telephone

Telephone is a telecommunications device, which is used in transmitting and receiving sound across distance. In this device, electric signals are transmitted over a complex telephone network, which allows the user to communicate with the other user. Usually, there are four ways to connect to a telephone network:

- a traditional fixed phone that is the ‘landline,’ which uses dedicated physical wire connections connected to a single location;
- wireless and radio telephones, which use either analogue or digital radio signals;
- satellite telephones, where communication is through telecommunications satellites; and
- Voice over Internet Protocol (VoIP) telephones, which use broadband internet connections.

Now-a-days, fibre optic cable, point-to-point microwave or satellite relay, carry transmissions across a network. This has increased the usage of cordless and mobile phones considerably in recent times.

Telephone technology has undergone many changes and innovations since the time it came into being. This has been due to increased demand for this communication device. Today, electrical telephones have been replaced and electret microphones are now used in almost all telephone transmitters. Besides, there are other technologies as well that include manual switchboard, rotary dial, automatic telephone exchange, computerised telephone switch, Touch Tone® dialling (DTMF), and digitisation of sound using different coding techniques including Pulse Code Modulation (PCM). We will discuss some of them briefly.

- **Digital Telephony**

The Public Switched Telephone Network (PSTN) has improved the capacity and quality of the networks. Digital transmission has made it possible to carry multiple digitised switched circuits on a single transmission medium, known as multiplexing. While today the end instrument remains analogue, the analogue signals reaching the aggregation point (Serving Area Interface (SAI) or Central Office (CO i.e. telephone exchange) are typically converted to digital signals. Digital Loop Carriers (DLC) are often used, placing the digital network even closer to the customer premises.

- **Cordless Telephone**
Cordless telephone consists of a base unit that connects to the landline system and a remote handset, which uses low power radio. This permits use of the handset from any location within range of the base. Because of the power required to transmit to the handset, the base station is powered with an electronic power supply. The range of cordless phones, today, is normally a few hundred metres because of various factors like quality of voice or interference with other communication devices using the same frequency.
- **Cellular Phone**
Mobile phone systems are cell-structured. Radio is used to communicate between a handset and nearby cell site. When a handset gets too far from a cell site, a computer system commands the handset and a closer cell site to take up the communications on a different channel without interrupting the call.
- **Voice Over Internet Protocol Telephony**
Protocols used to carry voice signals over the IP network are commonly referred to as Voice over Internet Protocol or VoIP, or IP Telephony or Internet Telephony or Digital Phone. It is the routing of voice conversations over the internet or any other IP-based network. The voice data flows over a general-purpose packet-switched network, instead of traditional dedicated, circuit-switched voice transmission lines. In general, phone service via VoIP costs less than equivalent service from traditional sources. Some cost savings are due to using a single network to carry voice and data, especially where users are having existing under-utilised network capacity, which they can use for VoIP at no additional cost.

VoIP makes easy some things that are difficult with traditional phone networks, such that incoming phone calls can be automatically routed to the VoIP phone, irrespective of where one is connected to the network. One can take one's VoIP phone on a trip and anywhere connect it to the internet and receive incoming calls. VoIP phones can integrate with other services available over the Internet, including sending and receiving messages or data files in parallel with the voice conversation, audio conferencing, managing address books and passing information about whether others (e.g. friends or colleagues) are available online to interested parties.

VoIP technology still has a few shortcomings that have led some to believe that it is not ready for widespread deployment, as it does not provide any mechanism to ensure that data packets are delivered in a sequential order, or for any quality of service guarantees.

2.2.2 Radio

Radio owes its development to two other inventions: the telegraph and the telephone. These three technologies are closely related. Mostly radio broadcasts are sent over telephone wires. However, a few radio broadcasts travel through the air exclusively. Guglielmo Marconi, an Italian inventor, sent and received his first radio signal in Italy in 1895. By 1899, he was able to flash the first wireless signal across the English Channel and two years later in 1902, received the letter 'S', telegraphed from England to Newfoundland. This was the first successful transatlantic radiotelegraph message.

Wireless signals proved effective in communication for rescue works when sea disasters occurred. A number of ocean liners installed wireless equipment. In 1915, speech was first transmitted across the continent from New York City to San Francisco and across the Atlantic Ocean from Naval radio station at Arlington, Virginia to the Eiffel Tower in

Paris. Military radiotelephony was also experimented between ground and aircraft in the First World War.

Today, Radio Frequency IDentification (RFID) is used in transmission, which is an automatic identification method, relying on storing and remotely retrieving data using devices called RFID tags or transponders. RFID tag is a small object that can be attached to or incorporated into a product, animal or person. RFID tags contain antennas to enable them to receive and respond to radio-frequency queries from an RFID transceiver. (See Annexe)

2.2.3 Television

Television is a telecommunication system for broadcasting and receiving moving pictures and sound over a distance. Baird transmitted live, moving, and half-tone (grayscale) images in 1925, and gave the world's first public demonstration of a working television system to members of the Royal Institution on 26 January 1926 at his laboratory in London. These were vertically scanned images, using a scanning disc embedded with a double spiral of lenses, having only 30 lines, just enough to reproduce a recognisable human face. By 1934, all electromechanical television systems were outmoded, although electromechanical broadcasts continued on some stations until 1939.

On 25 August 1934, at the Franklin Institute in Philadelphia, Farnsworth gave the world's first public demonstration of a working, all-electronic television system with 220 lines per picture, 30 pictures per second. The first field test broadcast of colour television was by NBC, USA on 20 February 1941. The post-war development of colour television was dominated by three systems namely:

- the field sequential system, which was incompatible with existing black and white sets without an adaptor;
- dot sequential system, which in 1949 became compatible with existing black and white sets; and
- Colour Television Inc.'s system (also incompatible with existing black and white sets), which used three camera lenses, behind which were colour filters that produced red, green, and blue images side by side on a single scanning tube, and a receiver set that used lenses in front of the picture tube (which had sectors treated with different phosphorescent compounds to glow in red, green, or blue) to project these three side by side images into one combined picture on the viewing screen.

Programmes are broadcast on television stations, also called channels. At first, terrestrial broadcasting was the only way television could be distributed because bandwidth was limited. Development of cable and satellite means of distribution in the seventies pushed businessmen to target channels towards a certain audience and enabled the rise of subscription-based television channels. Today, television has grown up all over the world and has become a major source of disseminating information.

Broadcasting

There are many means of distributing television broadcasts, including both analogue and digital versions:

- **Terrestrial Television**
Terrestrial television is the traditional method of television broadcast where signal delivery is by radio waves transmitted through open space. The signals are usually unencrypted and the system is described as "free-to-air"

- **Stratovision (From aircraft flying in a loop)**
Stratovision is an airborne television transmission relay system from aircraft flying at high altitudes. This system was used for domestic broadcasting in the USA and by US military in Vietnam and other countries.
- **Satellite Television**
Satellite television is delivered by way of communication satellites, as compared to the conventional terrestrial television. In many countries, satellite television services supplement older terrestrial signals, providing a wider range of channels and services, including subscription-only services also.
- **Cable Television**
Cable television is a system of providing television, FM (frequency mode) radio programming and other services to consumers via radio frequency signals transmitted directly to people's televisions through fixed optical fibres or coaxial cables as opposed to the over-the-air method used in traditional television broadcasting (via radio waves) in which a television antenna is required.

Modern cable TV systems employ digital cable technology, which uses compressed digital signals, allowing them to provide many more channels than they could with analogue alone.

- **Other Cable-Based Services**
Coaxial cables are capable of bi-directional carriage of signals as well as transmission of large amount of data. Cable television signals use only a portion of bandwidth available over coaxial lines. This leaves plenty of space available for other digital services such as broadband internet and cable telephony.

Broadband internet is achieved over coaxial cable by using cable modems to convert the network data into a type of digital signal that can be transferred over coaxial cable.

Another service being added to many cable systems is cable telephone service. This service involves installing a special telephone interface at the customer's premises that converts the analogue signals from the customer's in-home wiring into a digital signal, which is then sent on the local loop to the company's switching centre, where it is connected to the PSTN. Data can be compressed, resulting in much less bandwidth used than a dedicated analogue circuit-switched service for digital cable telephone service. Other advantages include better voice quality and integration to a VoIP network providing cheap and unlimited nationwide and international calling.

- **Multi-Channel Multipoint Distribution Service (Wireless Cable)**
Multi-channel multipoint distribution service, also known as MMDS or wireless cable, is a wireless telecommunications technology used for general-purpose broadband networking or, more commonly, as an alternative method of cable television programming or programme reception usually in sparsely populated rural areas, where laying cables is not economically viable.

2.2.4 Computer Hardware

Computer hardware means the physical parts of a computer, which enable the computer software or computer programmes and data to operate within the hardware. Computer hardware is also enclosed as embedded systems in automobiles, microwave ovens, electrocardiograph machines, compact disc players and many other household appliances.

A typical personal computer consists of a cover box or chassis and the following parts:

- **Motherboard:** it is also known as a main board, logic board or system board. It is the central or primary circuit board making up a complex electronic system. It has slots for expansion cards and holding parts including:
 - i. **Central Processing Unit (CPU)** -or sometimes simply processor, is the component in a digital computer that interprets instructions and processes data contained in software. CPUs provide the fundamental digital computer trait of programmability.
 - ii. **Random Access Memory (RAM)** – it enables programme execution and short-term data storage, so the computer does not have to take time to access the hard drive to find something. More RAM can contribute to a faster PC.
 - iii. **Buses-** in computer architecture, a bus is a subsystem that transfers data or power between computer components inside a computer or between computers. Unlike a point-to-point connection, a bus can logically connect several peripherals over the same set of wires. Each bus defines its set of connectors to physically plug devices, cards or cables together.

There are two types of buses:

- a. **PCI bus:** the Peripheral Component Interconnect standard specifies a computer bus for attaching peripheral devices to a computer motherboard. These devices can take the form of:
 - integrated circuits fitted on the motherboard itself (called *planar devices* in the PCI specification); or
 - expansion cards that fit in sockets
 - b. **US bus:** Universal Serial Bus provides a serial bus standard for connecting devices, usually to computers such as PCs. A USB system has an asymmetric design, consisting of a host controller and multiple devices connected in a tree-like fashion using special hub devices, called USB hubs.
- **Storage Controllers:** control hard disk, floppy disk, CD-ROM and other drives. The controllers sit directly on the motherboard (on-board) or on expansion cards.
 - **Video Display Controller:** produces the output for the computer display.
 - **Computer Bus Controllers** (parallel, serial, USB, FireWire): to connect the computer to external peripheral devices such as printers or scanners.
 - **Removable Media Writer:** some of its types are:
 - i. **CD (Compact Disk)** – they are the most common type of removable media:
 - a. CD-ROM (Compact Disc Read Only Memory) Drive
 - b. CD Writer
 - ii. **DVD (Digital Video Disk)** – they are comparatively costly but more reliable:

- a. DVD-ROM Drive
- b. DVD Writer
- c. DVD-RAM (Random Access Memory) Drive

iii. Floppy Disk

iv. Zip Drive- is a medium-capacity removable disk storage system.

- v. **Tape Drive** - is a peripheral device that reads and writes data stored on a magnetic tape or a punched tape. It is mainly used for backup and long-term storage.

- **Internal Storage** – it keeps data inside the computer for later use:
 - i. **Hard Disk** - for medium-term storage of data
 - ii. **Disk Array Controller** -disk array is an enterprise storage system, which contains multiple disk drives. In computing, a disk array controller is a computer hardware device, which provides secondary storage services to computer systems, often in large servers.
- **Sound Card** – it translates signals from the system board into analogue voltage levels and has terminals to plug in speakers.
- **Networking** - to connect the computer to the Internet and/or other computers:
 - i. **Modem** - for dial-up connections
 - ii. **Network Card** - for DSL/Cable Internet and/or connecting to other computers.
- **Other Peripherals**
In addition, hardware can include external components of a computer system. The following are either standard or very common.

i. Input or Input Devices

- a. Text Input Devices, such as keyboard
- b. Pointing Devices, such as Mouse and Trackball
- c. Gaming Devices, such as Joystick and Game Pad
- d. Image, Video Input Devices, such as Image Scanner and Web Cam
- e. Audio Input Devices, such as Microphone and Headset

ii. Output or Output Devices

- a. Image, Video Output Devices
 - Printer
 - Monitor

b. Audio Output Devices

- Speakers

2.2.5 Computer Software

Computer software consists of encoded information (or computer instructions). The term is roughly synonymous with computer programme but is more generic in scope. Software is loaded into RAM and executed in the central processing unit. It is an ordered sequence of instructions for changing the state of the computer hardware in a particular sequence to obtain a particular result. It is generally written in 'high-level languages' (html) that are easier and more efficient for people to use. Software may also be considered an interface between hardware, data, and/or (other) software.

- **Types of Software**

Practical computer systems divide software into three major classes:

- i. System Software
- ii. Application Software; and
- iii. Programming Software.

System software helps run the computer hardware and computer system. It includes operating systems, device drivers, diagnostic tools, servers, windowing systems, utilities, etc.

Application software allows a user to accomplish one or more specific tasks. Typical applications include business software, educational software, databases and computer games. Most application softwares have a Graphical User Interface (GUI).

Programming software usually provides some useful tools to help programmer in writing computer programmes and software using different programming language in a more convenient way. The tools include text editor, compiler, interpreter, linker, debugger, etc.

2.2.6 Local Area Network

Local Area Network (LAN) is a computer network that spans a relatively small area. Most LANs are confined to a single building or group of buildings and connect workstations and personal computers. Each node (individual computer) in a LAN has its own CPU with which it executes programmes. It is also able to access data and devices such as laser printers, anywhere on the LAN. This allows many users to share data and devices. Users can also use the LAN to communicate with each other by sending e-mail or engaging in chat sessions.

There are different types of LAN. The following characteristics differentiate one LAN from another:

- **Topology:** the geometric arrangement of devices on the network. For example, devices can be arranged in a ring or in a straight line.
- **Protocols:** the rules and encoding specifications for sending data. The protocols also determine whether the network uses peer-to-peer or client/server architecture.
- **Media:** devices can be connected by twisted-pair wire, coaxial cables or fibre optic cables. Some networks do without connecting media altogether, communicating instead via radio waves.

LANs are capable of transmitting data at very fast rates, but the distances are limited, and there is also a limit on the number of computers that can be attached to a single LAN.

A wireless LAN uses radio waves for transmitting data. The last link with the users being wireless, it acquires the capability to give a network connection to all users in the surrounding area. Areas may range from a single room to an entire campus. The backbone network usually uses cables with one or more wireless access points connecting the wireless users to the wired network. Many laptop PCs now have wireless networking built in, thus eliminating the need for an additional plug-in PCMCIA (Personal Computer Memory Card International Association) card.

2.2.7 Wide Area Network

Wide Area Network (WAN) spans a relatively large geographical area. Typically, a WAN consists of two or more LANs. Computers connected to a WAN are often connected through public networks, such as the telephone system. They can also be connected through leased lines or satellites.

It enables communication between users and computers in different locations. Many WANs are built for one particular organisation and are private. Others, built by Internet Service Providers, provide connections from an organisation's LAN to the Internet. WANs are most often built using leased lines. At each end of the leased line, a router connects to the LAN on one side and a hub within the WAN on the other. Network protocols including Typical Computer Protocol/Internet Protocol deliver transport and addressing functions. Internet is the largest WAN in existence.

- **Internet**

The Internet, or simply the Net, is the publicly accessible worldwide system of interconnected computer networks that transmit data by packet switching using a standardised Internet Protocol (IP). It is made up of thousands of smaller commercial, academic, domestic and government networks. It carries various information and services, such as electronic mail, online chat, interlinked web pages and other documents of the World Wide Web.

Contrary to common perception, Internet and World Wide Web are not synonymous. Internet is a collection of interconnected computer networks, linked by copper wires, fibre-optic cables, etc., whereas web is a collection of interconnected documents, linked by hyperlinks and URLs. Web is a global information space, which people can read and write via computers connected to the Internet.

2.2.8 Satellite

A satellite is an object that orbits another object in the space. The space age began in 1946, as scientists began using captured German V-2 rockets to make measurements in the upper atmosphere. Before this, scientists used balloons (that went up to 30 km) and radio waves to study the ionosphere. From 1946 to 1952, upper-atmosphere research was conducted using V-2s and Aerobe rockets. On October 4, 1957 Sputnik I was launched into orbit. Today, the largest artificial satellite currently orbiting the earth is the International Space Station.

- **Types of Satellites**

- i. **Astronomical Satellites:** are satellites used for observation of distant planets, galaxies and other outer space objects.

- ii. **Communication Satellites:** are artificial satellites stationed in space for the purposes of telecommunications using radio at microwave frequencies. Most communication satellites use geo-synchronous orbits or near geo-stationary orbits, although some recent systems use low Earth-orbiting satellites as well.
- iii. **Reconnaissance Satellites:** are Earth observation satellites or communications satellite deployed for military or intelligence applications. Little is known about the full power of these satellites, as governments who operate them usually keep information pertaining to their reconnaissance satellites classified.
- iv. **Earth Observation Satellites:** are satellites specifically designed to observe Earth from orbit, similar to reconnaissance satellites but intended for non-military uses such as environmental monitoring, meteorology, map making, etc.
- v. **Navigation Satellites:** are satellites, which use radio time signals transmitted to enable mobile receivers on the ground to determine their exact location. The relatively clear line of sight between the satellites and receivers on the ground, combined with ever-improving electronics, allows satellite navigation systems to measure location to accuracies often to the order of a few metres in real time.
- vi. **Solar Power Satellites:** are built in high Earth orbit that use microwave power transmission to beam solar power to very large antenna on Earth where it can be used in place of conventional power sources.
- vii. **Space Stations:** are man-made structures that are designed for human beings to live on in outer space. A space station is distinguished from other manned spacecraft by its lack of major propulsion or landing facilities- instead, other vehicles are used as transport to and from the station. Space stations are designed for medium-term living in orbit for varying periods- weeks, months, or even years.
- viii. **Weather Satellites:** are satellites that are primarily used to monitor the weather and/or climate of the Earth.
- ix. **Miniaturised Satellites:** are satellites of unusually low weights and small sizes. Classifications are used to categorise these satellites: mini satellite (500–200 kg), micro satellite (below 200 kg), nano satellite (below 10 kg).
- **Orbit Types**
Many times satellites are characterised by their orbit. Although a satellite may orbit at almost any height, satellites are commonly categorised by their altitude:
 - i. Low Earth Orbit (LEO: 200 - 1200kms above the Earth's surface)
 - ii. Medium Earth Orbit (MEO: 1200 - 35286 kms)
 - iii. Geosynchronous Orbit (GEO: 35786 kms above Earth's surface)
 - iv. Geostationary Orbit (GSO: zero inclination geosynchronous orbit)
 - v. High Earth Orbit (HEO: above 35786 kms)

2.2.9 Very Small Aperture Terminal

A Very Small Aperture Terminal (VSAT) is a 2-way satellite ground station or may be called an earthbound station. It is used in satellite communications of data, voice and video signals (excluding broadcast television). It consists of two parts:

- a transceiver with a dish antenna (that is smaller than 3 meters, as compared to around 10 meters for other types of satellite dishes) that is placed outdoors in direct line of sight to the satellite; and
- a device that is placed indoors to interface the transceiver with the end user's communications device, such as a PC.

The transceiver receives or sends a signal to a satellite transponder in the sky. The satellite sends and receives signals from a ground station computer that acts as a hub for the system. Each end user is interconnected with the hub station via the satellite, forming a star topology. The hub controls the entire operation of the network. For one end user to communicate with another, each transmission has to first go to the hub station that then retransmits it via the satellite to the other end user's VSAT. VSAT can handle up to 56 Kilo bite per second. It transmits real-time data back for processing.

VSAT is most commonly used for point of sale transactions such as credit cards and RFID applications. VSAT is also used by local dealers affiliated with manufacturers (such as car companies) for transmitting and receiving sales figures and orders, as well as for receiving internal communications, parts ordering, service bulletins and interactive distance learning training courses from the manufacturer. Stockbrokers also make extensive use of VSAT technology.

VSAT technology is also used by 2-way satellite internet providers. These services are used across the world as a means of delivering broadband internet access to sites, which cannot get ADSL or cable Internet access, which are usually the remote or rural locations. Nearly, all VSAT systems are now based on IP with a very broad spectrum of applications.

There are two typologies of VSAT-Star VSAT and Mesh VSAT. The deployment of these topologies depends on their commercial viability. Mesh VSAT systems are preferred for deployment where the number of users is high as they minimise the overall cost of the network. Star topology services can be used to provide broadband WAN or broadband internet access. Star systems are also useful in front and back office applications and manage, store and forward solutions, such as, digital signature and interactive distance learning.

2.2.10 Ham Radio

It is not known where the nickname 'ham' radio operator came from but it is thought to have originated as a Morse Code short hand notation for 'amateur' radio operator. Once licensed, ham operators are able to use a wide variety of communication technologies including:

- World Wide Voice, CW (the technical term for Morse Code communication) and data communications using the short wave bands;
- use of FM voice repeaters at VHF and UHF frequencies - repeaters retransmit a weak signal from a handheld radio (the same size as a cellular phone) so that it can be heard over a wider area;
- access to telephone phone patches for making phone calls over radio system;
- direct access to 9-1-1 emergency communications systems (in many areas);

- packet radio data communication networks, from short wave to high speed microwave networks; and
- satellite communications systems, including numerous U.S., Russian and internationally built amateur spacecraft;
- colour television transmissions both direct and through repeaters.

Amateurs often use a multi-element ‘beam’ antenna. Such antennas produce ‘gain’ in both reception and transmission so that a signal ten times weaker can be received. This type of gain is important to enable long distance communications. The typical amateur beam antenna is mounted at about 50 feet above ground level, with significant variations depending on space and costs of installation, resulting in probably most amateur beam antennas being mounted in the 35 foot to 70-foot range above ground level. However, some installations do go higher than this. Height is important for several reasons. If using VHF or UHF radio frequencies, where line-of-sight communications is typical, height overcomes ground level obstructions.

The type of equipment used by ham operators vary from home built or kit built radios to the state-of-the-art communication systems. Probably, the most typical radios are:

- handheld VHF or UHF two-way radio;
- short wave or HF two-way radio transceiver;
- mobile VHF and/or UHF radio for mounting in car; and
- kit-built, particularly low power radios for HF short wave communications.

2.3 CONCLUSION

The various technologies described above are not exhaustive but give a fairly good idea of their applicability in governance structures. It may be stressed here that most of these technologies require massive investments and governmental approvals.

2.4 ACTIVITY

1. Give examples of satellite versions that India has so far placed into the Earth’s orbit. Also let us know about their applications.
2. Narrate a VSAT based project (e.g. Edusat or Maharastra-----) that has been implemented in our country.

2.5 KEY CONCEPTS

Digital	is one that uses numbers, especially binary numbers, for input, processing, transmission, storage, or display, rather than a continuous spectrum of values (an analogue system) or non-numeric symbols such as letters or icons. The distinction of ‘digital’ versus ‘analogue’ or ‘symbolic’ can refer to method of input, data storage and transfer, the internal working of an instrument, and the kind of display. The word comes from the same source as the word digit and digitus i.e. Latin word for finger (counting on the fingers) as these are used for discrete counting.
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Electret Microphone everything	<p>it is the most ubiquitous microphone in use. It can be found in from telephones to children's toys to medical devices. Nearly 90 percent of the approximately one billion microphones manufactured annually are electret designs. They are small, high quality and inexpensive to produce. Electret-- is a thin plastic film that after exposure to a strong electrical field, retains its electrical polarisation without requiring a power source -- something like the electrical equivalent of a magnet, with a positive and a negative side. In an electret microphone, the film is drawn taut like the head of a drum and is suspended just above a metal surface. As you talk into the microphone, pressure fluctuations in the air distort the film. Charges in the metal surface experience fluctuating forces as the polarised electret moves above it. As a result of these forces, a very small current flows from the metal surface through a wire that touches it. It is simple, rugged, versatile and provides high quality sound, especially for telephony. Electret microphones can be made extremely small -- smaller than a shirt button.</p>
Digital Loop Carrier of the	<p>is a system which uses digital transmission to extend the range local loop farther than would be possible using only twisted pair copper wires. A DLC digitises and multiplexes the individual signals carried by the local loops onto a single data stream on the DLC segment. Loop carrier systems were ordained to solve two problems: to reduce copper cable pair requirements; and to overcome electrical constraints on long loops. It would also reduce cable pair deployments.</p>
Public Switched telephone Telephone Network concentration of (PSTN) switched networks. Originally, a	<p>is the concentration of the world's public circuit-switched networks, in much the same way that Internet is the the world's public IP-based packet-switched networks. Originally, a network of fixed-line analogue telephone systems, the PSTN is now almost entirely digital, and now includes mobile as well as fixed telephones. A circuit switched network is one where a dedicated connection (circuit or channel) must be set up between two nodes before they may communicate. For the duration of the communication that connection may only be used by the same two nodes and when the communication has ceased, the connection must be explicitly cancelled.</p>
Grayscale	<p>In computing, a grayscale or greyscale digital image is an image in which the value of each pixel is a single sample. Displayed images of this sort are typically composed of shades of gray, varying from black at the weakest intensity to white at the strongest, though in principle the samples could be displayed as shades of any colour, or even coded with various colours for different intensities. Grayscale images are distinct from black and white images, which in the context of computer imaging are images with only two colours, black and white; grayscale images have many shades of gray in between. In most contexts other than digital imaging, however, the term 'black and white' is used in place of 'grayscale'; for example, photography in shades of</p>

gray is typically called 'black-and-white photography'. The term monochromatic in some digital imaging contexts is synonymous with grayscale, and in some contexts synonymous with black-and-white.

Cryptography

is the field concerned with linguistic and mathematical techniques for securing information, particularly in communications. In cryptography, encryption is the process of obscuring information to make it unreadable without special knowledge. While encryption has been used to protect communications for centuries, only organisations and individuals with an extraordinary need for secrecy have made use of it. In the mid-1970s, strong encryption emerged from the sole preserve of secretive government agencies into the public domain, and is now employed in protecting widely used systems, such as Internet e-commerce, mobile telephone networks and bank automatic teller machines.

Encryption can be used to ensure secrecy, but other techniques are still needed to make communications secure, particularly to verify the integrity and authenticity of a message; for example, a Message Authentication Code (MAC) or digital signatures.

Pixel

is one of the many tiny dots that make up the representation of a picture in a computer's memory. Each such information element is not really a dot, nor a square, but an abstract sample. With care, pixels in an image can be reproduced at any size without the appearance of visible dots or squares; but in many contexts, they are reproduced as dots or squares and can be visibly distinct when not fine enough. The intensity of each pixel is variable; in colour systems, each pixel has typically three or four dimensions of variability such as Red, Green and Blue, or Cyan, Magenta, Yellow and Black.

Analogue

describes a device or system that represents changing values as continuously variable physical quantities. A typical analogue is a clock in which the hands move continuously around the face. Such a clock is capable of indicating every possible time of day. In contrast, a digital clock is capable of representing only a finite number of times (every tenth of a second, for example). In general, humans experience the world analogically. Vision, for example, is an analogue experience because we perceive infinitely smooth gradations of shapes and colours.

When used in reference to data storage and transmission, analogue format is that in which information is transmitted by modulating a continuous transmission signal, such as amplifying a signal's strength or varying its frequency to add or take away data. For example, telephones take sound vibrations and turn them into electrical vibrations of the same shape before they are transmitted over traditional telephone lines. Radio wave transmissions work in the same way. Computers, which handle data in digital form, require modems to turn signals from digital to analogue before transmitting those signals over communication lines, such as, telephone lines that carry only analogue signals. The signals are turned back into digital form

(demodulated) at the receiving end so that the computer can process the data in its digital format.

Chassis

In computers, the chassis refers to the rigid framework (metal frame) onto which the assembly-worker mounts the motherboard, memory, disk drives and other equipment

Peripheral

is a type of computer hardware that is added to a host computer in order to expand its abilities. More specifically, the term is used to describe those devices that are optional in nature, as opposed to hardware that is either demanded or always required in principle.

The term also tends to be applied to devices that are hooked up externally, typically through some form of computer bus like USB. Typical examples include joysticks, printers and scanners. Devices such as monitors and disk drives are not considered peripherals because they are not truly optional as they are internal devices.

Tape Drive

also known as a streamer, is a peripheral device that reads and writes data stored on a magnetic tape or a punched tape. It is typically used for archival storage of data stored on hard drives. Tape drives are sequential-access and must wind past all preceding data to read any one particular piece of data. They are not the fastest form of data storage, as they are sequential, but are long lasting and cost efficient

Router

is a device that forwards data packets along networks. A router is connected to at least two networks, commonly two LANs or WANs or a LAN and its ISP's network. Routers are located at gateways, the places where two or more networks connect. Routers use headers and forwarding tables to determine the best path for forwarding the packets, and they use protocols such as ICMP to communicate with each other and configure the best route between any two hosts. Very little filtering of data is done through routers.

Packet Switching

Refers to protocols in which messages are divided into packets before they are sent. Each packet is then transmitted individually and can even follow different routes to its destination. Once all the packets forming a message arrive at the destination, they are recompiled into the original message.

Most modern Wide Area Protocols, including TCP/IP, X.25, and Frame Relay, are based on packet-switching technologies. In contrast, normal telephone service is based on a circuit-switching technology, in which a dedicated line is allocated for transmission between two parties. Circuit switching is ideal when data must be transmitted quickly and must arrive in the same order in which it is sent. This is the case with most real-time data, such as live audio and video. Packet switching is more efficient and robust for data that can withstand some delays in transmission, such as e-mail messages and web pages.

A new technology, ATM, attempts to combine the best of both worlds- the guaranteed delivery of circuit-switched networks and the robustness and efficiency of packet-switching networks.

Uniform Resource Locator

URL or web address, is a standardised address name layout for resources (such as documents or images) on the internet (or elsewhere). First created by Tim Berners-Lee for use on the World Wide Web, the currently used forms are detailed by Internet Standard RFC 1738. It is also known as Universal Resource Locator.

GEO

meaning geo-synchronous or geo-stational earth orbit used to place satellites for purposes of telecommunications. GEOs orbit is at 22,300 miles above the earth's surface. They are tied to the earth's rotation and are, therefore, in a fixed position in space in relation to the earth's surface. The satellite placed in GEO goes around once in its orbit for every rotation of the earth. The advantage of a GEO system is that the transmission station on earth needs to point to only one place in space in order to transmit the signal to the GEO satellite. GEO systems are used for transmissions of high-speed data, television signals and other wideband applications.

ADSL

short for Asymmetric Digital Subscriber Line, a new technology that allows more data to be sent over existing copper telephone lines. ADSL supports data rates from 1.5 to 9 Mbps when receiving data (known as the downstream rate) and from 16 to 640 Kbps when sending data (known as the upstream rate). ADSL requires a special ADSL modem. ADSL is growing in popularity as more areas around the world gain access.

Operating System

is the most important programme that runs on a computer. Every general-purpose computer must have an operating system to run other programmes. Operating systems perform basic tasks, such as recognising input from the keyboard, sending output to the display screen, keeping track of files and directories on the disk, and controlling peripheral devices such as disk drives and printers. For large systems, the operating system has even greater responsibilities and powers. It is like a traffic cop- it makes sure that different programmes and users running at the same time do not interfere with each other. The operating system is also responsible for security, ensuring that unauthorised users do not access the system. Operating systems can be classified as multi-user that allows two or more users to run programmes at the same time. Some operating systems permit hundreds or even thousands of concurrent users; multiprocessing that supports running a programme on more than one CPU; multitasking that allows more than one programme to run concurrently; multithreading that allows different parts of a single programme to run concurrently; and real time that responds to input instantly.

Operating systems provide a software platform on top of which other programmes, called application programmes, can run. The application programmes must be written to run on top of a particular operating system. Your choice of operating system, therefore, determines to a great extent the applications you can

run. For PCs, the most popular operating systems are DOS, OS/2 and Windows, but others are available, such as Linux.

As a user, you normally interact with the operating system through a set of commands. For example, the DOS operating system contains commands such as COPY and RENAME for copying files and changing the names of files, respectively. The commands are accepted and executed by a part of the operating system called the command processor or command line interpreter.

Wireless Application Protocol	a secure specification that allows users to access information instantly via handheld wireless devices, such as, mobile phones, pagers, two-way radios, smart phones and communicators. WAP supports most wireless networks. These include CDPD, CDMA, and GSM.
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2.6 REFERENCES AND FURTHER READINGS

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UNIT 3 ICTs: ROLES AND APPLICATIONS

Structure

3.0 Learning Outcomes

3.1 Introduction

3.2 Roles of ICTs

3.3 Applications of ICTs

3.4 Conclusion

3.5 Activity

3.6 Key Concepts

3.7 References and Further Readings

3.0 LEARNING OUTCOMES

After studying this Unit, you should be able to:

- explain the roles of ICTs; and
- discuss their various applications.

3.1 INTRODUCTION

In the previous Units, you have read about the significance of ICT in governance. ICT in governance is much more than mere digitisation of processes. It is rather a ‘tool’ for good governance and human development. The roles of ICTs in governance are fourfold. They:

- enhance the quality and delivery of public services;
- enhance the quality of citizen-government interface;
- enable people’s participation in governance; and
- provide greater access and outreach so as to include the disadvantaged in governance.

In this Unit, an attempt is made to explore the applications of ICTs, which can enable governance to achieve the above-mentioned objectives.

3.2 ROLES OF ICTs

Before embarking upon a discussion on various ICT applications, we will briefly explain the roles of ICTs.

- **Information Browsing**

Browsing is defined as ‘an exploratory, information seeking strategy that depends upon serendipity ... especially appropriate for ill-defined problems and for exploring

new task domains' (G. Marchionini). Remote access systems to information databases on personal computers and via the internet have grown exponentially in the last few years. World Wide Web browsers allow a user to quickly access a wide variety of information sources. Internet contains textual as well as audio and video resources. Hence, there is a growing interest in multimedia retrieval of information today.

At present, only primitive browsing of audio/video data is possible, since there is very little structure available in digitised audio/video data. Although visual metaphors for browsing text files and images have been explored, there is little on the classification (Brazil et. al.). Moreover, there is a flip side to this information availability. Woods refers this to as the data availability paradox, as more and more data is available, but our ability to pickup what is available has not increased.

- **Electronic Publishing and Dissemination**

Access to online databases, electronic resources, online information transactions and digitised services have revolutionised the way information is disseminated. People can access information at the click of a button.

Electronic publishing provides for unfettered access to reliable information to academicians, researchers, practitioners and policy makers alike from any part of the world.

- **Modelling and Simulation**

Modelling and simulation help in developing a level of understanding of the interaction of the parts of a system, and of the system as a whole. ICTs play a very important role in modelling and simulation, which are crucial in improving systems' capacities in delivering services. For example, almost all airlines look towards weather forecast for scheduling their flights in inclement weathers. Indian Meteorological Department and similarly elsewhere, the weather departments use various ICTs, supercomputers and software to produce models through simulation and are thus able to give weather forecast-most of the time pretty accurate.

Modelling and simulation requires huge database, which are managed through various ICTs and a pattern is derived based on certain parameters, which give shape to models. A simulation generally refers to a computerised version of the model, which is run over time to study the implications of the defined interactions. Simulations are generally iterative in their development. A model is developed and then simulated and then learnings from the simulation are used to revise the model and iterations continue till an adequate level of understanding is developed. In fact, ICTs have enabled the related processes to handle complex scenarios.

- **Online Business and Government Transactions**

Land records have been made available by many state governments. Birth and death certificates can be procured without physically visiting the government offices. One can pay his / her telephone bills over internet, saving crucial time in the process. Paying income tax or property tax is no longer a cumbersome process. All this and much more has become possible due to increased use of online business and government transactions.

Such initiatives are designed to improve the efficiency and effectiveness of the government's transactions through the use of improved technology. These e-government initiatives eliminate redundant systems and significantly improve the government's quality of services for citizens and businesses. They streamline service delivery to citizens, reduce paperwork burdens on businesses and apply the best commercial practices to improve government operating efficiency. Such projects have the potential to generate huge resources in savings by reducing operating inefficiencies, redundant spending and excessive paperwork.

- **Electronic Conferences (Meetings and Discussions)**

Meetings and conferences provide arenas for dissemination of information and immediate presentation of new results and cutting edge research. However, there are some disadvantages to meetings- travel is expensive and this dramatically reduces the potential audience. Similarly, time constraints imposed by meetings often conflict with duties.

Electronic conferences can offer many of the same features of traditional conferences. The main purpose of a conference is the exchange of new results. Electronic conferences offer an excellent medium for this exchange. Internet provides a robust environment for presenting information, allowing for extensive use of text, graphics, and multimedia. The major advantages of electronic conferences are their low cost and the lack of travel time. A physical conference is located at a single venue at a set period of time. Electronic conferences lift this restriction. While the web server is located at a physical site (which might be mirrored at a few other locations), the participants can access the conference from anywhere and at any time.

After discussing the various roles, we will now explain the applications of ICTs.

3.3 APPLICATIONS OF ICTs

Various applications of ICTs enable them to perform the above-mentioned roles. These are:

- Data Base- Relational Data Base Management Systems, Knowledge Base Expert Systems;
- Decision Support Systems;
- Geographic Information Systems-Data Capture, Data Integration, Data Modelling; and
- Management Information Systems

Now we will discuss these applications in detail.

Data Base

A database is information set with a regular structure. It is usually but not necessarily stored in some machine-readable format accessed by a computer. There are a wide variety of databases, from simple tables stored in a single file to very large databases with millions of records stored in rooms full of disk drives or other peripheral electronic storage devices. Databases resembling modern versions were first developed in the 1960s.

- **Relational Data Base Management Systems (RDBMS)**

Databases can be compiled using RDBMS so that it will be possible to subject the database to queries for more informed decision-making. It is also possible to interface such an RDBMS to a Geographic Information System of the area, which will act as a front-end so that scenario analysis results can be simulated to see the options on the GIS. Such systems can also support forecasting and predictive models, especially if time series data sets are available for such areas and communities.

The database can form a very valuable resource, especially when it is properly archived with the facility for retrieval for specific purposes through well-designed query interfaces. (N. Vinod Chandra Menon)

- **Knowledge Base Expert Systems**

Knowledge-Based Systems focus on systems that use knowledge-based techniques to support human decision-making, learning and action. The quality of support given and the manner of its presentation are important issues with such systems. The primary goal of expert systems is to make expertise available to decision makers and technicians to enable them to respond swiftly with effective and efficient solutions to problems. Computers loaded with in-depth knowledge of specific subjects can help in accessing information to solve a problem. The same systems can assist supervisors and managers with situation assessment and long-range planning.

These knowledge-based applications of artificial intelligence have enhanced productivity in business, administration, science, engineering, military, etc. With advances in the last decade, expert systems clients can choose from dozens of commercial software packages with easy-to-use interfaces. Each new deployment of an expert system yields valuable data for what works in what context, thus fuelling the research that provides even better applications.

Decision Support Systems (DSS)

The systems that facilitate, expand, or enhance a manager's ability to work with one or more kinds of knowledge are called DSS. These are a specific class of computerised information system that supports decision-making activities. A properly designed DSS is an interactive software-based system intended to help decision makers compile useful information from raw data, documents, personal knowledge, and/or models to identify and solve problems and make decisions.

In the late 1960s, model-oriented DSS or management decision systems were found to be very useful. According to Peter Keen and Charles Stabell, the concept of decision support evolved from 'the theoretical studies of organisational decision making done at the Carnegie Institute of Technology during the late 1950s and early 1960s, and the technical work on interactive computer systems mainly carried out at the Massachusetts Institute of Technology in the 1960s.'

In an earlier article, Little had identified four criteria of robustness, ease of control, simplicity and completeness of relevant detail for designing models and systems to support management decision-making. These four criteria are used even today to evaluate modern DSS. The late 1970s developed many interactive information

systems that used data and models to help decision-makers analyse semi-structured problems. Now, DSS can use structural multidimensional data, unstructured documents and also spatial data in a system like Geodata Analysis and Display System (GADS) (Grace, 1976 and Swanson and Culnan, 1978).

Today, DSS can be designed to support decision-makers at any level in an organisation. They can support operations, financial management and strategic decision-making. There is growing interest in DSS that directly supports distributed decision-making at the group, organisation and inter-organisation levels. DSS differ with respect to the kinds of knowledge they help manage. While majority of conventional DSS have been devised to help manage primarily descriptive and procedural knowledge, there is a class of artificially intelligent DSS, which focuses on representation and processing of reasoning knowledge. However, it may be noted that often DSS are created to solve particular problems on an adhoc processing basis and are not needed on a regular basis.

Geographic Information Systems (GIS)

A geographic information system or geographical information system is a system for creating and managing spatial data and associated attributes. In the strictest sense, it is a computer system capable of integrating, storing, editing, analysing, and displaying geographically referenced information. According to Encyclopaedia of Earth System Sciences, GIS is a computer-based system for the manipulation and analysis of spatial information in which there is an automated link between the data and their spatial location. A GIS consists of computer hardware and software for entering, storing, transforming, measuring, combining, retrieving, displaying and performing mathematical operations on digitised thematic data (e.g. soils, vegetation, hydrology) that have been registered to a common spatial coordinate system.' In a more generic sense, GIS is a 'smart map' tool that allows users to create interactive queries (user created searches), analyse spatial information and edit data.

- **Data Capture**

GIS data represents real world objects (roads, land use, elevation) with digital data. A GIS can also convert existing digital information, which may not yet be in map form, into forms it can recognise and use. For example, digital satellite images generated through remote sensing can be analysed to produce a map-like layer of digital information.

Existing data printed on paper or PET film maps can be digitised or scanned to produce digital data. A digitiser produces vector data as an operator traces points, lines and polygon boundaries from a map. Scanning map results in raster data that could be further processed to produce vector data. Survey data can be directly entered into a GIS from digital data collection systems on survey instruments. Positions from a Global Positioning System (GPS), another survey tool, can also be directly entered into a GIS. Remotely sensed data also plays an important role in data collection and consists of sensors attached to a platform. Sensors include cameras, digital scanners etc., while platforms usually consist of aircraft and satellites.

Satellite remote sensing provides another important source of spatial data. Here satellites use different sensor packages to measure the reflectance from parts of the

electromagnetic spectrum or radio waves that were sent out from an active sensor, such as, radar. Remote sensing collects raster data that can be further processed to identify objects and classes of interest, such as land cover. When data is captured, the user should consider if the data should be captured with either a relative accuracy or absolute accuracy, since this could not only influence how information will be interpreted but also the cost of data capture.

- **Data Integration**

In addition to collecting and entering spatial data, attribute data is also entered into a GIS. For vector data this includes additional information about the objects represented in the system. After entering data into a GIS, it usually requires editing, to remove errors or further processing. For vector data it must be made 'topologically correct' before it can be used for some advanced analysis. For example, in a road network, lines must connect with nodes at an intersection. Errors such as, undershoots and overshoots must also be removed. For scanned maps, blemishes on the source map may need to be removed from the resulting raster.

- **Data Modelling**

It is impossible to collect data over every square metre of the Earth's surface. Therefore, samples must be taken at discrete locations. GIS can be used to depict two and a three-dimensional characteristic of the Earth's surface, subsurface and atmosphere from points where samples have been collected.

GIS can provide a great deal more problem-solving capabilities than using a simple mapping programme or adding data to an online mapping tool. The Website GIS.com suggests that GIS can be viewed in three ways:

- **Database View**

A GIS is a unique kind of database of the world—a geographic database (geodatabase). It is an 'Information System for Geography.' Fundamentally, a GIS is based on a structured database that describes the world in geographic terms.

- **Map View**

A GIS is a set of intelligent maps and other views that show features and feature relationships on the earth's surface. Maps of the underlying geographic information can be constructed and used as 'windows into the database' to support queries, analysis and editing of the information. This is called geovisualisation.

- **Model View**

A GIS is a set of information transformation tools that derive new geographic datasets from existing datasets. These geoprocessing functions take information from existing datasets, apply analytic functions, and write results into new derived datasets.

In other words, by combining data and applying some analytic rules, one can create a model that helps find solutions to problems being faced. Today, many local bodies in India are using GIS data for city development planning.

Management Information Systems (MIS)

MIS is the study of the design, implementation, management and use of information technology applications in organisations. Peter Keen defines MIS as ‘the effective design, delivery and use of information systems in organisations.’ It focuses on providing managers with structured periodic reports. Much of the information is from accounting and transaction systems. Apparently, MIS are not concerned with day-to-day operations, but rather with the management of activities that do support operations.

MIS became extremely relevant with the emergence of global economy, where the managers / administrators can no longer afford to ignore how the information is handled by their organisations. Expectations of the people have also increased in terms of more and better services with lesser costs. Laudon and Laudon identify three activities associated with producing information for making decisions, controlling operations, analysing problems and creating new products or services. These are:

- **Input:** it captures or collects raw data from within the organisation or from its external environment;
- **Processing:** it converts raw input into a more meaningful form; and
- **Output:** it transfers the processed information to the people or activities where it will be used.

Feedback emanating from the use of this information serves as the input for the same process again.

Today, we are using second generation of MIS. First generation MIS were concerned with the capture of information and experience so that it was easily accessible. Technology had primacy in this phase. Emphasis was given to developing sophisticated data analysis and retrieval systems with little concern towards how the information they contained would be developed or used. This led to the theoretical and practical failure of first generation techniques to live up to its promise. How well information is organised allows individuals to understand and make sense of it or leaves them lost in a maze of irrelevant information overload. Consequently, the attention was paid towards developing system that gave priority to the way in which people construct and use knowledge. This is the second generation MIS.

Characteristics of MIS

Some of the important characteristics of modern MIS are given below:

- MIS are management oriented, where the management concerns all the employees of the organisation. The system is designed from top to bottom. Development of the system starts from appraisal of organisational needs and its objectives;
- management actively directs, reviews and participates in system development efforts to ensure that the implemented information system meets the requirements of the organisation.
- an integrated system and MIS are not synonymous. However, the integrated concept is a necessary characteristic of MIS;

- due to the integrated nature of MIS, it is prudent to capture relevant data close to the source where the event occur and use it throughout the functional areas. The common data flow concept supports several tenets of systems analysis- avoiding duplication, combining similar functions and simplifying necessary functions, wherever necessary;
- while the integrated approach makes it appear a single entity, it is broken down into desirable sub-systems;
- MIS needs to be planned carefully and evolves in due course of time;
- MIS should be developed with the flexibility so that future changes in the organisational needs may be accommodated in the system; and
- MIS includes every type of systems that gives information, whether it is formal or informal (Srivastava).

Components of MIS

There are five components of MIS:

- **Hardware-** the physical equipment used in computing;
- **Software-** the set of instructions that controls the hardware;
- **People-** in the early days of computers, programmers, design analysts and a few external users were directly involved in MIS. Today, almost everyone in the organisation is involved with the information system;
- **Procedures-** are instructions that help people use the systems. They include items such as, users manuals; and
- **Databases-** are collections of related data that can be retrieved easily and processed by the computers.

MIS: Some Challenges

Some of the challenges pertaining to the use of MIS are mentioned below:

- **How to use information technology to design organisations to introduce new products and improve service delivery?**

Technical change moves much faster than the individuals and organisations. It becomes difficult to adapt to these changes in a large bureaucracy. Various restructuring efforts by various levels of government world over indicate the need for redesigning the organisations in order to become competitive in introducing new products or improving the service delivery from the existing standards.

- **How to understand the system requirements in a global economic environment?**

In the new world order if a government takes a decision, it also has to conform to several international agreements. MIS needs to incorporate those critical features so that the required inputs are available to policy maker and products remain competitive.

To develop integrated MIS, organisations need to have access to global level hardware, software and communication standards.

- **How to develop the architecture of MIS that helps in achieving goals?**

While information technology can suggest new ways of doing things, organisations need to have a clear picture of their objectives and how these can be supported best by MIS. Many organisations are not able to meet their goals because they are crippled by incompatible computer hardware, software and information systems. Integrating these ‘islands of information’ into a coherent architecture is now a priority.

- **How to secure investments for new MIS?**

A look at the budget of various ministries would reveal the kind of investment that is required to put effective MIS in place. It requires massive investment from government both for hardware and software. Besides, people have to be trained so that most optimal use of resources can be made by the organisations. Developing countries, like India, have problems of resource constraint. This challenge can be overcome only if the business value of information systems can be ensured.

- **How to ensure that MIS are used in an ethically and socially responsible manner?**

Information systems need to be designed in a manner that they function as intended but at the same time it needs to be ensured that health, safety, job security and social well being are considered as carefully as meeting the organisational objectives.

3.4 CONCLUSION

ICTs have penetrated all areas of governance and have made management of information and knowledge and service delivery more efficient, cost-effective and virtually real time. Design and development of databases, GIS, MIS and DSS has made governance more dynamic and functional. Internet and websites have facilitated easy information browsing, electronic information publishing and dissemination, speedy governmental and commercial transactions, meetings, discussions, etc. IT interfaces with satellite communication has further enabled facilities of e-learning, e-training and teleconferencing.

Thus, ICT applications have prompted effective decision-making, policy analysis and problem solving by governments at all levels and across the globe. Appropriate use of such applications can have a substantial impact and improve governance qualitatively.

3.5 ACTIVITY

1. Discuss among your peer group about the usability of database in e-governance.
2. Cite an example of a project where GIS and MIS have been used in policy planning and implementation.

3.6 KEY CONCEPTS

Vector data	: a coordinate-based data structure commonly used to represent map features. Each liner feature is represented as a list of ordered x, y coordinated. They are mathematical descriptions of geometric entities and are employed by applications like Geographic Information Systems (GIS), Computer-Aided Design (CAD), and Computer-Aided Manufacturing (CAM).
PET Film	: this is a kind of polyester and acronym of Polyethylene terephthalate.
Raster Data	: is a method of storing, representing or displaying spatial data in digital form. It consists of using cell data (not necessarily square) arranged in a regular grid pattern in which each unit (pixel or cell) within the grid is assigned an identifying value based on its characteristics.
Attribute Data	: data that relate to a specific, precisely defined location. Attributes data are qualitative data that can be counted for recording and analysis. The data are often statistical but can also be in text, images or multi-media. These are linked in the GIS to spatial data that define the location.

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ICT AND ADMINISTRATION

UNIT 4 ROLE OF ICT IN ADMINISTRATION

Structure

4.0 Learning Outcomes

4.1 Introduction

4.2 ICT Implementation in Administration: Essential Components

4.3 Role of ICT in Administration

4.3.1 Internal Administration

4.3.2 Planning and Decision Making

4.3.3 Service Delivery

4.4 Suggestions

4.5 Conclusion

4.6 Activity

4.7 Key Concepts

4.8 References and Further Readings

4.0 LEARNING OUTCOMES

After studying this Unit, you should be able to:

- discuss the essential components for ICT implementation in administration;
- examine the role of ICT in the vital areas of administration; and
- suggest measures for effective implementation of ICT in administration.

4.1 INTRODUCTION

In the early 1990's, with the coming of globalisation, liberalisation and privatisation, the governments, especially of the developing world, found themselves under remarkable pressures of economic reforms. They sought to create social and economic systems that could compete effectively in the globalising world. There was also a continuous pressure from the citizenry for reinvention of governments. The traditional bureaucracy focusing on hierarchy, authority, control, rigidity, rationality, centralisation, etc. found itself challenged by these changes. It was now to pave way for restructured administrative organisation, re-engineered work processes, strategic management, decentralisation, delegated authority and control, delegated decision-making, localness, shared and participative vision and purpose, and entrepreneurial skills, insightfulness and innovativeness.

ICTs emerged as major instruments in facilitating and enabling these changes. ICTs enabled the restructuring of hierarchical organisations, re-engineering of work processes and effective and participative decision-making. ICTs are helping governments to perform

the new roles of serving, steering, coordinating, reinventing and realignment. The tools and applications of ICT are the new modes of enabling multi-stakeholders' participation in policy making. They have helped in achieving citizens' engagement in policy deliberation and implementation process. ICTs have also given a new meaning and definition to administration. Administration has now become efficient, accountable, digital, responsive, transparent, equitable, qualitative, participative, team spirited, vision based, paperless and flexible.

In this Unit, we will discuss the role of ICT in facilitating three vital areas of administration, namely,

- Internal Administration;
- Planning and Decision Making; and
- Service Delivery

However, before we proceed to discuss the role of ICT, we will delve upon certain conditions that are necessary for effective ICT implementation in administration. Also, we would like to mention that the words 'administration' and 'governance' have been used interchangeably, without any distinction. Though we are aware of the distinction, they are used for convenience sake.

4.2 ICT IMPLEMENTATION IN ADMINISTRATION: ESSENTIAL COMPONENTS

Before we proceed to discuss the role of ICT in governance, we will delve upon certain conditions that are necessary for effective ICT implementation. According to A. Sawhney, we need to have a proper and well laid down ICT architecture that can provide strong technology framework for e-government initiatives. It should lay down the design imperatives and constraints each project must adhere to and ensure that various projects and initiatives are interoperable and capable of being combined in a logical and cohesive manner to add value to each other. It should ensure that the architecture components are extensible and scalable to adapt to the changing environments. ICT architecture encompasses the following components:

- Application-software application, which includes database programmes, word processors and spreadsheets;
- Information- processed data;
- Groupware- also known as collaborative software, is an application software that integrates work on a single project by several concurrent users at separated workstations;
- Componentware-computer and associated physical equipment directly involved in the performance of data processing or communication functions;
- Shared Database-especially pertaining to citizens, organisations or establishments;
- Middleware- in a distributed computing system, middleware is defined as the software layer that lies between the operating system and the applications on each site of the system. These are the intermediate software layers hiding distribution, that

is, the fact that an application is usually made up of many interconnected parts running in distributed locations; hiding the heterogeneity of the various hardware components, operating systems and communication protocols; providing uniform, standard, high-level interfaces to the application developers and integrators so that applications can be easily composed, reused, ported and made to inter operate; and supplying a set of common services to perform various general purpose functions in order to avoid duplicating efforts and to facilitate collaboration between applications. Hence, the role of middleware is to make application development easier by providing common programming abstractions, by masking the heterogeneity and the distribution of the underlying hardware and operating systems, and by hiding low-level programming details;

- Integration-combining software or hardware components or both into an overall system;
- Network- Wide Area Network, Local Area Network ensuring connectivity;
- Platform- it describes some sort of framework either in hardware or software, which allows software to run. Typical platforms include a computer's architecture, operating system or programming languages;
- Security Policy- security certifications and standards for data and system security.

Besides the above, an e-government model needs to have:

- Shared software applications that would be deployed across:
 - i. all the departments in the state, such as, the software suite built around Multi-purpose Household Survey Citizens' Database, e-procurement portal, or Human Resources Management System, or an Integrated Financial Information System, or Social Benefits Management System or Online Transaction Processing System;
 - ii. a group of departments, such as, software for all engineering departments or health departments that would integrate with the core applications and deal with common processes across such groups; and
 - iii. departments integrating the core and group applications.
- Shared delivery channels relating to services from several departments and organisations being delivered across the same counter in single window centres or through a comprehensive citizen services portal on the internet, which can be accessed by citizens cyber cafes or internet kiosks. This enables well-defined quality of services;
- Public- private partnerships for generating resources; and
- Training of manpower-officials and employees.

We will now discuss the role of ICT in the three vital areas of administration individually.

4.3 ROLE OF ICT IN ADMINISTRATION

ICT enables administration to be efficient and effective by facilitating the three core areas

of its functioning. It helps administration perform its public functions by simplifying the work processes and internal functioning via internal computerisation and automation, thus fostering transparency and accountability. Further, ICT facilitates policy formulation through multi-stakeholders participation enabling administration to incorporate the ideas and suggestions of professionals, academicians, private sector, civil society organisations, media, community and individuals in policy making. In addition, it renders public goods and services to the people by making the service delivery much more convenient, customer oriented and cost-effective.

We will now examine these roles in detail.

4.3.1 Internal Administration

ICT has brought about an electronic transformation in the traditional functioning of administration and has made it accountable, transparent, decentralised and citizen-centric. ICT:

- tends to reduce the inordinate delays in file processing and movement caused by multiple levels in the departments/organisations (Gupta, et.al). From the lowest level of receipt of application to the highest level of action taking is the involvement of online file movement. Once the concerned official does noting, it is sent online to the next official. Hence time is not wasted in unnecessary physical movements. Computerised database is available for ready reference and it becomes possible for the officials to reduce the number of file movements;
- promotes centralised storage of files and data. This enhances maintenance, reduces unnecessary effort, minimises storage place and lessens security risks. As the files and data are maintained in the electronic form, location and retrieval becomes easy and time saving. The entire office management system is electronised;
- establishes efficient communication system between employees of departments thereby reducing wastage of time. Technology promotes connectivity and closer collaboration between departments and helps them to work in an integrated manner increasing overall productivity and reducing time overheads. This will not only benefit the employees of the organisation but also the citizens who would experience a much shorter turnaround time and a greater degree of transparency (paraphrasing Gupta, et.al);
- replaces the manual system of using standard process sheets and similar documents for processing leave applications, transfer orders or General Provident Fund advances of the employees. These process sheets can be maintained in the electronic form in a computerised environment (Gupta, et.al); and
- shapes the environment in which the department is operating and enhances the knowledge and skills required by administrators and staff. It facilitates organisational learning and adaptation to the changing global environment by way of partnership, participation, information sharing and delegation- a complete shift from the functional traits of classic administration.

Now there is a shift from the traditional administration to a modern electronised administration. ICT modernises the traditional pattern of administrative functioning in the following way:

Traditional Administration	Electronic Administration
• Unwieldy paper files	Computer based files
• Hierarchical authority	Networked power
• Wielding power through hiding information	Empowerment by sharing information
• Expenditure orientation	Performance orientation
• Individualistic	Organisational
• Batch processing	Online processing
• Delayed access	Instant access
• Delayed response	Prompt response
• Manual data entry	Electronic data entry
• More time for routine repetitive work	More time for creative work
• Fear of unknown	IT savvy
• Status quo	Continuous improvement

Source: Jagdish Kapoor, IT and Good Governance

Technology for Effective Internal Administration

Internal functioning of administration will become effective with the application of the following devices. (Gupta, et.al.)

• **Wireless Devices**

Wireless communication devices, like cellular phones, can help in accessing the internet. Hence, with mobile phones it is possible to access people even when they are outside their offices through email or voice mail. Important and urgent matters can be immediately attended even when the officials are not in office. According to the Gartner Research Report, integration with such wireless devices has facilitated effective communication and has increased productivity (by 30%). Hence, integration with wireless technology should be taken up for effective functioning of our departments. A suitable system for interfacing with mobile devices through such channels as wireless email, SMS and voice mail, so as to harness time and cost saving, must be incorporated.

• **Unified Messaging**

Unified Messaging (UM) is a part of unified communications which provides users with the ability to access, receive and send different types of messages-faxes, emails, and voice mails-through a single common interface, such as, a browser on a PC or web enabled wireless devices. This makes it easier for the user now to access multiple messages-

voice, fax and email- through wireless devices or a PC browser. Equally, it is possible to save time in sending fax by over 80% (Captaris and ComGroup). Hence, UM can save time and money and increase productivity through effective communication system, especially in government departments, where there is reasonably enormous inter-employee communication.

- **E-mail**

E-mail facilitates inter-employee communication and inter-department communication, as communications can be sent, received and replied across electronically. Internal communication will be improved by increasing use of e-mail in the government. Even mobile wireless devices, such as, mobile phones and Personal Digital Assistants (PDA) can be used to access the message. Hence, users can now have multiple interfaces apart from computers.

- **File Tracking Module**

All files move from one section to the other and from one desk to the other in a well-laid down pattern. The file-tracking module helps to maintain a central record of the status of the files. So, whenever a file crosses one desk or checkpoint the dealing assistant enters it in the central record. Hence, all related officials and staff can access the information from the central location. This facility not only reduces the unnecessary procedure of maintaining file registers but also helps in locating all information pertaining to a single file at a central place in an electronic form that can be accessed online. Thus, the transactions can be processed online achieving greater efficiency, higher productivity and less paper work.

Steps Taken

- Most of the states have fully automated the budgeting process. The revenue collection offices have been computerised. Border check posts have been connected with central computerised system at the headquarters of respective states. Relevant data of those who pay different kinds of taxes are computerised. States like, West Bengal, has taken the effort of National Informatics Centre (NIC) in preparing software for implementing a model value added tax scheme. Tripura has taken up the computerisation of taxes and treasuries;
- States like, West Bengal, has computerised the registration of documents relating to immovable properties in transactions involving sale, mortgage, lease, etc. with the help of software prepared by NIC. In Andhra Pradesh, the Computer-aided Administration of Registration Department Project has transformed the government to citizen interaction through application of ICT and has introduced a transparent system of property valuation. This Project has helped in replacing the manual system of copying and filing documents with a sophisticated document management system that uses imaging technology replacing the manual system of indexing, accounting and reporting; and introducing electronic document writing;
- Letters and files tracking system for different offices have been implemented in states like Maharastra. Software for fund flow system, file monitoring system, letter monitoring system including receipt and despatch of letters have been developed by NIC and are in use in many departments in West Bengal;

- Government of Delhi has not only taken steps to automate its existing procedures but also reinvent government processes and redefine the role of bureaucracy. This would enable the Government to make its functioning citizen-centric, transparent and efficient;
- Video teleconferencing is used to centrally address the officials and staff at secretariat departments. Even training is being conducted through this mode. The Andhra Pradesh Government has created a requisite information infrastructure to support IT solutions in Government for disseminating relevant information for improving productivity and efficiency at all levels. It has set up a state-of-the-art video conferencing network for this purpose;
- Regional language software package with keyboard has been prepared by states, like West Bengal, for office work. West Bengal and Sikkim have integrated multi-lingual interface with Hindi data support using GIST SDK Software of C-DAC for data entry, validation, mutation, report generation, security, querying etc. of land records;
- NIC has developed an intranet based system for the management of personnel within each department providing for leave management and processing of benefits like house building advance, computer advance, TA/DA, LTC claims, etc. The Planning Commission and the Ministry of IT has already demonstrated the software for the purpose;
- In West Bengal, software of pension calculation has been developed by NIC for the primary and secondary school teachers as well as employees of the municipalities and panchayats. The State has developed software for pension file monitoring system of papers at each table of operation and tracking from entry point to despatch; and pension information system facilitating payment of gratuity, commuted value of pension, etc. to the employee at the date of his/her retirement;
- States have taken up training of employees and officials concerned in computer literacy. West Bengal has training in computer for both staff and officials of the Departments/ Directorates and District Offices. A Bengali Software package with keyboard has been prepared which will be used for office work in Bengali. Orissa has started Centre of IBM Software for imparting high-end software training. Tripura has taken up programme of training its officers and staff in basics and slightly more advanced concepts of computing.

4.3.2 Planning and Decision Making

ICT enables planning and decision making with the help of following applications:

Information Systems

Storage of information in electronic databases opens up significant possibilities for sharing information and creating new information and knowledge. Such information can be retained as individual data elements, as combinations of data to support decision-making, and with the application of judgement, as accumulated knowledge and wisdom (Gupta, et.al.). Information collected for one purpose can be re-used for multifarious policies and

plans. Geographic Information Systems and Management Information Systems (MIS) have enabled effective planning and decision-making by government departments.

- **Geographic Information Systems (GIS)**

GIS are special category of Decision Support Systems that can capture, store, check, integrate, analyse and display data using digitised maps. Every record or digital object has an identified geographic location. By integrating maps with spatially oriented databases and other databases, government departments can generate information for planning, problem solving and decision making, thereby increasing their productivity and quality of decisions. With help of GIS, use and analysis of spatial information in conjunction with connected socio-economic information is possible, which provides an ideal basis for planning. GIS is used for systematic town planning, establishing network, taking stock of country's agricultural and other resources, identifying natural resources through remote sensing; and developing infrastructure projects through spatial digital information to meet the growing needs of urbanisation (Gupta, et.al.).

GIS has been used for local level development planning in the country. The Department of Science and Technology has implemented a UNDP assisted Project on 'GIS-Based Technology for Local Level Development Planning' in association with leading academic institutions, data generating agencies and NGOs in the country. The Project helps in local level planning by using remote sensing, GIS and modern data communication facilities. Tools and techniques, such as, Geo-referenced Area Management or the GRAM++GIS package and Decision Support Modules were used for selected sectors of local level planning, for example, water resources management, land use planning, energy budgeting and infrastructure development (<http://www.undp.org.in>).

Besides, GIS-Based Decision Support System was implemented in Kutch district in Gujarat. The System helps in processing of survey data. Geo-database prepared by laying the various databases on the district, taluka (block) and village maps of the district is used for decision-making at the local administration level (<http://www.undp.org.in>).

Andhra Pradesh has employed comprehensive GIS for the State under the A. P. Development Monitoring System, which combines satellite imagery with digitised district, mandal (block) and village maps with several thematic layers covering aspects, such as, contours, soil, roads, irrigation and so on. This has helped in local level development planning.

In West Bengal, the Land Record Data Retrieval System at Block Land and Land Reforms office has been initiated. Digitisation of cadastral maps has taken place, which has made their availability to the Ryots (farmers) easy and highly cost effective. A Land Acquisition Information System has been developed by NIC for the State to ensure speedy disposal of land acquisition cases.

In West Bengal, GIS is being implemented in municipalities. It will cover geographical layout, land use, physical infrastructure and socio-economic scenario with special emphasis on education, health and family planning.

Vikas Darpan is a GIS based Planning and Decision Support System in Rajasthan, which covers more than 40000 blocks on about 200 demographic and socio-economic indicators.

Department of Telecom, Ministry of Defence and Maharashtra Earthquake Emergency Response Project are also using GIS applications.

- **Management Information Systems (MIS)**

There have been various instances of state initiatives in the application of MIS in decision-making and planning. Comprehensive MIS has been undertaken for the Department of Irrigation in Maharashtra. The infrastructure in the State includes a network among various levels in the Irrigation Department starting at Mantralaya (secretariat) upto the Divisional Offices. Hence, all information is smoothly exchanged among these levels and database is consolidated for planning and monitoring irrigation schemes. The network mainly constitutes of a dialup network for communication with various offices and ethernet for local network.

The Land Records Management Information System in Andhra Pradesh has provided land records database, which apart from furnishing land record certificates to the people, helps in land reforms planning. Now land records database can be easily accessed and used for planning land reforms. In West Bengal, the Land Records Data Retrieval System at Land and Land Reforms office at the Block level has enabled effective system of land management. A Land Acquisition Information System has been developed by NIC to ensure speedy disposal of land acquisition cases and has been in use in states like West Bengal. Tripura has also taken up the project of transport MIS for traffic management. Infrastructure for rural and urban areas can be well planned with the help of MIS as in Tripura, which has taken a project on computerisation and information system for rural infrastructure.

In Maharashtra, Cabinet Meeting Information System for the Chief Secretary's office has been implemented. Executive Information System for the CM and other ministers and senior bureaucrats is also undertaken. This will have well defined canned queries for the use of various ministers and executives and these queries will be accessible over a web interface.

The Sales Tax Department of Maharashtra has developed and deployed an Integrated Information System to facilitate electronic business, such as, web filing of returns and payment of taxes. The application forms can be downloaded from the web and used. It enables dealer specific queries and complaints. 'News Flash', 'Opinion Poll', and 'Chat with the Commissioner' are added features for the web-based solution. It also helps the dealers with accurate tax collections and simplified interpretation of the Sales Tax Act.

Information systems help in data communication as we can see in the case of AP Irrigation Information System. It encompasses development of information infrastructure in the form of radio based voice communication system at the field office level, telemetry system with limited coverage of selected project locations and use of existing Department of Telecommunications lines for networking the higher level offices. The existing NICNET terminal at important project sites also facilitates data communication to the State Headquarters at Hyderabad.

Computerisation

Computerisation of all sections of the government departments has made the system efficient in policy making and policy implementation. Properly maintained and updated centralised database and records in the computer has made decision-making quick and

easy. It has become possible for the local offices to access data more conveniently for day-to-day decision-making. Computerisation, therefore, aid in the preparation of data repository.

Today, most of the departments have been computerised. Computerisation has modernised departments, such as, the police department. They are able to now effectively operate control rooms with all vehicle registration figures computerised. They are able to plan policing system for urban areas also. ICT has, further, helped in modernising the criminal-tracking system.

West Bengal has computerised its government departments and directorate. The State has computerised the transport system so that the traffic police can get automated access to vehicle data. It has computerised the preparation of land records, which enables the collection of certified copies of land records readily from the local offices of the land records directorate against some fees. Budgeting process has also been fully automated. Revenue collection offices have been computerised. Relevant data of about lakhs of professionals paying profession tax has been computerised. Treasuries have also been computerised. All Land Acquisition Offices and Offices of the Divisional Commissioners are computerised. The Home Department is providing computer network to all police stations in Kolkata. Transport Department is using Smart Cards for registration certificates and driving licenses.

Computerisation at even the village and taluka (block) level, e.g., in Tamil Nadu, has facilitated free flow of information and data for planning for these levels.

Maharastra, AP, Gujarat, Tamil Nadu and UP have implemented the Voucher Level Computerisation System for Offices of the Accountant General.

Maharastra has automated the back-end operations of the Motor Vehicle Department for purposes of registration of new vehicles, issue of licenses, tax collections and defaulter prosecutions.

Andhra Pradesh has computerised the Registration Department with the Project, namely Computer aided Administration of Registration Department.

Besides States like Rajasthan, Haryana and Tripura have also taken similar steps and initiatives.

Connectivity

Connectivity among various government departments is provided horizontally and vertically through LAN and WAN. With networking they are able to smoothly transfer files, papers, records, information and notifications on intranet. Transfer and exchange of data is now immediately done. Wide area network has helped in linking state headquarters with district and cities and even the villages. Departments are now able to stay connected with their local units. Reports and data from the grassroots offices can be sent via e-mail. Linking the offices at the cities' and village level has helped in policy monitoring.

Post &Telegraphs Department has connected Postal Directorate at Delhi with the Northeast Postal Circle and the Assam Postal Circle with internet. This helps in sending directives and matters related to policy via internet and email.

The AP Secretariat Campus Network has linked the various secretariat departments. This Network has been integrated with AP Wide Area Network linking all government and public offices with State Secretariat including the district headquarters with facilities for data, video and voice communications. To enhance good quality communication of sufficiently high speed between departments, LAN has been set up. Equally, the government departments located all over Hyderabad and Secunderabad have been integrated under the TWIN Cities Project.

West Bengal has set up State Wide Area Network to provide backbone networking for e-governance projects. The departments have taken steps to provide connectivity from their district offices to the respective District Magistrates' offices to enable data flow. Rajasthan and Tripura have also followed suit by networking the secretariat departments. Rajasthan has developed intranet for city police. Maharastra has set up a backbone LAN for entire Mantralaya. In West Bengal, the departments, such as, transport and traffic police are electronically connected at Kolkata, enabling automated access to vehicle data and speedy disposal of cases by the traffic police.

Project implementation and monitoring can be done with the help of such networking. A system for monitoring of various aspects of rural development schemes implemented at the district level has been made available to the Department of Rural Development. The state and central government departments can monitor online the progress made in the implementation of the poverty alleviation schemes. This has been implemented in State of Madhya Pradesh.

Video Teleconferencing

Video teleconferencing can be used to decide urgent matters in consultation with senior officers without calling them over from their offices. This will make them accessible to the people even while being in a position to confer with other officers in matters which are urgent and cannot wait for a formal meeting to be convened.

The AP State Wide Area Network provides connectivity across 25 key locations that can be used for data, voice and video communications. The state departments are able to address their units with the help of this Network. The Network connects the State Headquarters with key locations in the district and cities and provides video teleconferencing which is used by the Chief Minister, Ministers and Heads of Department to hold frequent reviews of various programmes without requiring the district officers to travel and be physically present in the State Headquarters. This has proved to be extremely effective tool for managing natural calamities and drought relief, handling health related epidemics, tracking performance and organising state-wide campaign for various programmes and themes.

Teleconferencing has enabled citizens' participation in decision-making, especially in matters concerning them. Rather, multi-interest groups' participation, deliberations and discussions have become possible through teleconferencing in areas of wider and broader concerns of the community.

ICT has further enabled a direct form of democracy through e-polls, e-consultations, e-discussions and e-ballots. Political parties, governmental institutions, non-governmental organisations and media get the opinions and feedback of the people through e-polls on

policy matters and on crucial issues. The suggestions are important inputs to planning and policy making by the government. Recently, we can see the emergence of Internet Discussions proving to be a significant tool in involving the citizens and civil society organisations in policy making.

4.3.3 Service Delivery

ICT helps administration to perform its duties towards citizens by efficient and effective delivery of public services. With ICT enabled service delivery, administration is able to provide:

- qualitative and comprehensive information on departmental websites, especially in local languages. Internet and websites are used to disseminate information pertaining to various policies and programmes of the government. Government departments also host notifications and various Acts promulgated from time to time on the web, fostering information sharing and effective communication. Government is now able to provide information to those who are living in remote and disadvantaged areas where they have no access to libraries, newspapers, etc.

Most of the state governments like Andhra Pradesh, Kerala, Maharashtra, Karnataka and others are now hosting bilingual websites enabling easy access to information and services by the people. Information on utility services and welfare schemes, as those given below, is now being hosted on bilingual websites.

- i. rural services relating to land records;
 - ii. police services concerning FIR registration and lost and found matters;
 - iii. social services relating to pension scheme, schemes for elderly and widows, schemes for physically challenged, licenses, motor vehicle registration, ration cards, certificates relating to births and deaths, domicile, caste/tribe, etc;
 - iv. public information regarding employment exchange registration, employment opportunities, examination results, hospitals/beds availability, railway time tables, airline time tables, government notifications, government forms, government schemes, etc.;
 - v. agricultural information on seeds, pesticides, fertilisers, crop disease, weather forecast and market price;
 - vi. utility payments of electricity, water and telephone;
 - vii. commercial services pertaining to taxation and return filing; and
 - viii. public grievances matters pertaining to civic amenities, such as electricity, water, telephone, ration card, sanitation, public transport, etc. (Sawhney)
- integrated and seamless services to the citizens. All service providers, all services and all service channels are integrated to provide seamless services to the people. It is now possible to deliver the services seamlessly across governments and across the delivery channels of the internet, telephone, and service counters. Citizens are able to access the services in a seamless fashion (fluid, agile, integrated, transparent and

connected) as per their needs (Kernaghan). Thus, they are saved from travelling distances and spending time and money for getting services, as everything is available at a single window centre.

The single window system will provide all government services and information online at a single point, that is, web portal. All the citizens' requests can be handled through the portal. The single window system helps in compilation, presentation and delivery of government services in an integrated manner where searching, finding and accessing different possible services is effortlessly achieved by citizens (Gupta, M. P. et.al.) Comfort and satisfaction is ensured, as administration is now able to render services that can be conveniently accessed from any place and anytime from the net.

In Andhra Pradesh, government departments and organisations are providing public services through the single window and one-stop shop, namely, e-seva kendras and city civic centres. The people can visit the e-seva kendras and city civic centres and avail information on employment schemes, development programmes and government notifications. Departments can now get online payments on the utilities (electricity, water and telephone) they provide to the citizens. Departments have now enabled the people to file returns and taxes, lodge grievances, and apply for various certificates using e-seva or civic centre facilities. In addition, departments are able to host information pertaining to a number of social services, such as, schemes for widows, old and physically challenged online.

Civic departments are able to use one-stop centres of FRIENDS Project in Kerala to provide public information and utility services to the people. The FRIENDS centres are fast, reliable, instant and efficient networks for disbursement of services by departments. These centres render one-stop, front-end, IT enabled payment counter facility for citizens to make all kinds of government payments. Hence, the government is able to get increased revenues, as now there is no scope for intermediaries and corruption.

In States like West Bengal, queries relating to sales tax, luxury tax, coal cess, etc. are received over e-mail from citizens and are replied via e-mail. Land records preparation has been computerised that enable the pattadars to get certified copies of updated land records from the local office of the Directorate of Land Records and Surveys. Public Grievance Monitoring System has been implemented at most of the District Offices and also at New Secretariat Building. These systems are connected in a network for enabling proper and prompt services to the public. A government portal has been set up for providing information to the citizens in English and Bengali.

The National Capital Territory of Delhi has set up citizen service points, which could be used by the citizens to access any information about government services from any location. These citizen service points are electronically linked to government departments through websites. The government has also put up Suvidha Points at each department to enable the citizens to interact at only a single point. At these Suvidha Points the applications are accepted and acknowledged and the citizens are given a date by which they can expect a response from the department.

States like Tripura have opened Information and Facilitation Centres in the State Secretariat. This enables the departments to highlight their activities and use database

at the backend to respond to citizens' queries. Likewise Delhi, Orissa and Rajasthan have undertaken similar initiatives in service delivery.

NIC has developed a web-based Public Grievance Redressal Monitoring System for the Directorate of Public Grievances enabling the citizens to file their grievances to the Directorate. The system also helps in monitoring the status of grievance redressal.

Thus, with ICT in service delivery:

- public interaction has become maximum. It has taken government at the doorsteps of the people. One stop information centres render all services to the people without the need for them to visit the departments personally. Administration has become people-oriented providing high quality services through a very large set of conveniently located access points (AS). Government has facilitated comfort and satisfaction to the people, as they can avail public services of their own choice conveniently from any place and at any time. Government departments are able to render improved, qualitative and comprehensive services and information to the people even in their regional languages;
- administration has access to multiple service delivery channels now. Government uses integrated service channels, such as, internet, website, computers, CDs, mobile and other wireless devices, television, radio, etc. in delivery of services. Hence, ICT has provided multiple electronic channels to the government departments to render different types of services and to reach to those far-flung areas, which have connectivity and bandwidth problem. ICT has ensured seamless service delivery involving all service providers and all service channels for all services;
- openness is ensured. Government departments have become transparent in sharing information with the people. There is no secrecy and administration has become open in giving information. This has ensured the right to information to people; and
- accountability and efficiency has increased. Administration has now become hassle free, as they are able to dispose of cases online. With service delivery becoming integrated at both front-end and back-end, their burden of facing hundreds of people every day and being tangled in the file work has been reduced. Now, departments can focus on their core functions. Also, internal monitoring of disposal of applications is possible and delay, harassment and corruption can be checked. The system brings in transparency relating to the number of applications received and the concerned department to which they relate.

4.4 SUGGESTIONS

For effective implementation of ICT in the three vital areas of administration, there is need to have the following:

- each ministry/department need to provide PCs with necessary software to all officials, especially upto the level of section officer. They all should be connected through the LAN. This will facilitate two main areas of internal functioning, namely: internal communication and data handling;
- each ministry/department should start using the Office Procedure Automation Software developed by NIC for keeping record of receipt of dak (post), issue of letters, as

well as movement of files in the department. Internal communication will be improved by increasing use of e-mail, bulletin boards and video conferencing in the government.

Pay roll accounting and other housekeeping software should be put to use in day-to-day operations. Notices for internal meeting should be sent by email to the officers. Similarly, submission of application for leave and for going on tour should also be done electronically. Ministry/department should also set up on-line notice board to display orders, circulars, etc., as and when issued;

- state WAN should be provided to ensure connectivity across districts and blocks with the state headquarters for data, voice and video communications. This would facilitate video teleconferencing enabling departments to address, interact and hold frequent reviews with their local units;
- all ministries/departments should use the Web-enabled Grievance Redressal Software developed by Department of Administrative Reforms & Public Grievances;
- each ministry/department would also make efforts to develop packages so as to begin electronic delivery of services to the public. Each ministry/department should have its own website. Websites of ministries/departments/organisations should specifically contain a section in which various forms to be used by citizens/customers are available. The forms should be available for being printed out or for being completed on the computer itself and then printed out for submission. Attempts should also be made to enable completion and submission of forms online. Bilingual version of the content of the websites should be developed simultaneously;
- all Acts, rules, circulars should be converted into electronic form and made available on the internet and be accessible from the information and facilitation counters. The government should issue multi-purpose electronic cards to citizens for accessing services offered by different departments. Such cards will serve the purpose of being a driving license, or an identity card, or ration card, etc.;
- full-fledged training should be imparted to the staff in use of computers. For this purpose, ministries/departments should set up or share learning centres for decentralised training in computers as per the guidelines issued by the Department of Information Technology. Rather, modules for IT courses should be specifically designed for imparting computer training and education to produce knowledge workers in government. Annual confidential reports of employees should reflect the employee performance in using IT. Employees should also be given the benefits of loans for purchasing computers. Also, appropriate level of computer literacy should be made an essential requirement in the recruitment rules;
- handbook with successful ICT initiatives should be prepared for ready reference and avoidance of duplication of efforts; and
- internet based information delivery systems in combination with conventional broadcast media- TV and radio- could act as a major vehicle to educate citizens regarding their duties to the nation and the State. This will immensely help in people's participation in programmes of government (<http://egov.mit.gov.in/minagenda.asp>).

4.5 CONCLUSION

ICT in administration has led to positive developments. With ICT enabled administration, there is/are:

- citizen-centredness in service delivery;
- restructuring of government departments;
- better working methodologies and re-engineered work processes;
- better decision-making, implementation, monitoring and evaluation;
- increase in efficiency and productivity;
- cost effectiveness, consistency and seamless services;
- participative and collaborative policy making;
- openness and wider accessibility; and
- accountable, responsible and decentralised governance.

4.6 ACTIVITY

1. Let us know about some of the ICT applications being implemented in the secretariat departments of your State.
2. Discuss the civic services rendered by your area local body through the Information and Facilitation Counters.

4.7 KEY CONCEPTS

Ethernet	: is a frame-based computer networking technology for local area networks. It has become the most widespread LAN technology in use during the 1990s to the present. In telecommunications, a frame is a packet which has been encoded for transmission over a particular link. A packet is the fundamental unit of information carriage in all modern computer networks.
Telemetry	: basically refers to wireless communications and is a system for acquisition, storage and transmission of real time data from remote locations. It is a technology that allows the remote measurement and reporting of information of interest to the system designer or operator. The word is derived from Greek word- 'tele' meaning remote, and 'metron' meaning measure.
Application	: software application, which includes database programmes, word processors and spreadsheets. Application software sits on the top of systems

software because it is unable to run without the operating system and system utilities. It is defined subclass of computer software that employs the capabilities of a computer directly to a task that the user wishes to perform.

Spreadsheets : is an accounting or bookkeeping programme that displays data in rows and columns on a screen. It is a screen-oriented interactive programme enabling user to lay out financial data on the screen.

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UNIT 5 ADMINISTRATIVE ORGANISATION CULTURE: TOWARDS ICT BASED REFORMS

Structure

- 5.0 Learning Outcomes
- 5.1 Introduction
- 5.2 Meaning and Importance of Organisation Culture
- 5.3 Administrative Organisation Culture: A Case for ICT
- 5.4 Towards Changed Organisation Culture
 - 5.4.1 Mechanisms
 - 5.4.2 Limitations
 - 5.4.3 Suggestions
- 5.5 Conclusion
- 5.6 Activity
- 5.7 References and Further Readings

5.0 LEARNING OUTCOMES

After studying this Unit, you should be able to:

- explain the meaning and importance of organisation culture;
- describe the culture of government organisations;
- examine the mechanisms to bring in reforms in the existing administrative culture; and
- analyse the limitations and suggest measures to ensure reforms.

5.1 INTRODUCTION

"Ultimately, the government worker of the future has to be a knowledge worker."

"Men well governed should seek no other liberty, for there is no greater liberty than a good government." This in times when the waves of change point towards a liberal economic framework and exit of state from sectors that could be better done through private enterprise has far reaching implications. While this is so, it definitely does not mean curtains for governments since as long as the civilisations exist; governance of some form has to exist to ensure order and fair play. The areas of operation may change but the societal dependence on state is inevitable and if that is the case, it is important that the state does its task in the manner giving least inconvenience and maximum facility to its citizens. Never before was the craving for looking at options and alternatives to improve governance stronger than now. Though there are many ways of achieving that, one has to find out methods that are easiest and cost effective and it is here that the tools of Information and Communications Technology score over others.

ICTs enable transformation of a very vital component of governance, that is, administrative organisation. It plays a significant role in enabling the organisation to be citizen centred and service oriented in the context of globalisation. In this Unit, we will be focusing on the administrative organisation culture and how ICTs can facilitate it to become citizen centred and vibrant with the changing environment.

To mention we have used the terms 'administrative organisation,' 'government organisation' and 'bureaucratic organisation' interchangeably for convenience sake.

To begin with, we will now delve on the meaning and importance of organisation culture.

5.2 MEANING AND IMPORTANCE OF ORGANISATION CULTURE

The culture of any organisation is the internal environment of the organisation to which the members of the organisation subscribe. This is characterised by certain defining organisational traits, pattern of thinking, and philosophy of living on and off work. Although culture is not strictly a part of organisation design, culture and design must complement each other in order for organisation to function smoothly.

Organisational culture is the set of values that defines for members what the organisation stands for, how it operates, and what it considers important. The organisational culture communicates important information about acceptable and unacceptable behaviour. Most managers acknowledge that a strong and clear organisational culture helps provide a common frame of reference for managerial decision-making and other organisational activities.

An organisation's culture normally forms over time and is often deeply influenced by the values of the firm's founders. As organisational culture evolves, various symbols, stories, heroes, slogans and ceremonies emerge. These facilitate the perpetuation of culture.

5.3 ADMINISTRATIVE ORGANISATION CULTURE: A CASE FOR ICT

Everyday when one sees tens of thousands of citizens approach the government, one can't help asking a question- whether it is possible to live up to their expectations. The expectations that are huge while resources at disposal are thin. To make matters worse, systems to administer those resources are primitive and inefficient.

There are constraints; sometimes due to lack of resources and manpower, while many a times there are vested interests not allowing it to be done a particular way. On many occasions the general lethargy and casualness that has crept into our system becomes the major impediment.

The vast apparatus of governance that we've got is now slowly coming to a state where it has stopped moving without getting a push and the unfortunate thing is that not many of us have the capacity and the wherewithal to do so. This notwithstanding, what is without doubt is that the systems of governance lying in the hands of powerful and influential need to be transformed for catering to the requirements of all, whatever their face may be.

This rhetoric might sound a bit cliché, after all there are so many who have been talking of this. What remains unaddressed, however, is that many of these issues have been getting swept below the carpet without any visible change. Nobody is able to tell us where the real action is and where the solution is. One thing perhaps is certain; the solution does not lie in the talk and cannot be in pronouncements. If we've to improve the administration of governments anywhere, we would have to do some serious introspection, look inwards, do a system analysis and figure out where the rub lies.

Every government department has two lives; one that it lives internally while the other that it lives with its clients, the citizens as we call them. Internally, the organisations suffer from problems of malfunctioning due to lack of proper and smooth systems; while externally it makes its clients suffer. There are many in the government who are frighteningly overworked while there are many more who are woefully under worked or do not want to work. Due to this it is very difficult to distinguish where the disease is and who the diseased is.

To any casual observer, a government office is a place where papers move or get stalled, papers containing loads of information affecting people. This information moves through a huge hierarchy giving scope to manoeuvrability at all levels. This leads to imperfections in its processing leading to bad decisions that range from being whimsical at times to looking prejudiced sometimes. The bureaucratic system that was based on the impersonal arrangements is now caught in the web of its

procedures. The same procedures that were created to protect it from its ill wishers are seriously hampering the lives of its well wishers.

The bureaucratic culture in a government organisation is characterised by traits where fixed ideas and achievement against predetermined targets hold precedence. It is based on formal rigidities, systems, clearly spelt out rules and rationally laid down guidelines and procedures. The bureaucratic organisation design is the overall configuration of structural components that define jobs, groupings of jobs, hierarchy, patterns of authority, approaches to coordination, and line staff differentiation into a single, unified organisational system. The organisation is characterised by a hierarchical set up, a top to bottom approach and is largely a closed system. Unity of command and compliance to set rules and procedures takes precedence over rest. The accent is more on doing least number of mistakes rather than experimentation and risk taking and committing errors as a result of that. The stereotypical belief about bureaucracies is that they are inflexible, monolithic organisations with uncaring employees who create red tape.

A thorough system analysis would, however, confirm that nine out of ten times, both the prevention and cure of this disease is possible only if we allow technology to take precedence over the norm. Internally, technology solutions would ensure that the non-performers can't hide themselves and the decision support systems are on a stronger wicket with properly processed information base. Externally, technology would ensure that the discretionary advantages and favours possible in the tech-less system are eliminated allowing level playing field to everybody, which in essence, is the purpose of government. ICTs though can play a catalytic role but cannot alone change this culture. In order to achieve meaningful gains, the whole process needs to be backed by strong willed effort to change the organisational culture and then sustain it over a reasonable frame of time.

The immediate need of the hour is to make administration get a citizen centred focus and to make use of technology for storing, retrieving, processing, handling and doling out information. However to do this, every office needs to do some groundwork. It has to carry out the system analysis to weed out incorrect procedures and lengthy formalities and above all, right sizing so as to get right people for right positions by training and re-staffing, if required. The quality of people manning various positions needs a real push if we have to make any headway in improving the face of administration.

This however does not mean that technology by itself can make administration transparent, smart and responsive, as there are host of other factors that influence but it is also true that technology is a sine qua non, an indispensable condition for achieving that.

5.4 TOWARDS CHANGED ORGANISATION CULTURE

To put in place a data network through ICT in a government organisation, one needs to:

- gain high-level management support for the project;
- undertake a pilot project;
- ensure that all users have access to the network, to provide an adequate population of users;
- make sure the networking is integrated with the organisations' core office automation applications;
- have the central IT unit co-ordinate introduction of technology; and
- tackle the difficult questions of security, reliability, cost and ownership.

For building the new culture, one needs to:

- demonstrate possibilities to those who are interested;
- provide organisation with a presence on internet;
- provide a way to receive information from internet;
- create an internal process to guide Internet use;
- provide positive role models for users;
- provide new mechanisms to support the rhetoric of organisation; and
- use technology to implement and administer technology

5.4.1 Mechanisms

In order to bring about the change in the bureaucratic culture and infuse in them new thoughts and urge for creativity, ICT and its solutions can play a major role. This can allow them to gain insights into expanding frontiers of information technology but also help them become knowledge workers. This would also free their minds and open them to open ended thinking.

In order to achieve this objective, there has to be designed and tailored programmes to sensitise them to information needs on one hand and bringing technical skills of functionaries on the other.

The main objectives of these programmes are to:

- identify ICT applications that can provide improved services to citizens and help public administration in improving planning, monitoring and administrative processes;
- demonstrate the feasibility of implementing such applications by specifying broad architecture, detailed design and creating prototype application software (wherever feasible); and
- disseminate the work to public administrators that promote and use e-governance

A major shift has occurred in the operation of the public sector in India and other countries over the last decade or so. At the heart of this change is the proliferation of new instruments or tools of public action-regulation, contracts, cooperative agreements, reimbursement schemes, tax subsidies, vouchers, insurance, and many more. Moreover, many of these new or newly expanded tools have in common a reliance on a host of third parties-such as commercial banks, non-profit organisations, other levels of government, or for-profit companies-to implement public programmes. The adoption of these tools has, thus, transformed the public sector from a provider to an arranger of services with profound implications on the nature and content of public management and democratic governance more generally. Those involved in public administration must consequently learn not only how to operate public agencies but also the distinctive operating requirements of the different tools, many of which involve complex collaborative relationships with private contractors, regulated industries, non-profit agencies and other levels of government.

The governments would, therefore, need to play a pivotal role in calling attention to this development and producing educational and other materials to promote understanding of it. This should include:

- emphasis on 'new governance' concept and its implications to accountability, management and democratic control; and
- instructional materials to acquaint both policy scholars and practitioners with these alternative tools and with the "tools approach" that focuses attention on them. More than that, it is needed to establish an agenda for future action that might improve the operation of public programmes by sensitising policymakers

and policy administrators to the distinctive features and operating demands of the various tools that public programmes embody.

Within the broad framework of these objectives, there is a need to take up the following types of activities:

- developing conceptual papers on strategies that governments can follow to introduce e-governance;
- working with specific departments/programmes to identify opportunities for developing ICT applications;
- designing ICT applications and identifying hardware and software resources that would be required to implement such applications;
- developing the software as prototypes (wherever feasible) to demonstrate the feasibility of building such applications;
- conducting cost-benefit analysis of e-governance projects and preparing comprehensive evaluation reports;
- documenting case studies of successful e-governance applications already developed in the field;
- designing workshops for sensitising senior echelons of public administrators; and
- developing papers, reports and films to disseminate the output.

5.4.2 Limitations

The resistance to change is inevitable, especially, so if the status quo gives the vested interests additional clout. Such a shift in the bureaucratic culture may also meet with a similar response as the bureaucracy ever so reluctant to open up may create many hurdles to see that the power they wield over the information they control is not reduced by bringing it into public domain through net. Besides this, openness and transparency in administration, which such activities attempt to achieve, would also be feared by those sections of employees who do not want to get exposed for their inefficiency. Another constraint is paucity of funds as the case is with most of the public bodies in India. This exactly is the reason why such projects should be taken up as public-private initiative getting entrepreneurs to invest in them. Another challenge is to develop public awareness about ICT and making the citizens use such mediums for accessing civic services.

ICTs in the administrative parlance have been simply equated to computerisation resulting in myriad of computers with absolutely no accent on the 'information' part of IT. Anybody who understands ICT would agree that it is almost 80% in the information part and only rest in the latter, that is, technology. The wrong understanding of this definition in organisation has, however, resulted in needless addition of computers leading to a system which neither has citizen focus and nor has evolved out of the real understanding of the maladies the particular system is afflicted with. Most of the computers lying with various organisations are relegated to being used as typewriters; more than 90% of their processing and storing capacities are unutilised/underutilised.

In most of the cases, if every government department can take a lead and analyse its functioning, simple local ICT solutions keeping citizens as focus can be found. Due to the scale of operation and multiplicity of tasks what one needs in government system is creation and maintenance of databases that allows the retrieval and sorting of data easier and faster. Smooth front ends could allow user-friendly access to these databases. Networking and connectivity should be ensured wherein all these related computers and databases talk to each other, share the information and live

symbiotically. A stand-alone computer serves no purpose and is an injustice to its inherent capacity. These computers talking sub consciously without any human intervention is the key to administrative reforms. It is also important that once the databases are readied and set, any further transaction be compulsorily routed through the data base so that the database is routinely and sub-consciously updated and remains relevant and dynamic at all times.

The bane of most government databases is that individual rather than systems drive it and hence, most of it is never updated once the individual departs. It is, therefore, essential that this process is ingrained into the departmental bloodstream and the transactions are invariably done through the database and updated without any conscious effort. Also, common databases for multiple departments need serious attention and promotion. There should be centralised maintenance of databases at various strategic levels. Last not the least; strong political and administrative will is required to achieve this in fairly minimal time.

5.4.3 Suggestions

Changing the administrative bureaucratic culture to a tech savvy, modern looking, flexible, goal-oriented culture requires significant efforts both at the technical as well as organisational and personnel level. There are few management tips, as suggested below that can help usher in such a change:

- **Making a Compelling Case for Change**

Successful organisations have one important thing in common - the people who have a stake in the outcome see the need to change. Most researches also found that as employees' understanding of a need for a change went down, the failure rate went up. Creating a change readiness is, therefore, critical.

Leaders of successful new initiatives made a compelling case to critical stakeholders before doing anything else. How did they do it? The change managers were able to make a compelling case for change in their organisation by creating a change readiness in the officials and employees.

- **Communicate Formally and Informally**

Formal communications – meetings and memos – are necessary, but they are not sufficient in times of change and transition. Employees need to know how the new direction relates to their day-to-day work. Officials at all levels need to talk about how the change relates to day-to-day decisions, actions and events.

Look for opportunities to discuss differences and similarities with new methods or structures during team meetings and one-to-one meetings.

Most officials and employees need to hear a new idea many times before they absorb and integrate the new information. This is, especially true, when the new way of doing things is significantly different from current practices. As they hear about a change and talk through how it supports organisation goals, they mentally rehearse how they will accomplish work using different means or different methods. For a significant change, this will not happen in a day or a week. Significant transformation requires time.

- **Personalise the Message: What Does This Mean for Me?**

Employees want answers to questions about how a change will affect them, and how his or her job will change.

Until the employees know what part they will play and how the change will impact them directly, they can withdraw into worry. Their energy is not available to work on change or on the business of the organisation.

Someone on the executive level can only answer questions like this in generalities; employees will look to their supervisors to gain information. The more preparation and information direct supervisors have, the better equipped they will be to answer questions.

And, it is impossible to have all the answers. Draw the picture of what you do know and the boundaries of what is unknown.

- **Acknowledge the Unknowns**

The maxim, “I’ll communicate something when I know something,” does not work in change situations. In times of change, employees fill in the blanks with their worst fears. Every bit of factual information helps.

The statement, “I don’t know,” is more helpful than no communication at all. When you do not know an answer, tell employees when you will report on progress finding answers.

Most employees do not expect their directors to be perfect and all knowing. They will accept when you are not able to find answers. Be sure, though, not to let questions fall into a black hole. Reporting that you have no new information is better than silence.

- **Surface Rumours and Fill in the Blanks**

In many government organisations while the computerisation process is on, it is observed that rumours regarding lay off etc. hold sway. By the next day, the rumour spreads to the entire organisation. Employees latch onto such messages as fact. The members become incensed and their productivity plummets.

Rumours thrive on lack of credible information. One simple thing managers can do is regularly ask, “What’s the scuttlebutt? What are the latest rumours and gossip?” Bringing rumours out into the open deprives them of their power and provides a chance to replace rumours with solid facts or at least informed denials.

While it is important to quash rumours, they can also be a source of information. Rumours also provide a clue about what people are worried about, and where they are having trouble finding information. Look for patterns and fill in with factual information and frank discussion of unknowns.

- **Practice What You Preach**

When management actions do not match the changes they are asking others to make, employees grow cynical. One administrator extolled the virtues of self-organising teams, but continued to dictate the details of team membership and assignments. He even stopped by developers’ desks to give them advice on how to write code. He talked the talk but his actions showed he did not walk the walk of self-organisation.

Successful change requires changes from everyone, not just the lower levels of the organisation. Wise managers do not ask other employees to make changes they are not willing to make themselves.

Sometimes it only looks like there is a contradiction between what the executives say and what the executives do. Explain the apparent inconsistencies to avoid the appearance of hypocrisy and the resultant cynicism.

- **Acknowledge and Build on What Employees Value**

In periods of change, people struggle hardest to keep what they value most. Employees do not change based on logic; they change to keep something that is valuable to them.

Unfortunately, it is not always easy for employees to articulate what they value about the way they do their work. One finds that asking the question a different way help surface the information. As employees work out the details of how the new ways will work, ask, “What were the strengths of the way we have been doing things? How do those strengths map to the new way?”

Acknowledge that the old way was not stupid or bad – it worked well at one time, but it does not fit the current context.

- **Reframe Resistance**

When employees resist, the natural tendency is to push harder, give more reasons or even threaten. But exploring the response to change can be a source of important information.

When faced with a change, some employees are afraid they will not be able – or will not have time – to learn the new skills, methods or procedures to be successful with the change. Employees who do not believe they can be successful are reluctant to try a new way. Sometimes they are not interested in learning new skills too.

How a person feels about his or her senior colours what they hear. Even if employees have never spoken to the senior, they have a relationship with him based on their good or ill regard for him. Communication from a well-respected senior will garner more attention than communication from one the employees regard as inept or irrelevant. And they are less likely to want to go through the disruption of a change for someone with whom they have a negative relationship.

Past experience with change will affect how employees greet the current change initiative. When past change efforts have failed, fizzled, or flopped, people will be understandably sceptical. When you hear someone say, “It won’t work here,” or “We’ve tried that before,” it is a clue that people have been burned in the past. Arguing will not help, but curiosity may. Probe to find out what is behind the categorical statements. You may uncover useful information that will help you avoid pitfalls with the current change. Or you may be able to point out what has changed since the last time that makes the change more likely to succeed this time.

Resistance is a label that cuts off a conduit for information. Resistance is when someone is not doing what you want him or her to or expect him or her to. Listen and probe to find out why.

- **Employees Do Not Resist Change, They Resist Coercion**

There is a misplaced notion that people hate change. In reality, people choose change all the time-big changes. People choose to marry, to have children or adopt children, to divorce, or join any foreign assignment, etc. These are all life-altering changes. Yet people choose them freely. Most of the time, people buck up and muddle through when change is thrust upon them by circumstances. Most people manage to find their way through to the other side of that change event. Clearly, people do not hate or resist all changes. One should realise that they do not resist change itself; they resist coercion.

Employees will reject even insignificant changes when they feel coerced. The reality is, it is impossible to make someone else change. Lay out the reasons, acknowledge the emotions, provide support and give employees a chance to choose change.

Not everyone will change at the same pace, and some may choose not to change at all. If there is another place in the organisation where they can be valuable, support them to find that place and if there is not, support them to move on.

- **Empathise**

Every so often we run into administrators who are not very patient with employees going through change. There are directors who would say, 'Move on or move out,' there would be many who would say 'I've thought about it and there's no reason for you to feel that way.'

In reality, change involves loss: loss of routines, relationships, turf, expertise and status. It is normal for people to experience intense emotions during times of change. Pretending those emotions do not exist will not make them go away; failing to acknowledge emotional responses may actually prolong and amplify them.

This does not mean administrators need to play psychologist; they do need to listen, empathise and acknowledge that feelings are real and valid.

Real change takes time. One is not expected to complete a major transformation in a matter of weeks. Transitions that involve significant changes-new methods or reorganisations-are measured in months and years, not days and weeks.

Expect that the world around you will shift during the transition and be prepared to adapt to new opportunities and circumstances. Be willing to refine goals and plans based on new information from both inside and outside the organisation. Plan for small wins and celebrate those wins.

Start change communication with a compelling reason for the change, then communicate, communicate, communicate until the employees begin to forget they ever did things a different way.

5.5 CONCLUSION

ICTs have taken up the challenge of re-building administrative culture in government organisations. They have brought in an improved and qualitative work culture by fostering:

- open, transparent, flexible and decentralised organizations;
- information sharing and dissemination;
- shift in the traditional organisational culture of neutrality, anonymity and political accountability;
- speed, accuracy and efficiency in day to day work;
- participative, collaborative, cost effective and responsive work culture ; and
- values of public interest, public discourse and dialogue, and democratic citizenship in administrative organisations and has enhanced public accountability and trust of the masses in administration.

5.6 ACTIVITY

1. Visit a government department or agency. Observe the functioning and the work culture. Please jot down your observations about the behaviour and action of the employees and officials.
2. Narrate some suggestive measures to revamp the administrative culture of our government organisations.

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UNIT 6 ROLE OF ICT IN RURAL DEVELOPMENT

Structure

6.0 Learning Outcomes

6.1 Introduction

6.2 ICT in Public Service Delivery

6.3 ICT Applications in Rural Development

6.3.1 ICT Applications in Agriculture

6.3.2 ICT and Women Empowerment

6.4 Suggestions for Effective ICT Implementation in Rural Development

6.5 Conclusion

6.6 Activity

6.7 Key Concepts

6.8 References and Further Readings

6.9 Annexe

6.0 LEARNING OUTCOMES

After studying this Unit, you should be able to:

- explain the importance of ICT in citizen service delivery;
- discuss the role of ICT in rural development;
- highlight ICT applications in agriculture development ; and
- describe the role of ICT in creating livelihood opportunities in rural communities.

6.1 INTRODUCTION

India is a country of villages and their socio-economic transformation shall always serve as an index to development. Rural development is generally taken as development of rural areas. The concept encompasses within its scope the prosperity of people and place in rural areas. While talking of rural development the target has to be an overall improvement of the quality of life in rural areas taken as a whole and not just the development of an isolated sector. Rural development means rather a comprehensive development of rural areas in its wholesome nature.

Since 1991, a new era has commenced which has brought drastic changes in economic environment of the country. Indian economy has opened up to the world economy and invited foreign capital, investment collaborations and technology in a big way. Today, every

sector of the Indian economy is attuning itself to the changing economic environment. The rural sector is no exception. New feature of today's globalisation that has profound impact on rural sector is the ICT. The major objectives of ICT in rural development are to bring efficiency, openness and responsiveness along with participation in the formulation and implementation of rural development programmes by the people. It contributes to qualitative and quantitative changes in rural life style.

In this Unit, we will now discuss and assess the role played by ICT in the field of rural development.

6.2 ICT IN PUBLIC SERVICE DELIVERY

Service delivery is a core component of any government's obligation to citizens. Today, citizens are demanding more efficient and responsive services from government. Therefore, citizen service delivery has become a key focus area among governments throughout the world. With advent of ICT, there is now a greater need for governments to draw on these mechanisms to provide more efficient and responsive services to the citizens.

Governments all over the world have taken major transformation processes in citizen service delivery with the use of ICT. ICT is enabling citizens' participation and streamlining the work processes of government to improve the quality of services and responsiveness towards citizens. It enables citizens to use information as a key resource for betterment of their lives and strive towards socio-economic development. It has enabled governments to use multiple service delivery channels, such as, internet, mobile devices, WAP, etc. to render effective services to the target group.

In the following paragraphs, we will be discussing a project namely, 'PRAJA' that is based on ICT applications to render services to the people in the rural areas.

PRAJA: Reaching People in Rural Areas

The Project aims to provide all public services to the rural people at the district and mandal (Block) levels. National Informatics Centre (NIC) technically supports this Project taken up for the first time in West Godavari district of Andhra Pradesh.

The Project 'Praja' (meaning citizens) is an effort to bring government closer to the people and empower them through ICT. It makes the government more accessible to the people. It is an effort to deliver various Government to Citizens (G2C) and Citizens to Citizens (C2C) services in the rural areas. The Project has provided web enabled rural kiosks termed Praja Seva Kendrams at mandal level and village level. The fully computerised Praja Seva Kendrams are on a district wide network connected through dial up circuits and internet, with the district server acting as a remote access server.

The Praja Seva Kendram runs a district portal that allows access to various citizen services. These services range from the issuance of various certificates to getting information about various programmes and also go to the extent of networking citizens to each other and allow them the flexibility and convenience of mutually beneficial transactions. The Project allows access to hitherto marginalised communities and therefore, helps in bridging the existing information gaps and is a step towards digital unite. Many of the Praja Seva Kendrams are run as self-employment units and are manned by unemployed

youths from Chief Minister's and Prime Minister's rural employment plan beneficiary groups. The Project envisages that all villages can become knowledge hubs and gain symbiotically from each other and derive benefits from global networks. In addition to providing government services, this Project encourages rural e-commerce and rural cyber forums in the villages.

The traditional channels of citizen service delivery are continuing and complementing electronic channels for transactions, as they cater especially to those who are unfamiliar with technology or electronic transactions. Therefore, it is of prime importance that governments create awareness and educate the citizens on how to use the electronic channels. Through proper education citizens can familiarise with the changes in service delivery mechanisms.

6.3 ICT APPLICATIONS IN RURAL DEVELOPMENT

ICTs have the capacity to significantly empower people and facilitate development. This major technological revolution can significantly influence the development capacity of any society. Their applications to agriculture and rural development are very extensive and pervasive. With telecommunication technology, computers and information processing technology, data and image transfer technology, and interactive technology, ICTs have made a qualitative difference in the way we can generate, disseminate and transfer knowledge and promote development. The convergence of these technologies has created not only a new technological and production sector, but also a new social and economic reality in the rural sector. Increased connectivity and quicker flow of information has opened new frontiers of knowledge.

ICTs develop in rural communities a learning and innovation capacity that increases the effectiveness of their efforts to solve problems and improve their lives. They empower these communities and increase the effectiveness of their development efforts through informed decision making to achieve the objectives of poverty eradication, food security and sustainable development in rural areas.

However, technological applications are largely restricted to urban areas. Rural areas have not reaped enough benefits from them. ICTs must be used judiciously as important tools in developmental activities to address the problems of rural development in all sectors of the economy, such as, agriculture, energy, health and sanitation, rural engineering, housing and habitat, etc.

It is, therefore, necessary, to develop and introduce appropriate of so called green technologies coupled with sound delivery system, which ensures economic and ecological sustainability and optimum use of local resources emphasising on technology capacity building of rural people. In this endeavour, institutional linkages and active participation amongst voluntary agencies, science and technology based field groups, R & D institutions, financial agencies and above all, people who are primary stakeholders, become crucial for improving the quality of life in rural areas to achieve long term sustainability.

Essentials

In above process, technology choice can have a critical impact on many aspects of rural development, especially, the way we choose them, the way we innovate and design them, and the way we deliver them to masses. Therefore, technology must be carefully chosen

to enable rural people to:

- acquire and imbibe knowledge of technologies appropriate to their needs and environment;
- upgrade their traditional skills and capabilities;
- minimise fatigue and reduce drudgery; and
- be innovative

Equally ICT should:

- be capable of easy assimilation;
- generate significant and assured added value to existing methods of operation;
- generate employment and use local resources, both men and materials;
- need low capital investment and result in low cost production of goods;
- be capable of replication and adoption; and
- blend harmoniously with existing ecosystems leading to tangible improvements in the living conditions and self-sustained development of the rural people.

Thus, appropriate or green technologies, with above features, can play crucial role in building up local capacity, devising solutions for tackling the identified problems, and improving the lives of rural people by improving their surroundings and daily activities. Focus must be on technological empowerment of people with skills and critical thinking that fosters a sense of self-reliance and ability to evaluate what is beneficial or detrimental to their interests. This will improve their access to affordable, environmentally sound technologies and generate meaningful employment in local economic structure.

However, success in development and dissemination of such green technologies lies in participatory systems with down to earth approach or effective percolation of technology from people's acceptance point of view as well as to make proposed intervention sustainable to be managed by them. This involves:

- need identification/assessment of the people by local voluntary or science and technology based field groups;
- identification of ideal technological options as per location specific needs, skills and resources available;
- in-house technology appropriation or with assistance of nearby technical institution to a scale and level, which is acceptable to the people for long term sustainability;
- technology back up for 2-3 years through continuous handholding to people; and
- establishing backward and forward linkages for long term sustainability.

Once total system is in place with the complete technology package, the field group can gradually withdraw giving the entire responsibility to locally formed people's groups/organisation for further dissemination.

With above approach in mind to reach majority of the people who live in the vast areas of rural India, several grassroots level organisations with scientific and technological capabilities are providing crucial link between the emerging new developments in knowledge and technology, and also helping to strengthen and diversify the local economy, utilisation of local resources, and upgrading the skills of artisans, land-less labourers and other disadvantaged sections. By adopting above mentioned approach, such groups have developed proven and viable models of a large number of green technologies for socio-economic up-liftment through skill upgradation, income generation, drudgery removal, sustainable use of resources, etc. Such interventions have brought in visible changes in the lifestyles in rural areas and can have multiplier effects in different parts of the country.

6.3.1 ICT Applications in Agriculture

ICTs have played an important role in promoting agriculture during the last several decades. The role of television and radio in rural education and extension services has been well documented. These technologies will continue to play a crucial role in and along with the new ICTs.

ICT revolution is leading to the need to develop a new paradigm for agriculture. Beyond databases and information systems, application of ICT to agriculture are appearing everywhere. ICTs are profoundly transforming extension services through the use of multimedia technology, distance education technology, as well as through innovative approaches based on interactive knowledge development processes. They are having a clear impact on our capacity to monitor the environmental impact on agriculture and degradation of natural resources through remote sensor data. GIS are opening new approaches to regional planning and to the management of natural resources.

In the context of agriculture, there are five key services or functions that are very closely related to ICT:

- access to information through different types of **Agricultural Information Systems (AIS)**;
- monitoring the situation of natural resources and environmental impact through different **Information Processing Tools** (i.e. analysis of environment deterioration, soil erosion, deforestation, etc.);
- **Education and Communication Technologies** that are playing a very important role in generating new approaches to learning and knowledge management;
- **Networking** where ICTs can contribute greatly to relating people/institutions among them and facilitating the emergence of 'Virtual Communities of Stakeholders' that generate and exchange information and knowledge among themselves. If well managed, networking is a first step in the direction of developing interactive knowledge development processes that may lead to learning networks; and
- **Decision Support Systems (DSS)** through which data and information provide relevant knowledge inputs for informed decision-making. These tools are playing an important role in converting information systems into knowledge systems.

The main objective of these ICT applications, from a development perspective, is that of empowering people through knowledge. It means developing in people a capacity to

achieve their development objectives and goals through the generation, acquisition and use of knowledge.

National Institute of Agricultural Extension Management

Agriculture continues to be an occupation and way of life for more than half of Indian population even today. Sustainable prosperity of this class, that is, farmers and landless agricultural labourers, holds key for improving the over all human resource development scenario in the country. Various efforts are being made to improve the social and economic conditions of this class through ICT.

National Institute of Agricultural Extension Management has taken up a number of “Cyber Extension” initiatives across the country. District level websites are hosted, information kiosks are established at block /mandal and village levels, and technical and other need based information is collected, digitised and hosted on the internet.

The Institute has taken initiative to provide linkages to the technical and other farmer-friendly information through its websites. In Andhra Pradesh, websites of 24 districts contain very important information on district profile, land use pattern, district agriculture scenario, strategic research and extension plans, replicable success stories and information on important contact persons with their telephone numbers and e-mail addresses. These websites have improved information dissemination significantly.

As an apex national institution, the Institute through its various projects and programmes is working towards providing cyber connectivity to all Indian villages to make available the benefits of ICT to the Indian farmers and change the face of Indian agriculture.

Village Knowledge Centres

The future of food security in the developing world is dependent less on resource-intensive agriculture and more on knowledge-intensity. In the coming years, agriculture will have to be developed as an effective instrument of creating more income, jobs and food and such a paradigm of sustainable agriculture will be both knowledge and skill intensive. The development of precision agriculture is need of the hour, which emphasises knowledge intensity. Precision agriculture refers to exactness and implies correctness or accuracy in any aspect of production. Precision agriculture is the application of technologies and principles to manage spatial and temporal variability associated with all aspects of agricultural production for the purpose of improving crop performance and environmental quality. The enabling technologies of precision agriculture can be grounded into four major categories: Computers, Geographic Information System (GIS), Global Positioning System (GPS), and Sensors and Application Central (SAC).

The new agriculture paradigm in India will have to take advantage of knowledge availability to achieve the triple goals of increased income, jobs and food. The emerging ICTs have a significant role to play in evolving such a paradigm. The key step in the use of ICTs in sustainable agricultural and rural development is the value addition made to generic information to render it local specific. A programme has been launched in 1998 in the Pondicherry region to determine the manner in which ICTs make an impact on rural livelihoods. The Village Knowledge Centre Project has an operational centre/value addition centre at Villianur, which is the headquarters of the Villianur Commune. The value addition centre has access to the internet through two dial-up accounts. This also functions as the

hub of a local area network for data and voice transmission covering the project village. The value addition centre in Villianur has generated a number of databases to fulfil requirements of the people in the villages. Some of the databases pertain to the following:

- entitlements to rural families: this database provides details of about 130 schemes, which are operational in Pondicherry Union Territory;
- families below poverty line: details of families in the communes of Ariyankuppam, Villianur and Nettapakkam have been provided in this database, which has been compiled from the UT Administration. Approximately 22,000 families are listed;
- grain prices in Pondicherry region;
- input prices (quality seeds/fertilisers) in Pondicherry region;
- directory of general and crop insurance schemes;
- integrated pest management in rice crop;
- pest management in sugarcane crop;
- directory of hospitals and medical practitioners in Pondicherry-grouped with specialisations, such as, orthopaedics, paediatrics, etc.; and
- bus/train timetables-covering Pondicherry region and two nearby towns

These databases (except the data on families below poverty line, which is an official document in English) are available in Tamil language at all village centres. Updates are transferred using the wireless network. In addition, interactive CD-ROMs for health related issues have been developed, where FAQs (frequently asked questions) are posed to medical practitioners, whose replies are video-graphed and converted to Real Video format for retrieval, using a PC. Topics related to 'general hygiene', 'dental and oral hygiene' and 'eye' have been covered.

In addition to such defined content, daily transactions take place covering important public events and government announcements for rural families. Cricket information is much sought after through well-known websites. One important service provided is the announcement of examination results of 10th and 12th classes. The results and mark sheets are available on the web, cutting short the time of waiting by at least one week.

Recently, a significant new dimension was added with the commissioning of solar-mains hybrid power systems in all the centres.

This Project has received mention both in India and abroad (in the 136th Presidential Address at the US National Academy of Sciences by Prof. Bruce Alberts in April 1999). The Human Development Report (UNDP 1999) cites this as an example of a creative project in addressing the global information divide.

6.3.2 ICT and Women Empowerment

ICT applications in rural areas should benefit the agricultural sector and reduce rural poverty. Participation of the poor in planning and implementation of anti-poverty programmes is required to reduce the chain of intermediaries between the government and actual

beneficiaries and to improve their bargaining power. There is a need for institutional mechanism at the grassroots to safeguard the interests of the poor. Therefore, organising the poor in the form of self-help groups (SHGs) around thrift and credit services is one of the most effective methods, not only for alleviating poverty but also for empowering rural poor. In this context, the Government of Andhra Pradesh has provided a larger space for women self-help groups in its strategy for poverty alleviation and women empowerment. The Development of Women and Children in Rural Areas (DWACRA) Programme was started in 1982-83 in the State with UNICEF cooperation to provide opportunities of self-employment on a sustained basis for the rural poor women. National Institute of Agricultural Extension Management has provided multimedia computer system with UPS, printer and internet connectivity to Mutually Aided Cooperative Thrift and Credit Societies (MACTCS) organised by DWARCA groups. Four members identified by the group were trained in basic computer operations and internet browsing. Multimedia CDs on Agriculture-Intensive Self-Learning Packages on Watershed Management, Vyavasya, Panchangam (Encyclopedia of Agricultural Practices), Paddy Cotton, Mayo and Coconut Cultivation, Expert Systems on Selected Crops and Rural Development – pickle making, child labour, child education, nutrition and health education, etc. were given to all the groups. A user-friendly accounting package was given to all the MACTCS to maintain their accounts and two members were trained to use it.

The experiences of these groups have shown that they have been using the internet in innovative ways. They are browsing DRDA Websites for government programmes and schemes. They are looking for weather forecasts, market prices, job opportunities and news on the net regularly. They have also started to charge some of these services selectively. This has provided a good opportunity to the rural information kiosks to earn some revenue. Farmers are also using the net for getting technical advice online from various sources. Rural people have created their own e-mail accounts for faster communication. They are sending mails to DRDA, district collector and other district and state-level officials.

The studies conducted on the impact of these groups on women empowerment highlighted that woman's access to and control over their savings, credit and income has improved. Further, women have improved freedom to move and interact with the officials and other women after joining the SHGs of DWACRA. But, the studies also have revealed that empowerment varied across different social groups since issues of women empowerment are interlocked with caste, religion, headship of households and their age. The fundamental pre-requisite for sustainable women empowerment is intensive participation of women in the activities of respective SHGs facilitated by ICTs.

6.4 SUGGESTIONS FOR EFFECTIVE ICT IMPLEMENTATION IN RURAL DEVELOPMENT

Limited local participation, lack of availability of local resources, fractured relationship with state agencies and exogenous social and economic environment are identified as some of the factors for the inability of ICT projects to deliver their full range of outputs in rural areas. E-governance is invariably a passive system of information empowerment. There is need for promoting participatory methodologies of content creation and knowledge management. The approach to rural women and men should be one of partnership and

not patronage. In the field of agriculture, a Farmer Participatory Knowledge System (FPKS) could replace the existing beneficiary and patronage approach to knowledge dissemination. Information should be demand driven and should be relevant in terms of time and space.

There is need for more on-farm and non-farm employment opportunities in villages. This will be possible only if there is diversification of farming systems and value addition to primary products through improved post-harvest technology. Training should be with reference to market-driven skills. Small-scale industries and khadi and village industries should receive particular attention from the point of view of the upgradation of both technology and marketing skills. There is also need for synergy between the private sector and public and cooperative sectors in promoting more avenues for skilled jobs in villages.

The usefulness of a computer-aided knowledge centre in villages will be directly proportional to the social, ecological and economic significance of the static and dynamic information being provided. Hence, a consortium of content providers will have to be developed for each agro-ecological zone. Leading industries could participate actively in such a knowledge and skill empowerment revolution by adopting specific villages where they could provide, in addition to monetary support, marketing and management information.

A culture of change, knowledge and lifelong learning should be encouraged by rural communities and the government agencies serving them, along with openness to a wide spectrum of ideas in the knowledge age. Cultures of merit, analysis, professionalism and evidenced-based decision-making should be embraced in rural ICT4D (Development) initiatives. Online services should be designed with a mix of free and fee-based services so as to ensure commercial sustainability of rural ICT4D initiatives in the long run. As a major consumer of ICT products and services, governments in developing countries can also lead by way of example in the use of ICT, implementing best organisational practices and spurring local markets in rural areas.

ICT4D policy initiatives should have a strong grounding in local communities of villages. Online and offline forums should be promoted for communities of interest and communities of practice to exchange knowledge on harnessing and creating ICTs in the rural context. Multi-actor alliances targeting rural ICT4D initiatives should be encouraged and nurtured. Creating funding options for rural ICT4D initiatives should be explored. Special financing should be set aside for ICT initiatives involving marginalised communities, physically challenged, refugees, migrant population and youths. Measures should be implemented to increase ICT literacy in rural areas. Technical, managerial and design capacity should be built up in the adoption of ICT for rural communities, creation and maintenance of secure ICT infrastructure and scaling up of rural ICT initiatives across dimensions of depth and breadth. Capacities should be built up not just in adoption of ICTs in rural areas, but in creativity with regard to devising new applications, R&D focus areas and harvesting of local knowledge. Government of India should liberalise policies for the operation of community and ham radio stations. This will help to confer the benefits of the knowledge age to every woman and man in a village. Reaching the unreached and including the excluded will be possible only through an integrated ICT system.

6.5 CONCLUSION

Indian economy can rightly be called a rural economy, as sixty percent of the country's population resides in villages and thrives on agriculture. Socio-economic transformation of rural areas is, therefore, an indicator of the nation's economic development. ICT, especially as an important feature of good governance, plays an important role in bringing in this transformation extensively by:

- rendering effective and varied delivery channels to reach the target groups in rural areas;
- empowering people through knowledge and information creation and dissemination; and
- enabling food security, livelihood, poverty eradication and sustainable development.

By building up technical, managerial and design capacity in the adoption of ICT for rural communities; creating and maintaining secure ICT infrastructure; and scaling up of rural ICT initiatives across dimensions of depth and breadth will ensure rural development to reach the rural poor and disadvantaged. Technology has to be used as a strategic innovation and not as a tactical automation in this effort.

6.6 ACTIVITY

Mention some of the ICT initiatives/ projects/experiments undertaken in areas of agriculture and women empowerment in your State or Region.

6.7 KEY CONCEPTS

- | | |
|-------------------------------|---|
| Wireless Application Protocol | : a secure specification that allows users to access information instantly via handheld wireless devices, such as, mobile phones, pagers, two-way radios, smart phones and communicators. WAP supports most wireless networks. These include CDPD, CDMA, and GSM. |
| GPR | : short for Ground Penetrating Radar, a UWB imaging technology used for subsurface earth exploration. GPR uses electromagnetic wave propagation and scattering to image and identify changes in electrical and magnetic properties in the ground. GPR systems have wide applications, such as locating underground utility lines, monitoring airplane runways for structural integrity, detecting unexploded land mines, conducting groundwater studies or forensic research, and surveying land for construction purposes. |

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6.9 ANNEXE

A. E-nabbling India's Rural Reaches

Just two hours out from Bangalore on the railway main line to Chennai, Kuppam is a two-minute halt on most trains. But that is time enough for most passengers to snatch a quick look at the posters lining the two platforms, welcoming them to Kuppam's 'inclusive' or i-community.

For those who choose to alight, the contrast with other rural clusters in this southern corner of Andhra Pradesh is palpable: neatly signposted lanes, a clean bus shelter and something one is unlikely to find anywhere else in rural India: bright red-and-yellow booths which say: 'Emergency Telephone' in Telugu and English.

They are free phones supported by a wireless (802.11b) network and connect instantly to the local police, fire and hospital services.

They can also reach two other numbers: World Corps India, the voluntary agency that

has been instrumental in training local entrepreneurs to set up over 15 wireless internet-enabled Community Information Centres (CICs) spread across the five villages or mandals of Kuppam; and Hewlett Packard, whose adoption of Kuppam as one of the first sites of its global e-inclusion programme of 'appropriate' Information Technology has inspired the State Government as well as a dozen private companies, charitable foundations and non governmental agencies to come together and co-create a sustainable future for this so-called backward area, using cutting edge technologies that have largely been the preserve of urban pockets of plenty.

Digital Photography

Last week was a busy time for Neelamma and 15 other local women mobile photographers in the Kuppam community. Armed with Photosmart Digital Cameras, they 'covered' dozens of Ganesha 'nimarjan' (immersion) ceremonies, and using the field kits loaned to them by HP, converted the shots into instant colour photos using solar-powered direct photo printers and sold them at Rs. 30 a print.

On other days they routinely cover weddings, baby 'naming' ceremonies, bus route inaugurations, accident sites, etc. They earn anything from Rs. 750 to Rs. 2000 a month and are currently moving from a model where HP supplies all the material and takes away Rs. 20 for every print to a more lucrative one where they just lease the camera and buy all the consumables.

The change has come because of the sudden access to doorstep photo services in Kuppam which has created a big enough market for nearby towns to stock digital printer consumables. 'We want to move away from the 'pappad-and-pickle' stereotype of employment for rural women,' says Anand Tawker, Director of HP's emerging market solutions in its e-inclusion programme, who has nurtured this initiative from day one. 'We are thrilled that they are so confidently handling technology that may seem disruptive even to hardcore professionals in the metros'.

In his community kiosk in Kothaindlu village, a proprietor M. Kumarswamy has just one PC and a multi-function printer. He sells toiletries and sweets to attract the local customers then offers to cast their horoscopes using special software at Rs. 30 a go. He has also discovered a new and gainful use for the spare disk-space on his PC: he calls it 'surakshita dakhallu' ('electronic safe deposit locker'). Villagers usually have a hard time preserving their precious documents: birth certificates, land title deeds or 'pattas'...from the ravages of time and weather. Kumarswamy charges a one-time fee of Rs. 20 to scan and preserve the documents on his PC for as long as the customer wants.

Touch Typewriting

At the Mamidipudi Nagarjuna Social Welfare Residential School for Girls, 10 year olds crowd around a dozen PCs, learning 'touch typewriting' in Telugu or browsing language software created by the Azim Premji Foundation, another partner in Kuppam's i-community. A single PC running Linux fuels four monitors, which can work independently.

They are the first beneficiaries of an exclusive 2 MBPS 'pipe' provided by the State Government and fed from the Software Technology Park at Tirupathi, via fibre, to all five mandals of Kuppam. From here, a WiFi umbrella set up by Convergent Communications,

Bangalore, unfurls over the whole community of 3.2 lakh citizens even while fuelling the community Net portal (www.kuppamhpi-community.stph.net) that is already delivering a variety of local services under the 'Yojanalai' head. Last week, a domestic gas outlet was advertising a vacancy, as were World Corps and some of the local voluntary agencies.

The Web for Kuppam is also the gateway to a range of health and educational services: tele-medicine software from Tele-Vital, which connects remote villages to the P.E.S. Speciality Hospital and Medical College; computer-aided-education steered by World Links and the America India foundation; and documenting farm land productivity using remote sensing satellite data collated by Samuha, a voluntary agency.

Kuppam's i-community mobile van was parked in Vasanadu village. Local residents brought soil samples for immediate testing in the field lab even as others queued up to have their eyes tested for a possible referral to the Arvind Eye Hospital. And a crowd of school children waited to take possession of a laptop computer – their weekly treat.

It is very much in the spirit of Dr. A.P.J. Abdul Kalam's favourite blueprint, PURA: Programme for Urban Amenities in Rural Areas. The challenge remains to sustain the 'inclusive' drive, even while striving to create hundreds of other Kuppams.

Anand Parthasarathy

The Hindu

n. d.

B. Medical Advice Comes Calling to Woman at Remote Village

Gandhimathi, a 37-year-old agricultural labourer in Tiruvaiyaru village near Thanjavur district in Chennai, began complaining of breathlessness about four months ago. 'I could not work. I was finding it difficult to go through everyday chores,' she said.

Today, she consulted a specialist in Chennai – without stepping out of her village.

A Village Resource Centre (VRC) Project established by the Indian Space Research Organisation (ISRO) and M.S. Swaminathan Research Foundation (MSSRF) made it possible for her to consult the Vice-Chancellor of Sri Ramachandra Medical College and Research Centre (SRMC), Shri S. Thanikachalam.

The cardiologist wanted to see her echocardiogram and this was instantly flashed on the screen from Tiruvaiyaru. Dr. Thanikachalam confirmed this diagnosis of a defective valve and reassured Gandhimathi.

This interaction was part of a live demonstration of the on-ground effectiveness of the VRCs located at Tiruvaiyaru in Thanjavur district, Thankatchimadam in Ramanathapuram district and Sempatti in Dindigul district and at the MSSRF and SRMC in Chennai.

Tele-medicine is not the only application of the Project inaugurated by the Prime Minister, Dr. Manmohan Singh, from New Delhi, today. As Dr. Singh watched from the Capital, a wide range of interactions took place between the experts at the MSSRF, Chennai and farmers and fishermen in the villages.

This satellite-based ISRO-MSSRF-VRC Project aims to provide digital connectivity to remote villages to render services such as telemedicine, tele-education and remote sensing applications through a single window.

Inaugurating the VRC Project via INSAT link from New Delhi, the Prime Minister said that unless the benefits of science and technology were taken to the villages, the country could not eradicate poverty, ignorance and diseases.

The concept was evolved by ISRO and implemented through a partnership with the MSSRF. ISRO's capabilities in satellite communications and satellite-based earth observation system to disseminate a variety of services emanating from the space systems have been integrated with other information technology tools to address the changing and critical needs of rural communities. The VRC works on an interactive Very Small Aperture Terminal (VSAT) network.

19 October 2004, The Hindu

C. 250 Satellite Linked Village Resource Centres by March 2006

G. Madhavan Nair, Chairman of Indian Space Research Organisation (ISRO) has said that at least 250 villages in the country will have satellite-linked Village Resource Centres (VRC) by March this year, taking the benefits of space technology to the rural people. He said that VRC Project, jointly launched by the ISRO and the M. S. Swaminathan Research Foundation in October 2004, would provide multiple services such as tele-medicine, tele-education and remote sensing applications to remote villages. He further informed that at least 10,000 'virtual class-rooms' would be functioning in the country by the close of 2006.

3 January 2006, The Hindu

D. Net-based Information Kiosk for Farmers

The Haryana State Cooperative Supply and Marketing Federation Limited will launch a novel 'Kisan Choupal', and internet based Touch Screen Information Kiosk and Facilitation Centre at New Anaj Mandi, Jagadhri. The Facilitation Centre would also display the current and future prices listed on the National Commodities and Derivatives Exchange on an electronic board. A joint effort of HAFED and IFFCO, the Kisan Choupal is a significant step towards modernising and empowering farmers and member cooperative societies. The touch screen information portal would enable the farmers to access relevant and timely information at the touch of a finger.

8 January 2006, The Hindu

E. Intel launches PC Platform to suit Rural Conditions

Intel launched a personal computer (PC) platform to suit the rural environment. The PC platform, conceived by the Platform Definition Centre set up in India in June last year, is one of the many platforms for specific uses. It can work in temperatures of up to 50 degree celsius and can even run on a battery that can be charged by pedalling (as in a bicycle dynamo) and other means.

The battery works as a backup in areas where the power supply is erratic. The PC can also operate in high dust environment and in surroundings where there are a lot of insects.

Intel had positioned the personal computer as a community PC that could be used in citizen service centres and other applications like education. The PC platform would be priced between Rs. 20,000 and Rs. 30,000.

The applications for PCs would be developed by independent software vendors like TCS, Microsoft and Red Hat.

30th March 2006, The Hindu

F. Rural Bazar – An Internet based Solution

NIC, MIT, GOI is committed to strengthen the efforts of groups and agencies working for the benefit of rural poor and to that end, offers a solution in terms of an IT based marketing infrastructure to provide better visibility and sale of products produced by rural artisans.

NIC addresses the problem by adopting the e-commerce approach through its product Rural Bazar. Rural Bazar is a web store that allows customers to carry out the complete business transaction starting from browsing the products to paying for the chosen products. It offers several services to its users who may be broadly classified as the producer, the content manager, the business manager, the technical manager and the customer. The following paragraphs highlight the services offered by Rural Bazar to each of its users.

Customer Services

- allows a customer to browse a product catalogue online or offline (by downloading the catalogue from the web-site or through e-mail);
- provides a comprehensive search facility;
- accepts orders online or offline (through e-mail);
- accepts payment online using credit/debit card and offline through demand drafts;
- allows the customer to track order status;
- automatically confirms on order through e-mail;
- accepts customer feedback;
- maintains customer data on profile, preferences, bill and shipping addresses, etc.;
- provides individualised customer services on the basis of customer profile and preferences; and
- a host of other services and help facility.

Producer Services

The producer is the individual or group who is responsible for producing the products.

Keeping in mind the literacy standards of the rural poor and with a futuristic view, Rural Bazar offers the following services to the rural poor:

- it automatically generates letter or e-mail (whichever is desired) in the local language, intimating the producer of any new order placed for his products. The same information can be viewed over the web also, again in the local language;

- once payment is received for an order, Rural Bazar offers a facility to automatically credit the earnings to the respective producer's account, thus eliminating the role of any unwanted intermediaries; and
- the producer can also choose to be educated/updated, through reports, about the demand for his products as well as for any new products. This will help the producer in modifying or changing his product line.

Business Manager Services

The role of business manager is to manage the whole business of marketing the products. Rural Bazar provides an interface to the business manager through which he/she can:

- conduct an on-line market survey either by posing questions directly to the customers or collecting data from customer profile, preferences and behaviour;
- analyse the data collected from the market survey through a number of pre-defined textual and graphical reports; and
- launch advertisement and discount campaigns for the products.

Content Manager Services

The content manager is responsible for maintaining the content of the web site. Rural Bazar provides a user-friendly interface for the content manager to do the following:

- updation and maintenance of the product catalogue, such as, modifying the price and other information about products;
- updation and maintenance of producer information; and
- automatic generation of letters that may be required to be posted to a customer, a producer or a bank.

Technical Manager Services

Technical manager of the web store is the key person maintaining the technical aspects of managing the equipment and ensuring the smooth functioning of the same. Rural Bazar helps the technical manager modify the functional capability of the site on the fly without requiring re-development of the software.

Special Features

Besides the above services, Rural Bazar has certain features that are unique and therefore merit special mention:

- it may be configured to market the products of the rural poor belonging to a particular state or a particular district in a state;
- Rural Bazar can be configured to act:
 - as a simple advertising medium that displays product images and their information; or

- as a site that accepts orders but accepts only offline payment (through demand draft); or
- as a total e-commerce site that accepts orders as well as payment online.

(Authors: D.C. Misra, Avijit Dutta, Omkar Rai, Rama Hariharan, Rajiv Goel, Manie Khaneja) <http://crisp.nic.in/ruralbazar>

G eNRICH: Web-Based Community Software Solution Framework

Introduction

As part of the cross cutting theme on the eradication of poverty, UNESCO (<http://www.unesco.org/webworld>) launched a new pilot initiative to put ICTs to work in the hands of the poor under its ICT PR Project. The focus is not so much on technology itself, but on its innovative use to empower the poor with tools to change their circumstances. To test and introduce sustainable ICT access and utility models to empower the under privileged, UNESCO desired to produce a generic ICT browser that:

- acts as a one stop access and delivery mechanism for communities;
- is customisable in terms of local language and content;
- encourages local content production;
- allows easy access to relevant and authenticated information; and
- enables efficient interactivity within and among communities.

In response to UNESCO's request for generic software fulfilling the above requirements, the National Informatics Centre (NIC <http://home.nic.in>) undertook the design and development of eNRICH- a Community Software Solution.

The Need

The concept of Community Information Centres or Community Information Resource Centres (as they are variedly called) adopts a people centric approach where community members converge to identify their information needs and fulfil these needs through whatever medium is available to them. Many projects have been undertaken by various national and international agencies and NGOs to address the needs of the underprivileged through the use of ICTs in such community centres. Several models have been tried out- while some established a computer centre with internet facility, others went a step further and developed a web site for the community in an attempt to fulfil their information needs. However, all these models suffer from one or the other of the following drawbacks:

- web site development is both time consuming and needs special skills to modify, revise and upload information. This reduces the self-sustainability of the project;
- effective communication within and among community is necessary ingredient for empowering the communities. However, these web sites invariably focus more on information retrieval and less on providing facilities for community communication;
- the web site lack provisions for community members to participate in building the

web site; thus the community members are passive rather than active participants in the community building exercise;

- search for relevant information is time consuming, costly and requires special skill set. Even when information has been gathered, its relevancy and authenticity cannot be judged immediately. This problem is further compounded by the low standard of living and low literacy of the underprivileged section of the society; and
- last but not the least, research data on access habits of community members is severely lacking. Such data, if made available can greatly enhance the effectiveness of ICTs in improving the lot of the underprivileged.

eNRICH addresses all the above issues in two ways:

- it enables communities to quickly and efficiently build their own gateway, enriched with their own local content, connected to knowledge sources and services that are tailored according to their own information and communication needs, available in their own local language in a format and medium that is tuned to their assimilation capacities; and
- eNRICH attempts to reduce the challenges faced by disadvantaged communities, such as, lack of suitable skill set, language barriers and low literacy in using ICTs and the internet:
 - through a simple, consistent and easy-to-use interface that requires a low level of competence from users; and
 - through accessibility to the use of multiple media (textual, audio, visual).

Conceptual Framework

eNRICH has been developed as a web-based community software solution framework that adapts to the needs and circumstances of the poor. Through its customisable, multi-lingual interface, eNRICH truly puts ICTs to work in the hands of the poor. Its multiple features not only enable communities to identify, build and organise relevant information but also promote communication between and among communities. The framework encourages collection, preservation and sharing of indigenous knowledge. With the ultimate aim of empowering communities through a collaborative approach, eNRICH acts as a platform for voicing the thoughts and feelings of the poor.

Two Components of eNRICH

eNRICH comprises two main components, namely:

- Desk Manager User Interface (DMUI); and
- Communication Interface (CBUI)

Desk Manager User Interface (DMUI) – this interface, also called the Desk Manager or DM interface, will be used by the managers of the eNRICH site as well as by researchers. This is a broad administration and analysis tool for managers and researchers. Managers will use the DMUI to:

- specify the knowledge resources and services that should be provided to the community users on the Community Browser site;
- interact with community members to render the Community Browser more relevant and useful to them;
- identify issues for opinion poll, message of the day, etc.;
- moderate the contents and messages uploaded by community users so as to make them more authentic and relevant; and
- generally administer the site.

Community Browser User Interface (CBUI) – this interface, also called Community Browser interface, will be used by the community members. Using this interface, community members will:

- access various knowledge and services made available locally and/or on the internet;
- post announcements and public messages, such as, local meetings, bartering, auctions, etc. on bulletin board for other members to see and respond;
- upload content in the local database on community specific information;
- express their views on important community issues and also view peoples' opinion;
- communicate with their dear and distant ones through e-mail, chat, instant messaging service;
- learn through multiple media; and
- communicate their information and communication needs, suggestions, complaints, etc.

Enhancement

eNRICH Community Software Solution Framework has been enhanced further to include the following features:

- introduction of Content Managers (government officers) at national, provincial and local levels with a view to extend the reach of e-governance services to the rural communities;
- provision for engaging domain experts for contributing knowledge in their respective areas and authenticating content uploaded by others; and
- enhanced inter and intra community communication through specifically designed messaging services.

Key Design Features

- a customisable web-based community software framework that caters to multiple scenarios through its twin-component structure comprising DMUI and CBUI;
- addresses local language issues through its Language Manager Interface;
- allows site configuration to suit user's requirements through its site manager;

- allows building of an Information Category Structure that could be any level deep, within and outside of a category, thus generating a flexible framework for uploading and organising content through the site manager;
- provides specific spaces for community people as well as desk manager (site administrator) to post content thereby:
 - promoting participatory approach;
 - establishing two-way communication between user and manager; and
 - generating content of local relevance (contributed by community people) as well as global relevance (contributed by the desk manager)
- allows posting of content in multiple forms that include text, file and audio;
- allows moderation to prevent publishing of undesirable content on the site;
- provides flexibility to switch-on or off any of its features at will; and
- captures, analyses and generates reports on user's profile and usage patterns for registered users, facilitating research activities.

Source: <http://enrich.nic.in/keydesign.htm>

UNIT 7 PANCHAYATI RAJ INSTITUTIONS: IMPROVING SELF- GOVERNANCE THROUGH ICT

Structure

- 7.0 Learning Outcomes
- 7.1 Introduction
- 7.2 Changing Role of PRIs
- 7.3 ICT Intervention in Local Governance: Need and Importance
- 7.4 ICT in PRIs: Application Areas
- 7.5 E-Panchayat Project: Andhra Pradesh
- 7.6 E-Panchayat: Challenges in Implementation
- 7.7 Conclusion
- 7.8 Activity
- 7.9 References and Further Readings
- 7.10 Annexe

7.0 LEARNING OUTCOMES

After studying this Unit, you should be able to:

- explain the significance of PRIs as self-governing institutions in democratic set up;
- describe the changing role of PRIs;
- identify the need and importance of ICT intervention in local governance;
- highlight the application areas of ICT in PRIs; and
- explain the concept of e-panchayat and its challenges.

7.1 INTRODUCTION

Importance of local governance in a democratic polity can hardly be underestimated. In developing countries local governance institutions not only make democracy more meaningful, but provide much needed participation of the masses in the socio-economic transformation of the nations.

The concept of self-governance is one of the cherished values of Indian society. Self-governing institutions at the grassroots played an important role in ancient India. Self-governing village communities had existed in India even in the times of Rig-Veda. In course of time these village bodies took the form of 'Panchayats,' which means an

assembly of five persons. The panchayats looked after the affairs of the village. It is believed that these bodies were the pivot of administration and centre of social life. Sir Charles Metcalfe, the provisional Governor General of India (1835-36) called the Indian village communities as 'the little republics.' Now days these little republics are known as Panchayati Raj Institutions (PRIs) in rural areas.

After independence PRIs have come into existence in most of the states since 1959 consequent to the recommendations of Balwant Rai Mehta Committee. The inception of PRIs opened a new chapter in the annals of Indian democracy. In the process of development of the country, PRIs have been playing a vital role as agents of rural transformation. These institutions help in purposeful understanding of the masses and articulation of their responses. Democracy is introduced to grassroots of the country through these institutions. Even the common people of the country are associated with administration through these institutions. Through PRIs, local people not only determine policies but they also guide and control the administration for the execution of these policies. The importance of Panchayati Raj system lies in the fact that it assures expansion of democracy at the grassroots and ensures public participation in development programmes. Therefore, PRIs have become backbone of our democratic set up.

PRIs have undergone many changes especially in its role from the days of the British Empire to the 73rd Constitutional Amendment Act in 1992. In the era of globalisation, PRIs right from the village panchayats to the Zilla Parishad have to redefine their roles as that of catalysts and facilitators. Effective and meaningful functioning of these institutions would depend on active involvement, contribution and participation of citizens. The World Bank Report 2000 stated that 'development must address human needs directly, that institutions of direct democracy, such as, panchayats should be rooted in processes that are socially inclusive and responsive to changing circumstances'. Therefore, strengthening of PRIs as self-governance institutions at the grassroots level to run the administration of local affairs is much needed for more meaningful democracy. In this context, sincere efforts need to be taken to substantially enhance the knowledge, skills and capabilities of PRIs with the use of ICT. In this Unit an attempt is made to discuss ICT enabled initiatives undertaken in the country to reorient PRIs as self-governing institutions and make them vehicles of socio-economic transformation in rural India.

7.2 CHANGING ROLE OF PRIs

Democracy does not become meaningful without strengthening the grassroots institutions. Local self-government institutions are those institutions constituted at the grassroots level to administer local affairs. These institutions comprise those representatives who are directly elected by the people at regular interval of time. They are constituted by the Acts of state governments. These institutions fulfill the local needs, relieve the administrative burden, secure economy in administration, promote political consciousness, decentralise power and authority and make democracy a success.

Popular participation and strengthening of local governments are essential to achieve development at the local level. Institutions of governance at the local level have a clinching role in promoting a new equilibrium in rural India. The development machinery at the grassroots level work under the control of PRIs. Prior to 1992, state governments adopted different patterns of PRIs and there was no uniformity in the structures, powers

and functions, election methods, allocation of financial resources etc. of these institutions. Government of India has brought certain reforms in these institutions through 73rd Constitutional Amendment Act, 1992. This amendment aimed at creating uniform pattern of PRIs in all the states. It devolved a package of powers and functions to the PRIs. These institutions now perform a wide range of functions. This includes maintenance of public streets, proper drainage, electricity supply, lighting, medical relief, construction and maintenance of public toilets, registration of births and deaths, provision of primary education, water supply, maintenance of burial ground, etc. In addition, they are also expected to take up functions, such as, promotion of cottage industries, animal husbandry programmes, pollution control, famine relief, construction of culverts, maintenance of village roads, reading rooms, etc.

The XI Schedule added to the Constitution by the Act lists out 29 subjects to be transferred to Panchayati Raj bodies. They include agriculture, land reforms, minor irrigation, animal husbandry, fisheries, social forestry, small scale industries, rural housing, rural roads, rural electrification, poverty alleviation programmes, primary, secondary and vocational education; adult and non-formal education, libraries, rural markets, rural health centres, family welfare, women and child development, social welfare and welfare of weaker sections, public distribution system and maintenance of community assets.

The Constitution through 73rd Amendment visualises panchayats as institutions of local self-government. It also devolves the powers, functions and responsibilities to panchayats in respect of 29 subjects to prepare their schemes and development plans and implementation of these programmes of economic and social development. The Constitution enjoins the state government to take steps for devolution of powers and functions to the panchayats to enable them to become 'institutions of self-government'. However, the available information reveals that the process of devolution has not yet been firmed up in most of the states. The extent of devolution of powers and functions is subject to the will of the state legislature. It is found that the steps have been taken in most states on piece-meal basis.

Experience of one decade of implementation of the 73rd Constitutional Amendment Act shows that PRIs in most of the states have not delivered the services to rural people in accordance with the provisions made in the Act. Although the Act empowers them to prepare plans for economic development and social justice and implement the schemes of rural development as may be entrusted to them including those related to matters listed in the XI Schedule, they failed to become the real institutions of self-governance due to lack of community participation and insufficient capacity in running their activities. Therefore, capacity building measures need to be taken at local governance level to strengthen PRIs. Capacity building may be defined as support or intervention that empowers people, communities or organisation to achieve their objectives. Effective capacity building includes learning by doing, access to resources, facilitation, mediation and training. These measures comprise developing community audit skills, facilitating a strategic plan and phased operational measures and encouraging the monitoring and evaluation of progress.

The challenges before the PRIs in the new millennium are formidable. Infact, these institutions are to transform themselves from being representative political institutions to being community institutions of direct democracy with support from the local community. These institutions have to work within the broad framework of good governance. The

positive challenges of these institutions are preserving democracy at the grassroots, initiating necessary steps for good governance, maintaining accountability and transparency with the purpose of social audit, exploring possibilities for new initiatives or new power equations, civil society activities through partnership with NGOs, achieving women empowerment and developing efficient service delivery mechanisms.

Poverty reduction should be the highest priority mission of PRIs in the new millennium. These institutions have to draw long-term plans for rural development and catalyse public-private partnership to realise them in the areas of health, education, roads, water supply and other infrastructure services. They have to ensure that their administration and functions are accountable to the people to facilitate empowerment.

To meet these challenges a considerable number of ICT initiatives have been undertaken by the Central and state governments since 1990s. These initiatives have vast potential to ensure a more accountable, responsive and citizen friendly PRI. Positive harnessing of ICT can open new vistas for PRIs' efficiency and effectiveness.

7.3 ICT INTERVENTION IN LOCAL GOVERNANCE: NEED AND IMPORTANCE

Need of ICT Intervention in PRIs

With the passage of 73rd Amendment Act to the Constitution of India, the panchayats in rural areas received the Constitutional legality to function as local self-governments in the third tier of governance. Enormous authority has been given to them for managing their affairs including the responsibility to plan for their areas and collecting revenues for their sustenance. But even after more than a decade of this Constitutional sanction, the third tier governance is yet to take the full shape. The benefits of ICT are sparsely garnered and in general they function in isolation with little participation of the people in their affairs except to cast vote in an interval of five years.

Governance generally means rule of law, openness and accountability. Using ICT in local self-governance can ensure at least the last two components. Through openness, accessibility can be ensured to the citizens to know about 'what is being done, will be done and has been done' by the state and its agencies. At the local level, for example in the panchayats, the common villagers have very little accessibility to the activities of the panchayats, the funds they are getting and the funds they are raising. Despite of being the people's body the panchayats most often fail to be accountable to the local people in true sense of the term. Accountability means that the conduct of government needs explanation whenever citizens demand such explanation.

At the local level, in particular, non-availability of information leads to adhocism in prioritisation of schemes/ programmes, poor decision-making, slow process of making corrections during implementation and narrow participation of people in the process. In rural areas, most of the states have adopted the three-tier panchayati raj structure with village panchayat at the lowest level, block panchayat at the intermediate level and zilla panchayat at the district level. It is desirable that there should be a strong organic link all through the process. The present status of data communication system however, is not so effective. Most of the data generated at gram panchayats of the district are stacked

at the intermediate levels. Again, the flow of information from the blocks (the middle tier) to district is irregular on one hand and inadequate on the other hand because this data transfer is done manually and through human agencies like postal and courier services.

The state level data on varied items can be available in hard form, but it is partially true for district level data. In case of block level too, data on different development indicators are rarely available. For example, there is no consolidated data on infant mortality rate or fertility rate. Along with this there are problems of accuracy and completeness of data irrespective of the locality where they are gathered/ generated. Accredited agencies like Central Statistical Organisation, National Sample Survey Organisation or Centre for Monitoring Indian Economy (CMIE) goes up to the state level only. Though census provides a lot of data but they have a very defined area of operation and are concerned with specific time period only. For local level planning state level data are of little use. As a consequence, there remains large scope for adhocism.

Next is the case for transparency without which governance at the local level remains incomplete. It is expected that local people should have adequate access to the affairs of management of local bodies. The present practice is to convene meetings of gram sabhas twice in a year for sharing the achievements of gram panchayats. This has the Constitutional sanction (Article 243A). But the higher tiers, that is, intermediate and district have no such platform to share the experiences with the local people.

In case of beneficiary oriented programmes, the panchayats at the village and block levels are mainly entrusted with identification of beneficiaries. Though in matter of identification there are limited deliberations, but the list of selected recipients/beneficiaries is mostly not exhibited either in the office of village panchayat or block (intermediate) panchayat for public viewing. This may lead to corruption in the finalisation of the list. In addition to this when the scheme is actually implemented, i.e. at the time of delivery, local people have no channel to get the information regarding expenditure made or quantum of assistance etc. This lack of transparency further leads to corruption and jeopardises the interests of the people and the government. Manifestation of corruption in different forms distorts the policy objectives of the government and acts against the interest of the people. Along with transparency, accountability should also be there for successful governance. At the local level there is little scope for interaction between the people on the one hand and local bodies on the other. As there is no regular channel for effective communication between the local bodies and local citizens, the nature of development is not participatory. Lack of information sharing among the functional departments and the panchayats results in problems of interim coordination.

Importance of ICT in PRIs

Effectiveness of any institution depends on the delivery mechanism and the supportive rules and procedures acting in harmony with each other, so that the institution can discharge the functions and play the assigned role. For keeping in track, the institutions interact and exchange ideas with the stakeholders. The direct stakeholders are to be given importance, structures have to be redefined, and procedures and practices of governance have to be brought closer to people. Local governance should be understood from such a perspective, instead of just being seen as an agent of programme implementation. ICT intervention can facilitate this process.

ICT interventions aid in the process of development by sharing knowledge, increasing productivity, overcoming geographical boundaries and facilitating procedural openness. ICTs lead not only to increase in supply of information with economy and reliability, but also consequently, to better decision-making and innovations. It also leads to demand for greater openness and transparency in operations. It is a powerful tool of empowerment.

ICTs can improve local self-governance of PRIs in three distinct ways:

- it creates ‘efficiency benefits’ in the policy cycle. By acquisition, transfer and management of complex policy information and data it helps decision-makers in taking informed decisions;
- it improves the delivery of local government services; and
- it gives a facelift to the government civil society interface by increased access to government information and facilitating dialogue and public feedback on government projects and performance.

ICTs play an increasingly important role in helping policy makers and administrators to better manage the provision of public goods and services at the local level. They can enhance basic infrastructure services such as water, sanitation and electricity; speed up the approval and delivery of permits, and provide timely and more relevant response to information requests. Thus, ICT has emerged as an effective instrument to bring masses closer to the government. The Working Group on IT for Masses appointed by the Centre perceives ICT providing a unique and new opportunity to address age-old problems in the field of education, health, rural development, poverty alleviation, employment, etc. and to be a major facilitator for information transparency, good governance, empowerment, participative management and grass-root democracy.

Experiences of developing countries like Chile and Uganda encourage us to use ICT for the benefits of rural masses. Based on the experiences of these countries following four aspects can be delineated pertaining to the role of ICTs:

- empowerment of people through their wider participation in planning, implementation and management of programmes;
- transparency and probity by exhibiting the transactions, progress of work, future plans and actions and thus allowing access of the common man;
- increased effectiveness and efficiency of services provided directly by government and its agencies; and
- enhanced coordination within the different segments of the functional departments of the government.

7.4 ICT IN PRIs: APPLICATION AREAS

ICT application has vast potential to ensure more accountable, responsive and citizen-friendly PRIs. Wired PRIs would, not only be more transparent, but also more open to social audit. People can easily register their grievances through e-mail as we see in case of Gyandoot Programme in Madhya Pradesh. Software such as Rural Soft can be used

in monitoring rural development programmes and projects. ICT can also help in reducing the corrupt practices in rural infrastructure development projects undertaken by the PRIs. With the aid of Geographical Information System (GIS) and satellite imagery, a detailed visual record of the projects can be maintained, which can be accessed any time with a click of mouse. Physical verification of the projects would be no more at the mercy of time, but can be done by anybody, from anywhere and at anytime. Thus application of ICT can increase legitimacy and acceptability of the PRIs among its stakeholders.

The 'Working Group on IT for Masses' has recommended the need to re-engineer various services such as those related to local governance at block or panchayat levels through extensive use of ICT. It further suggested that ICT should provide relevant information while fulfilling local information needs of the people. ICT enabled initiatives will help in the successful realisation of powers and responsibilities of PRIs through a lot of information input and their efficient analysis. Therefore, ICT enabled initiatives can play a crucial role in the following areas of PRIs:

- **Participatory Planning**

Participatory planning needs access to a wide variety of information by the officials as well as the people and civil society. ICTs have the potential to provide comprehensive information and increase the speed and quality of this process. The concept of GIS can be applied to three major sections, namely inventory, analysis and planning. GIS consists of reliable and accurate spatial and non-spatial information on land and land resources. With the help of GIS, Panchayat Resource Mapping can be done, which can help not only in preparation of local plans, but also in consolidation of these plans at district level. Subject to the state laws, PRIs have the responsibility of agriculture, including agricultural extension, soil conservation, social forestry and farm forestry; all of which needs the aid of GIS and remote sensing data for efficient and effective performance.

At the implementation stage, application of ICT can lead to better resource mobilisation and deployment, manpower management and technical support. ICT can make quick, comprehensive and transparent impact-assessment possible, which can enable better implementation of the projects and plans. Thus, ICT makes decentralised and participatory planning a smooth and simple affair and helps in realising its inherent benefits, i.e. efficiency, equality and empowerment.

- **Taxation**

Subject to state laws, the PRIs can levy, collect and appropriate taxes, duties, tolls and fees. Experience of integrating ICT with the Central and States' tax administration shows more revenue collection and less corruption. The same can be replicated with tax administration and fiscal planning of PRIs.

- **Education**

Subject to state laws, primary and secondary education, vocational education, adult and non-formal education and technical training are the responsibility of the PRIs. Panchayat centres equipped with ICT tools and services can become major hubs for educating people on a mass scale. ISRO has launched Edusat- world's first satellite

dedicated to education to enable radio and TV broadcast, internet based education, data broadcasting, talk-back option, audio video interaction and video conferencing. This will be real-time interactive learning available 24 hours a day. By spending around Rs. 2 lakh for infrastructure, the PRIs can have access to Edusat facilities and take education to the doorsteps of the rural and disadvantaged sections.

- **Training**

Training of numerous functionaries as well as elected representatives has emerged as one of the most challenging areas in the effective functioning of the PRIs. Training is not one time process; rather it needs time-to-time administering on the recipients. Developing appropriate training module needs expertise. ICT can help in easing the difficulties faced in the area of training through District Panchayat LAN (for local contents), internet, video conferencing, etc. It can also provide cyber platform to share variety of panchayat related experiences from across the country.

7.5 E-PANCHAYAT PROJECT: ANDHRA PRADESH

ICT-enabled PRIs or e-panchayat does not mean merely computerisation of backroom offices, but encompasses a wide range of activities and actors. This can result in 4-dimensional interface namely:

- P2P: Panchayat to Panchayat
- P2B: Panchayat to Business
- P2G: Panchayat to Gram Sabha
- P2E: Panchayat to Employees

P2P (Panchayat to Panchayat) interface may involve sharing of data and conduct of electronic exchanges amongst different tiers of the PRIs. This also may entail horizontal information sharing with other agencies in their geographical jurisdiction. District Panchayat LAN would connect the PRIs at the district, block and village level and the district would be connected to higher levels of the governments through the internet. District Management Information System (DMIS), based on bottom-up approach would utilise the LAN. P2P interface would help in better coordination of resources, comprehensive planning and effective implementation.

P2B (Panchayat to Business) interface may involve sale of PRIs' goods to the public as well as procurement of goods and services by them. This would require the maintenance of electronic catalogues for purchasing, electronic tender floating and displaying the award and terms of the contract on the net. This may lead to improved transparency and accountability in the transactions of the PRIs.

P2G (Panchayat to Gram Sabha) interface is the foremost objective of e-Panchayat. Generally, P2G interface is thought to be confined to information related with schemes, procedures and forms. But this would be the first level of P2G interface. In the next level, the members would try to obtain information about various rules and laws. After this, efforts to know about the facts related with fund flows would be made. People would start questioning the decisions and their rationale. E-panchayats can help in realising these

goals of information dissemination, transparency and accountability and make P2G interface a potent weapon of democratic decentralisation.

P2E (Panchayat to Employees) interface can cover work guidelines, rules and regulations, salary structure and training modules. The local government functionaries including elected representatives are expected to know about Panchayati Raj Act, numerous rules framed under them and various orders issued by diverse governmental agencies. ICT enables accessibility to such updated documents thereby enhancing decision making by PRIs.

E-panchayat is a software product conceptualised, designed and developed by National Informatics Centre, Hyderabad, Andhra Pradesh, as a part of e-governance initiatives. At present, it is being implemented in 450 gram panchayats in the State with an investment touching eight crore rupees. E-panchayat has been designed taking into consideration all the information and knowledge management requirements in a gram panchayat. It covers all information requirements for the village panchayat functionaries and rural citizens. The Constitutional Amendment Act 1992, success stories of gram panchayats in the country, Government orders pertaining to village secretariats and functions of the village secretary and elected representatives of gram panchayat are included in the e-panchayat software package. Thus, e-panchayat fits well into the information systems at gram panchayat level. The software is web-enabled and citizen-centric.

E-panchayat software in Andhra Pradesh comprises nearly 30 main modules and 150 sub-modules in line with the 30 sectoral functions of the gram panchayats. Some of the important modules are explained below:

Gram Panchayat Administration

This module provides following information and services:

- minutes of meetings;
- schedules of Gram Sabhas;
- agenda update;
- certificates and licences;
- bill payments;
- attendance monitoring of Panchayat functionaries;
- gram Panchayat meetings management;
- gram Panchayat cleanliness monitoring;
- registration of births/ deaths/ marriages, etc.;
- issue of trade licences;
- pension schemes management system;
- self-help groups and other villagers welfare schemes management system;
- assets management, property tax assessment and management;
- property lost/found reporting system;
- law and order management system;

- encroachments checking and monitoring module;
- government orders searching and retrieval system;
- village statistics maintenance and reporting system; and
- intensive sanitation management information system.

Agriculture

This module:

- facilitates educational services on the best agricultural practices to enhance the yield and reduce expenditure and enhance the quality of produce for the farmers;
- facilitates agriculture and related departments to provide season-specific, region-specific information services to the farmers;
- enables elected representatives of gram panchayats to manage farmers' grievances;
- enables gram panchayat secretariat to report the details of agriculture production of the village; and
- offers counselling services to the farmers by agriculture experts.

Irrigation and Water Conservation

This module:

- provides information on irrigation canals to the farmers;
- facilitates education on various water harvesting and conservation schemes;
- enables reporting of problems on pipelines, canals, etc. and subsequent review of problems by Sarpanch (or the head of Panchayat or Village Council); and
- facilitates the appraisal of the status of water cess payments and reporting on the dues.

Elections

This module provides the following information services:

- registration of voters;
- objection to voters list;
- elected representative information;
- publication of electoral rolls; and
- dissemination of electoral rolls.

Housing

This module provides information on:

- low cost housing techniques;
- application for housing scheme; and
- loan recovery status

Adult Education

This module provides information on:

- enrolment of adults;
- schedule of education programmes;
- training kits for adult education;
- feedback on education programmes; and
- status monitoring

Cultural Programmes

This module provides information on:

- enrollment of artists;
- training of artists;
- schedule of programmes; and
- information on opportunities

Women and Child Welfare

This module extends information services on:

- immunisation schedules;
- nutrition programme;
- schedule of camps; and
- counselling by health workers

Social Welfare

Under this module services available are:

- atrocities reporting;
- welfare scheme information;
- inventory of handicapped persons;
- donors information;
- counselling; and
- application for schemes

Village Accounting System (VAS)

Following are the features of VAS:

- cash transactions;
- bill receipts;
- ODs and cheques receipts;

- automatic challan submission;
- treasury payments;
- classified accounts;
- all kinds of taxes and fee collections;
- cheques/DDs reconciliation; and
- reports (Daily collection report)

Feedback studies confirm the satisfaction of rural people with the functioning of e-panchayats in the State. E-panchayats have facilitated the implementation of right to information at the village level. They have equipped the rural folk with comprehensive and updated information thereby ensuring transparency in local governance.

7.6 E-PANCHAYAT: CHALLENGES IN IMPLEMENTATION

Some of the challenges in the effective implementation of e-panchayats are mentioned below:

- there is lack of adequate infrastructure that creates regional imbalances;
- the input cost in networking of PRIs is very high;
- there is shortage of software and quality content in regional languages; and
- due place to traditional folk media is not accorded.

E-panchayats should be based on ethnocentric, need-based and bottom up approach. They have to steer clear of these limitations to accomplish the constitutionally mandated goals.

7.7 CONCLUSION

In the process of development of the country, PRIs have been playing a vital role as agents of rural transformation.

In the era of globalisation, PRIs have to redefine their roles as that of catalysts and facilitators. Therefore, sincere efforts need to be taken by these institutions to enhance knowledge, skills and capabilities through ICTs. ICT initiatives lead to greater openness and transparency in operations and empower PRIs as self-governance institutions. ICT initiatives can be applicable in the areas of participatory planning, taxation, education and training, and service delivery.

Further, electronic knowledge-based panchayats, that is, e-panchayats aim at equipping rural people with comprehensive and updated information and ensure transparency in governance. In other words, e-panchayats have strengthened participative democracy at the grassroots.

However, applications of ICT to the PRIs have to address to certain crucial factors-regional imbalances, resources, software development, and high cost- to facilitate rural development and self-governance in the country.

7.8 ACTIVITY

- 1) Let us know about experiments in e-panchayat in other states of India and their experiences.
- 2) List out some of the software developed for rural applications in the country.

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7.10 ANNEXE

12,600 Village Panchayats to be Computerised this Year in Chennai Second Phase of the Programme to Kick off Shortly

As part of its efforts to take Information Technology enabled administration and e-

governance to villages, the State Government proposes to computerise all 12,618 village panchayats in the current year.

Till date, 1,113 village panchayats have been provided with computers. They were covered in the first phase of the computerisation programme launched in October 2004. In the first phase, 385 panchayat unions, 29 offices of Assistant Directors of Panchayats in the districts and the Directorate of Rural Development were also covered. The total cost was Rs. 10.37 crore.

The second phase, scheduled to be taken up shortly, will cover 5,409 village panchayats. Orders have been placed with the Electronics Corporation of Tamil Nadu Limited (ELCOT). Last week, it informed the Rural Development Department that the supply would be made by the first week of November. The village panchayats have been identified and Rural Development officials have advised them to keep buildings ready for installation of computers.

In the current phase, apart from around 5,400 panchayats, the Local Fund Audit Department will also be computerised. The cost is estimated at Rs. 28 crore.

Funds for the two phases have been provided from the 11th Finance Commission grants.

The Rural Development Department has also initiated steps for the third and final phase. Proposal has been sent to the Government for sanction of about Rs. 32 crore to cover the remaining 6,096 village panchayats.

An elaborate training programme is being given to panchayat Presidents and officials. A web-enabled software, designed by the National Informatics Centre (NIC), in consultation with the Comptroller and Auditor General, is being used for maintenance of accounts of Panchayat Raj institutions.

Asked how the village panchayats were making use of the computers, the officials said the response was encouraging. Of 1,113 panchayats covered under the first phase, nearly 900 were using computers for data entry.

T. Ramakrishnan

October 10 2005, The Hindu

UNIT 8 E-LEARNING: ROLE OF ICT IN EDUCATION AND TRAINING

Structure

- 8.0 Learning Outcomes
- 8.1 Introduction
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8.0 LEARNING OUTCOMES

After studying this Unit, you should be able to:

- explain the concept and significance of e-learning;
- describe the online delivery of education and training through internet;
- discuss the concept and benefits of Virtual Learning Environment;
- highlight the features of digital library;
- explain the importance of digital portfolios; and
- highlight the basic features of the Edusat initiative of the Government of India

8.1 INTRODUCTION

Information and communication technology (ICT) has become an integral part of learning today. Countries across the world are using ICT in facilitating information dissemination and communication in all areas of education and training. There are now educational and training institutions imparting skills in the basic and advanced concepts of ICT. Besides, ICT is being used in facilitating distance learning. It is enabling online designing of courses, online delivery of courses, computer-aided teaching, online assessment, besides management and networking of a large number of educational institutions. ICT based systems and

software, CD based courses, online courses, digital libraries, discussion forums, digital portfolios, teleconference, etc. has made e-learning a reality today.

In this Unit, we will be discussing these ICT-based applications in the field of learning, that is, education and training.

8.2 E-LEARNING: CONCEPT AND SIGNIFICANCE

E-learning is an approach to facilitate and enhance learning through, and based on, both computer and communication technology. It refers to the use of computer-based electronic technologies of internet, e-mail, websites and CD-ROMS to deliver, facilitate and enhance both formal and informal learning and knowledge sharing from any place at any time. The communication devices can also include digital television, personal digital assistants (PDAs) and mobile phones.

E-learning is also called Computer-Based Training (CBT). Generally, CBT and e-learning are treated as synonyms, but CBT is the older term dating from the 1980s. The term e-learning evolved from CBT along with the maturation of the internet, CDs and DVDs. It includes Internet-based Learning, Web-based Learning and Online Learning.

E-learning: Significance

E-learning is significant in many ways. It

- enables flexible learning where just-in-time learning is possible. It is a means to effective and efficient learning due to its ease of access and the pace being determined by the learner;
- facilitates collaborative internet and web-based learning opportunities to the learners. It supports distance learning with wide area networks (WAN). It addresses the practical side of learning by organising the topics to be taught and creating multimedia CD-ROMs or websites. An important advantage is that hyperlinking is possible and having interactive parts illustrating difficult things or for doing exercises is also possible;
- allows a wider range of learning experiences, such as, educational animation to online learners;
- imparts e-training through the asynchronous and synchronous communication modes, permitting the learners the convenience of flexibility. Asynchronous learning uses technology such as blogs, wikis and discussion boards to allow participants to contribute when time allows. Synchronous activities allow all participants to join in at once with a chat session or a virtual classroom or meeting;
- develops the role competencies of the personnel in an organisation through the use of electronic media. Specialised training is rendered through customised software, which addresses the particular needs of the clientele mostly through the synchronous mode on a dedicated broadband internet connectivity. Equally, it also renders training to the learners through the generic software displaying universal contents in asynchronous mode to the learners through a shared network with limited internet access or on World Wide Web; and

- enhances teaching by professional development of teachers through training on usage of ICT in education. E-learning system like World Links enables the teachers to integrate technology into teaching and thus create dynamic student-centred learning environment in classrooms. The faculties can also interact with their peer groups in the world and exchange ideas and notes on the subject.

Hence, as put by Gupta and Singhal, e-learning is a planned effort towards providing interactive and experiential learning; flexibility in terms of time, place and pace; participation and accessibility; expertise and qualitative subject matter; best resource at the learners' doorsteps and personalised training; and centres round the trainees.

8.3 E-LEARNING: ONLINE DELIVERY OF EDUCATION AND TRAINING

E-learning is basically the delivery of learning via the internet. We can refer to this type of learning as online learning and/or web based learning. With the internet boom since mid-1990s, the concept of online learning has spread broadly. Online learning can be thought of as a subset of the broader e-learning category because it refers specifically to content delivered via the internet or intranet. A growing number of universities and colleges are now offering select set of academic courses via the internet. Universities around the world offer online courses ranging from associate's degrees to doctoral programmes in everything from business administration to criminal justice to nursing. While some programmes require students to attend some campus classes or orientations, many are completely online. In addition, several universities offer online student support services such as online advising, student newsletters, etc.

For the younger children (for example in US) there are free learning sites ranging from those that provide worksheets to those with interactive exercises. But, it is left to the parents to provide continuity, determine and to assemble an overall programme. In addition, there are online subscription services for children that track the children and provide assessment, placement, continuity and reports.

Similarly, there are universities and distance learning systems offering courses online to its learners. Now even the corporate and businesses are using online learning to provide cost-effective training to their employees, partners and customers.

As the number of students taking online classes continues to grow at a quicker pace (owing to the convenience and cost factor) we today have a second wave of online college students who are different. They are students who know the ingredients of a good online class. They are the new savvy consumers of online education. In response to their higher expectations, providers of online education are incorporating increasingly sophisticated teaching approaches, such as, educational animation that address the challenges of presenting dynamic content to learners.

Open source online learning system is growing fast in the education and business world. WebOpenSource.com lists the entire available open source online learning system in the market today. Instructors in education and business organisation may free use it under GNU Software License. One of the best open source online learning system is Moodle. WebClass.com is a professional hosted online learning system based on Moodle.

Internet Forums

ICT facilitates discussion groups, which can enable its participants to exchange ideas, suggestions and discuss crucial pedagogical/educational issues over the internet. This is a facility on the World Wide Web for holding discussions. Hence, the learning community can develop its discussion groups and exchange messages and join in debates through the internet. Some examples of discussion forums are the Manipal Academy of Higher Education Discussion Board, Directorate of Technical Education Discussion Forum, the EDTECH List, which is an international consortium of scholars and teachers; and the H-Net that uses communication technology to facilitate the free exchange of academic ideas and scholarly resources thereby advancing teaching and research in arts, humanities and social sciences. Such discussion groups/forums are also referred to as internet forums, web forums, message boards, discussion boards, bulletin boards or simply forums.

A virtual community of teachers, subject experts, professionals, learners and instructors can be developed and they can discuss a number of related themes/topics. Facilities like bulletin boards allow them to dial into the computer system over a phone line and using a terminal programme perform functions, such as, downloading software and data, uploading data and exchanging messages with other learners or teachers. Now it is even possible to have more than one forum dedicated to a particular topic.

As of late, forum software developers have actively encouraged the creation of open source plug-ins, which can be integrated with the software as a means of expansion. Plugins are auxiliary programmes that works with a major software package to enhance its capability. Generally, plug-ins provide more interaction for users and may add special features to the forum software. For example, plug-ins are widely used in image editing programmes, such as, Photoshop to add a filter for some special effect. They are also added to web browsers to enable them to support new types of content such as audio, video, etc.

8.4 E-LEARNING SYSTEMS: VIRTUAL LEARNING ENVIRONMENT

The Virtual Learning Environment (VLE) also called Managed Learning Environment (MLE), Learning Management System (LMS), Course Management System (CMS), Learning Support System (LSS) or Learning Platform (LP) makes possible for a course designer to present to students through a single, consistent and intuitive interface, all the components required for a course of education or training. It makes extensive use of computers and internet to implement all the elements pertaining to learning, such as:

- the syllabus for the course;
- administrative information including the location of sessions, details of pre-requisites and co-requisites, credit information and how to get help;
- a noticeboard for up-to-date course information;
- student registration and tracking facilities, if necessary with payment options;
- basic teaching materials. These may be the complete content of the course, if the

VLE is being used in a distance learning context, or copies of visual aids used in lectures or other classes where it is being used to support a campus-based course; and

- additional resources, including reading materials and links to outside resources in libraries and on the internet.

Virtual Learning Environment



The above webpage depicts the VLE with:

- navigation menu and icons giving access to automated tools and content pages to the learners;
- self-assessment quizzes which can be scored automatically;
- formal assessment procedures; and
- electronic communication support including e-mail, threaded discussion and a chat room with or without a moderator.

Besides VLE provides differential access rights for instructors and students and causes production of documentation and statistics on the course in the format required for institutional administration and quality control.

All these facilities are capable of being hyperlinked together. Also, easy authoring tools for creating the necessary documents including the insertion of hyperlinks is provided-though it is acceptable for the VLE to be designed so that standard word processors or other office software can be used for authoring. In addition, VLE is capable of supporting numerous courses, so that students and instructors in a given institution (and indeed across institutions) experience a consistent interface when moving from one course to another. Virtual learning software packages like Moodle, works toward a student-centred learning solution by helping educators create quality online courses.

Open Universities and other institutions of higher education are increasingly turning to VLEs in order to:

- economise on the time of teaching staff, especially when they are also involved in research and administration. The extent of the economy over traditional ‘talk-and-chalk’ teaching is not yet clear, but using a VLE almost certainly absorbs less instructor time (and requires less expertise, while producing a more professional result) than creating a home-grown website for a course;
- provide a service for students who increasingly look to the internet as the natural medium for finding information and resources;
- ensure that quality control requirements are met by providing a standard vehicle for collecting the required information; and
- facilitate the integration of distance and campus-based learning or of learning on different campuses.

Rather, open schools and distance education universities should be encouraged to make use of such learning platforms where is possible for every learner to have an access to an online learning space and e-portfolio.

In India, we have conceived an e-learning system namely ‘E-Vidyapeeth’. It is a Learning Management System and an e-learning infrastructure product. It has been developed with a vision to transform the internet into a powerful environment for teaching and learning. This system can be used for launching almost all the courses offered by various universities and educational institutions. This system makes it easy to publish documents, lectures and exercises for faculty members and lab faculty members. Besides, it will be a main portal for all the students to get the most up-to-date information for their lectures and exercises. With the help of this system, monitoring student performances will become easier. The system helps in:

- student registration;
- enrollment;
- course delivery;
- online examination;
- discussion;
- chat;
- white board;
- calendar;
- administration; and
- faculty operations

8.5 DIGITAL LIBRARY

According to Wikipedia, a digital library is a library in which a significant proportion of the resources is available in machine-readable format accessible by means of computers,

as opposed to print or microform. The digital content may be locally held or accessed remotely via computer networks.

In libraries, the process of digitisation began with the services in the following order:

First: cataloguing services;

Second: periodical indexes and abstracting services;

Third: periodicals and large reference works; and

Finally to book publishing.

Some of the largest and most successful digital libraries are Project Gutenberg, ibiblio, and the Internet Archive.

Advantages

The Wikepaedia Dictionary has summarised the following advantages of the digital libraries to the traditional libraries:

	Traditional libraries	Digital libraries
• Storage Space	limited	greater with digital information requiring very little physical space to contain them.
• Maintenance Cost	greater owing to payment rent, additional books	lower as they do away with these to staff, book maintenance, fees
• Innovation	casual	innovations in technology is immediately adopted to provide users with improvements in electronic and audio book technology. New forms of communication, such as, wikis and blogs are also presented.
• Physical Boundary	yes	no, as the user need not to go to the library physically. It is widely accessible around the globe with internet.
• Availability	limited	24x7
• Access	limited	multiple, as the same resources can be used at the same time by a number of users.
• Approach	time consuming	structured access to much richer content in a more structured manner, i.e. we can easily move from the catalogue to the particular book then to a particular chapter and so on.

- | | | |
|--|----------------|--|
| <ul style="list-style-type: none"> • Information Retrieval | time consuming | the user is able to use any search term bellowing to the word or phrase of the entire collection. Digital library will provide very user-friendly interfaces, giving click able access to its resources. |
| <ul style="list-style-type: none"> • Preservation and Conservation | difficult | an exact copy of the original can be made any number of times without any degradation in quality. |
| <ul style="list-style-type: none"> • Networking | no | a particular digital library can provide the link to any other resources of other digital library very easily. Thus, a seamlessly integrated resource sharing can be achieved. |

However despite the numerous advantages, certain gaps are to be looked into. Some of these success gaps are discussed below:

Disadvantages

Digital libraries:

- have problems pertaining to copyright laws, as the works cannot be shared over different periods in the manner of a traditional library;
- cannot reproduce the environment of a traditional library. Many people also find reading printed material to be easier than reading material on a computer screen although this depends heavily on presentation as well as personal preferences; and
- can see some of its content becoming out-of-date and its data becoming inaccessible due to technological developments.

However, despite these disadvantages, the future holds good for digital libraries, as service providers such as Google, the Million Book Project, MSN and Yahoo are undertaking large scale digitisation projects. As digital libraries continue to make improvements in book handling and presentation technologies, such as, through Optical Character Recognition, E-books and Internet Archive, there is a tremendous scope for e-learning today and in times to come.

8.6 DIGITAL PORTFOLIO

According to the Wikipaedia Dictionary, a digital portfolio is an evolving tool that documents ones personal, academic and professional development. It is a visual guide that maps out where one has been, where one is going and how one plan to get there. The digital portfolio can also serve as a tool to communicate one's plan to others. Hence, it as much a process as it is a product and is a 'living document' that evolves as one does.

Digital portfolio is a hypermedia document. This simply means that the portfolio is a set of screens (or pages in software terminology) that is linked by buttons on the screen.

When the user clicks the mouse to select a button, the programme reacts typically by navigating to another screen or by showing some additional information.

The opening page of the digital portfolio is an identification of the student and his/her school. In the bar along the bottom of the screen are several buttons; clicking on any of the words in that bar elicits an action. For example, clicking on the 'photo button' allows the user to see a digitised photo of the student. Clicking on the 'information button' shows a screen with additional information about the student, such as his/her years of enrollment and other administrative data. Clicking on the 'instructions button' brings up a screen that tells the user how to navigate through the portfolio.

Digital portfolios are a way of displaying student achievement through class assignments, community service and occupational experience. A digital portfolio means that students can save their work to a disk, a CD, a web page or an internet storage bin. It not only allows students to bring samples of their work to local college and/or job interviews, but it also enables them to send samples of their work at the touch of a keypad to colleges and businesses throughout the country.

Objectives

The purpose of digital portfolio is to:

- allow one to create a tool to assist in presenting what one is learning and planning in his/her personal, academic and professional life and how this learning and planning interconnect;
- provide academic plan that will help one to articulate what one is learning in classes. The portfolios embody student work from every discipline with an emphasis on future academic and career goals. It depicts what one is learning about oneself and one's academic goals;
- depict the personal/professional plan that will help one to reflect on what one is doing outside the classroom and what is one learning. One is, therefore, able to explain the skills and knowledge one has learnt as a result of one's involvement on campus;
- help one to plan professionally and explore career paths;
- serve as a tool to map out one's plan and express one to others. It can also serve as a tool that will help one to keep track of information one will need when preparing for a job or university;
- help professors view the academic, personal and professional goals of a student to get a better understanding of why one is taking a particular course and assist one with his/her personal, academic and professional development; and
- help schools to develop some preliminary answers to questions relating to school improvement plan. These questions may pertain to:
 - i) What a student of the school should know and be able to do?

The answer to this question is the 'vision' of the qualities that a graduate should possess. The vision needs to be created by the school community, led by the

faculty that will be looking for those qualities in their classrooms. Digital portfolios contain the learning goals prescribed by the schools, which the learner has to attain. When a student enters a school, he or she will be given a blank portfolio, containing only screens. The student can browse through the goals and see what it is that he or she is expected to be able to know and do before graduating. One might also expect that incoming students will want to see benchmark performances in goal areas from earlier graduates' folders.

- ii) How can a student demonstrate the skills and knowledge that a common graduate should have?

Digital portfolios provide for such demonstrations by students through 'exhibitions' that provide the opportunity for students to demonstrate a skill or knowledge that is highly valued by the school. These exhibitions or performance based assessments- seminars, research projects, oral and written presentations and timed tests- are completed either individually or collaboratively in the portfolio by the student/s. It allows a school to see what its students have done and to show the community what the school itself is doing. While any kind of information could go into the digital portfolio — including the familiar transcript, report cards and standardised test scores — its strength is its ability to present authentic performance, such as exhibitions, in any media. Thus, digital portfolio, with exhibitions as its core content, presents not only the student but also the values and contours of the school community.

- iii) How can the school arrange its system so that all students can exhibit the desired skills and knowledge?

On the basis of the outcomes of students in the portfolio the school can re-look at all its systems -curriculum, pedagogy, assessment, scheduling, administration, and so on -in a sincere way to determine if the decisions it makes are helping students fulfill the vision.

8.7 EDUSAT- INDIA'S FIRST DEDICATED SATELLITE FOR DISTANCE EDUCATION

Indian Space Research Organisation (ISRO) launched a communication satellite called GSAT-3 for exclusive use of education sector. EDUSAT, the Indian Satellite in Education Programme launched in September 20 2004, is India's ambitious programme to harness satellite technology to reach students in every corner of the country. It aims to provide connectivity to schools, colleges and institutions of higher learning and support non-formal education including developmental communication.

Geographical Coverage

The Edusat is designed to serve for seven years. In these years, the 1950-kg satellite will provide five transponders in the KU Band, each one beamed to cover the northern, north-eastern, eastern, southern and western regions of the country while providing a 45 MBPS broadband link. Another KU Band transponder has the whole of India as its coverage. The KU Band radio signals transmitted, especially in the spot beams, are more

powerful than that of the KU Band on the INSAT-3B. This makes the Edusat signals capable of being received with a smaller satellite dish and consequently, the reception terminals become cheaper.

Besides the KU Band, there are another six transponders in the extended C Band. This constitutes a huge resource in bandwidth dedicated to education. The purpose is to connect classrooms with each of the satellite's five spot beams, providing educational programmes to thousands of students.

Usage

Universities and educational institutions will have a studio from where the class will be taken. The teaching can be with a blackboard or even with power point presentations. The lecture is filmed live and uplinked to the satellite, which then broadcasts it to the ground terminals. All colleges and study centres linked to the universities and institutions are provided with two sorts of reception systems- non-interactive and interactive. The non-interactive ones allow the talk with all the audio-visual material to be received. However, questions from the students to the lecturer have to be sent by alternate means, such as over telephone, short message service, fax or email. The interactive terminals, on the other hand, provide a voice channel for students to ask questions.

Services

- it reaches education to remote places where there is dearth of educational institutions, especially in higher education. It can make up for the shortage of teachers, especially in technical programmes. A single teacher/lecturer is able to reach thousands of students across the country/state at the same time;
- a wide range of expertise can be rendered. This teleconferencing mode renders expert and specialist knowledge to the students across the nation by high profile academicians, IT companies, technological institutions, etc. from one place/studio/headquarters. This ensures quality teaching learning environment;
- contents of a lecture, talk, discussion or debate can be stored in a computer file and the students can access it at any time. The content can be made available in CD to the students or learners;
- the primary and secondary schools can be equipped with reception terminals and programmes prepared by respective state education departments and agencies can be broadcast;
- the satellite system can be used to run programmes for soft skills, such as, leadership training, techno-entrepreneurship and career planning, where too the students need to compete with their peers; and
- it enables teacher training.

Edusat Initiatives

- Visvesvaraya Technological University, Karnataka became the first user, linking 120 affiliated engineering colleges to reach 1.3-lakh students in the State with a one way video and two-way audio channel. It has started the live full semester lectures;

- nearly 900 primary schools in Chamarajnagar district of Karnataka are equipped with reception terminals and programmes prepared by the Karnataka Government's Department of State Education, Research and Training are broadcast;
- Kerala has leveraged the telemetry potential of Edusat and linked 45 learning centres, spread across all 14 districts for two way audio and video interaction. Kerala's satellite backed educational initiative, 'Virtual Classroom Technology on Edusat for Rural Schools' (VICTERS), leverages the technology, bottom up, starting with school level education rather than the college and technical end;
- Kerala has launched an 'Eduserve' Project to create a large centralised repository of educational multimedia material. This will enrich the content of education material and can be shared by other states, saving duplication, time and money;
- the YCMOU, Nasik has been given reception terminals at the contact centres, especially those in remote areas. This would enable the subject expertise to reach all the students in such areas;
- the Haryana Government has launched Edusat at 151 government senior secondary schools in urban areas; and
- the nation wide beams are being harnessed by Indira Gandhi National Open University, National Council of Educational Research and Training and the All India Council for Technical Education to reach hundreds of Receive only Terminals and Satellite Interactive Terminals located in schools and colleges, many in remote areas.

Nodal Agency

The University Grants Commission funded 'Consortium for Educational Communication' and the 'Edusat Multi Media Research Centres' are the nodal agencies to help leverage Edusat's potential.

Cost

The reception terminals will have to be paid for by the users, though ISRO has helped users in the pilot phase in providing the reception terminals. Again, generating good content comes at a cost and educational institutions and universities have to pay for content generation.

What is still required is that more valuable content is to be generated to avoid valuable link time getting wasted. Satellite link, which is 24 hours every day has to be maximally used for purposes of information exchange and so appropriate material has to be produced.

8.8 CONCLUSION

It has been oft mentioned in the context of education that e-learning misses the human interaction part owing to virtual teaching and virtual classrooms and some critiques like R. S. Peters argue that the process is no longer 'educational in the highest philosophical sense.' There are others who point out that e-learning software developers tend to limit their focus on course delivery and content, while online education institutions require a much wider range of educational services, especially, the quality and feedback part of it.

No doubt these inhibitions are likely to be raised, especially, by the traditionalist. But these doubts can be solved with the help of a number of learning systems provided by the electronic mode. The web-conferencing programmes, such as, Macromedia Breeze facilitates face to face interactions between the teacher and the learner, thus enabling feedback and expert subject matter to the learners. Again 'blended learning' can be made available by either combining distance learning with direct contact 'close at hand' human educational resources; or combining software driven resources with human intervention (computer mediated- through email or chat; or non-computer mediated- face to face or telephone; or combining software driven resources with any other educational resource- TV, radio, books, tapes, etc.).

Also it is important that teachers or trainers should be made to adopt technology in their teaching styles to provide pedagogical and educational gains to the learners. Training programmes should transform the teachers from just being information consumers to that of information producers. They should not only use internet to access resources but they should be able to create, produce and expand this information and add to the information repository.

E-learning has, thus, rendered convenience of online learning to thousands of learners who can not avail the benefits of higher education due to several constraints, such as, of time, cost, geographical location, age, etc. ICT has enhanced distance learning. The teaching community is able to reach far flung areas and learners are able to access qualitative learning environment from anywhere and at anytime. E-learning has proved to be cost effective for both learners and institutions in comparison to the traditional learning. It has fuelled the growth of e-learners in the world today.

8.9 ACTIVITY

You have studied the useful role played by ICT in education and training. Narrate some e-experiments carried out by educational and training institutions in India/abroad.

8.10 KEY CONCEPTS

- | | | |
|-------------------------|---|---|
| Computer Based Training | : | is a general term that relates to all training that is delivered with the assistance of a computer. Delivery of CBT can be via CD, the internet or shared files on a network. |
| Educational Animation | : | depictions that support the learning of dynamic content by providing direct information about how changes occur over time. |
| Hyperlinking | : | a hyperlink or simply a link is a reference in a hypertext document to another document or other resource. As such, it is similar to a citation in literature. Combined with a data network and suitable access protocol, a computer can be instructed to fetch the resource referenced. Hypertext is a user interface paradigm for displaying documents which 'branch or |

perform on request.’ The most famous implementation of hypertext is the World Wide Web.

Managed Learning Environment : is a Virtual Learning Environment (VLE) combined with a Managed Information System (MIS).

Moodle : is a software package designed to help educators create quality online courses. Such e-learning systems are sometimes also called Learning Management System (LMS), Course Management System (CMS), Virtual Learning Environments (VLE), education via computer-mediated communication (CMC) or just Online Education. Moodle advocates social-constructivism as a pedagogical perspective, whereby learners construct their knowledge through discussions, thereby enhancing their thinking skills. Moodle works towards a student-centred learning solution by building upon a social-constructivist pedagogy.

Blog : is a website in which items are posted on a regular basis and displayed in reverse chronological order. The term blog is a shortened form of weblog or web log. Authoring a blog, maintaining a blog or adding an article to an existing blog is called ‘blogging’. Individual articles on a blog are called ‘blog posts’, ‘posts’ or ‘entries’. A person who posts these entries is called a ‘blogger’. A blog comprises hypertext, images and links (to other web pages and to video, audio and other files). Blogs use a conversational style of documentation. Often blogs focus on a particular ‘area of interest’, such as political goings-on.

Blogs can be hosted by dedicated blog hosting services, or they can be run using blog software on regular web hosting services. In the early 21st Century, blogging has quickly emerged as a popular and important means of communication.

A blog has certain attributes that distinguish it from a standard web page. It allows for easy creation of new pages: new data is entered into a simple form (usually with the title, the category and the body of the article) and then submitted. Automated templates take care of adding the article to the home page, creating the new full article page and adding the article to the appropriate date- or category-based archive. It allows for easy filtering of content for various presentations: by date, category, author or other attributes. It usually allows the administrator to

invite and add other authors, whose permission and access are easily managed.

Wiki

- : the name is based on the Hawaiian term wiki, meaning ‘quick’, ‘fast’, or ‘to hasten’ (Hawaiian Dictionary). A wiki is a type of website that allows users to easily add and edit content and is especially suited for collaborative writing. The term wiki also sometimes refers to the collaborative software itself (wiki engine) that facilitates the operation of such a website. In essence, wiki is a simplification of the process of creating HTML web pages combined with a system that records each individual change that occurs over time. Some wikis allow completely unrestricted access so that people are able to contribute to the site without necessarily having to undergo a process of ‘registration’ as had usually been required by various other types of interactive websites, such as, internet forums or chat sites.

A wiki enables documents to be written collectively in a simple markup using a web browser. A single page in a wiki is referred to as a ‘wiki page’, while the entire body of pages, which are usually highly interconnected via hyperlinks, is ‘the wiki’; in effect, a very simple, easier-to-use database. A defining characteristic of wiki technology is the ease with which pages can be created and updated. Generally, there is no review before modifications are accepted. Most wikis are open to the general public without the need to register any user account. Sometimes session log-in is requested to acquire a ‘wiki-signature’ cookie for autosigning edits. More private wiki servers require user authentication. However, many edits can be made in real-time and appear almost instantaneously online. This can often lead to abuse of the system.

World Links

- : is a global non-profit organisation whose mission is to improve educational outcomes, economic opportunities, and global understanding for youth through the use of information technology and new approaches to learning.

Microfiche

- : is one of the most compact analogue storage media that provides a comprehensive research library in institutions that could not otherwise afford the floor space. Each microfiche card holds about 100-130 pages depending on the size of the original. A library of 20,000 microfiche, that is, 10,000-20,000 books fits in a cabinet about 1.5×0.5×2 metres.

- Synchronous : provides for real time communication. The learner and the facilitator are online at the same time. It is a computer-assisted training where the instructor and participants are involved in the course, class or lesson at the same time. Learners receive the content on the screen and may communicate through internet or any other media. Web conferencing is an example of synchronous e-learning. Participants can log on with a trainer and interact with participants at multiple facilities or locations.
- Asynchronous : computer-assisted training where the instructor and the participants are involved in the course, class or lesson at different times. Participation can be through World Wide Web, threaded discussion boards, blogs and e-mail. Asynchronous mode allows participants to access training materials round the clock, even when other students and/ or instructor are not present. Rather, asynchronous communication mode may permit the learner and the facilitator not to be online at the same time.
- Threaded Discussion : is simply a chronological listing of people's comments (with their names linked to their comments). It is a web-based electronic bulletin board. It organises class discussions into easy to read threads (a thread is a single posted message from one person, and to read the thread you simply click on the thread to read the message). The professor or instructor poses a question for the student to answer, and then each student is responsible to respond to the question. It is very simple for students to use and is simple for faculty to customise to their own particular teaching needs.
- Each threaded discussion site may have a different look and navigation and will have information on how to use and participate in a discussion.
- Learning Management System (LMS) : is a software package usually on a large scale that enables the management and delivery of learning content and resources to students facilitating 'anytime, anywhere' access to learning content and administration. It is a system for management and tracking of the involvement of participants with specific content, usually with the assistance of a database. Typically, the system tracks who is scheduled to participate in specific training programmes, who has begun the programme, who has completed the training, and what were the

participants' test scores. At a minimum, the LMS usually allows for student registration, the delivery and tracking of e-learning courses and content, and testing and may also allow for the management of instructor-led training classes. In the most comprehensive of LMS, one may find tools, such as, competency management, skills-gap analysis, succession planning, certifications, virtual live classes and resource allocation (venues, rooms, textbooks, instructors, etc.). Most systems allow for learner self-service, facilitating self-enrollment and access to courses.

Some LMS vendors do not distinguish between LMS and LCMS, preferring to refer to both under the term 'LMS', but there is a difference. The LCMS, which stands for 'Learning Content Management System', facilitates organisation of content from authoring tools and presentation of this content to students via the LMS. LMS are based on a variety of development platforms, from J2EE-based architectures to Microsoft .NET, and usually employ the use of a robust database back-end. While most systems are commercially developed, free and open-source models do exist. All LMS cater to and focus on different educational, administrative and deployment requirements. Open source LMS is growing fast in the education and business world.

Authoring tools

- : is a software application used to create multimedia content typically for delivery on the World Wide Web. This can include several types of tools including: HTML editors and e-learning Authoring Tools.

An HTML editor is a software application for creating web pages. Authoring tools can enable, encourage and assist users (authors) in the creation of accessible web content through prompts, alerts, checking and repair functions. It is just as important that all people be able to author content as it is for all people to have access to it. The tools used to create this information must, therefore, be accessible themselves. Adoption of these guidelines will contribute to the proliferation of web content that can be read by a broader range of readers and authoring tools that can be used by a broader range of authors.

Hypermedia

- : an extension to hypertext that supports linking graphics, sound and video elements in addition to text elements. The WWW is a partial hypermedia system, since it

supports graphical hyperlinks and links to sound and video files. New hypermedia systems under development will allow objects in computer videos to be hyperlinked.

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8.12 ANNEXE

A. India Must Quickly 'Light Up' for Science

Without urgent new initiatives in cutting-edge, high-speed networking in research and education, India will fall further behind the world leaders.

Despite its claim to the status of a software superpower, India stands virtually at the bottom of the world table when it comes to high-speed networking and digital connectivity dedicated to research and education. This is the conclusion of an International Committee of Scientists dedicated to the task of monitoring and promoting networking and connectivity initiatives for research communities across the world.

Using data from the worldwide passive monitoring of networks, the Committee found that India lags at least ten years behind the world leaders, the United States and Western Europe. It is at least three to four years behind countries, such as, Brazil and China, and only two to three years ahead of the Central Asian Republics and Africa.

This gap, the Committee warns, has been widening steadily and will worsen without urgent new initiatives. The urgency of the problem can be gauged by comparing the development of networking in Brazil and India over the past six years. While both countries had 1 mega bit per second (Mbps) connectivity in 2000, the core of Brazil's research network today has 10 gigabit per second (Gbps) connectivity, the standard for high-speed networking in the United States and Europe. Indian science can currently muster only a maximum of 622 Mbps, an international link for demonstration purposes between the Tata Institute of Fundamental Research (TIFR) and Japan. Scientists at TIFR, Mumbai, where the demonstration is currently situated are hopeful of making this a permanent link. Among the networks being planned or partially implemented, the National Grid Computing Initiative GARUDA – being implemented by the Centre for the Development of Advanced Computing (C-DAC), Pune, and the Educational and Research Network (ERNET) – envisages the fastest network speeds with 100 Mbps as access bandwidth.

Harvey Newman, Professor of Physics at Caltech, USA, and the Chair of the Standing Committee for Interregional Connectivity of the International Committee on Future Accelerators (ICFASCIC) that authored the report, presented this data in his lecture at the Sixth International Conference on Computing in High Energy and Nuclear Physics (CHEP06) currently being held at TIFR. Speaking after his presentation, Professor Newman said that there appeared to be no organisation in India charged with the mission of providing leading-edge high-speed bandwidth to education and research. China, on the other hand, handed over 30,000 km of 'dark fibre' rolled out some years ago to CERNET, its educational and research network, to 'light up.' This network is currently moving to a 10 Gbps backbone. This follows the worldwide trend of national education and research networks acquiring or moving to acquire 'dark fibre' expressly for education and research purposes.

A senior Indian networking specialist agreed that the need for a dedicated, cutting-edge, high-performance research and education network, supported by government and industry, was not appreciated in India. This had led to a significant lag in development of research network infrastructure in India, affecting support to science and engineering research and education. In response to a question about Indian ownership of a good fraction of international bandwidth, Professor Newman said the 'available bandwidth does not mean just the size of the cable.' Suitable equipment and installations were needed effectively to utilise the cable for actual connectivity that would be available for other organisations to service the users.

Professor Newman said the growth of connectivity also depend crucially on the business model in place for the pricing of bandwidth. If the goal was substantially to recover cable cost by charging the initial customers heavily and utilising only a small part of the capacity, then the explosive growth of digital connectivity seen elsewhere would not happen. A better model was one in which most of the capacity was available for use early, and research and educational users were encouraged to demonstrate the potential of the high available bandwidth. A suitable concessional tariff for the research and education sector would more than repay the concession in its contribution to development work and in the demonstration effect for the potential customer base.

Senior Indian high-energy physicists at the Conference privately concurred with the assessment of their foreign colleagues on the inadequacy of networking for research and education in India. However, Professors Atul Gurtu and Sunanda Banerjee of TIFR were hopeful of starting a fresh chapter with the current negotiations for their 622 Mbps link through VSNL, which are likely to yield a price that would be competitive by international standards.

T. Jayaraman

Feb. 17, 2006, The Hindu

B. Smooth Passage from Books to Bytes

Extending the reach of libraries through e-books

Five –minutes walk away from the Bugis station of Singapore's Mass Rail Transit system, a spanking new sixteen-storey tower block is testimony to the fact that the era of digital libraries is already here. While e-books or electronic versions of books have been available for at least two decades, the island state is arguably the first to translate the

technology into a virtual reality for its citizens.

And not just for readers in Singapore. From Bangalore, I could register within minutes to become a user of Singapore's National Library at its portal, www.nlb.gov.sg and access an awesome range of resources – including its newly created digital library.

Tamil Works Repository

This includes e-books and dozens of special databases. A link took me to the National Library Board – World e-book library, where I could locate the archives of Project Madurai – a repository of rare Tamil works. In seconds, I located Kalki's classic novel 'Sivakamiyin Sabadam' and could download the first 47 chapters in PDF format.

The library's registered readers in Singapore have the option of downloading and reading at home up to four books at a time – the same number that they were able to hitherto borrow.

The collection includes many recent publications for which the library has obtained the rights to electronically distribute; the titles tend to be popular works of both fiction and non-fiction.

From India, I could also access the digital collection of the British Library in Singapore, which is linked by the National Library. This contains many rare books and pictures, which are part of Singapore's history.

Indeed the total number of e-book resources is already over 500,000. Dozens of periodicals in English, Chinese and Tamil – the island's official languages – are also available for online reference, although some are restricted to within the system's 24 libraries.

Doubling Resources

The physical collection housed in the National Library Board headquarters is just over 600,000 items – so one can see how quickly the e-library option can help a library scale up and almost double its searchable resources.

Having become the first in the world to harness the technology of RFID – Radio Frequency Identification – to tag every book in its collection, Singapore's National Library has gone where few libraries have ventured – into an e-enabled digital future.

Indian Niche

Interestingly, the mechanics of e-publishing – converting printed texts into-machine-readable electronically distributable versions – is something of an Indian niche.

Tech Books, Versaware, First BPO...these are just three in a long list of names of e-publishing specialists, which have an operation in the Maharashtrian city of Pune that involves dozens of subject experts who help fuel the electronic versions of leading international technical journals and books. Tech Books, in fact, is a Singapore-based corporate.

Anand Parthasarathy

Jan. 5 2006, The Hindu

UNIT 9 E-COMMERCE

Structure

- 9.0 Learning Outcomes
- 9.1 Introduction
- 9.2 E-commerce: Meaning and Tools
 - 9.2.1 Intranet
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- 9.3 E-commerce: Benefits
 - 9.3.1 Organisations
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 - 9.3.3 Society
- 9.4 E-commerce: Limitations
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 - 9.4.2 Non-Technical Limitations
- 9.5 Electronic Payments
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- 9.9 Computerisation of Treasury System
- 9.10 Conclusion
- 9.11 Activity
- 9.12 Key Concepts
- 9.13 References and Further Readings

9.0 LEARNING OUTCOMES

After studying this Unit, you should be able to:

- explain the meaning of e-commerce;
- describe the ICT tools applied in processing commercial transactions;
- examine the benefits and limitations of e-commerce;
- explain the meaning of electronic payments and electronic markets;
- highlight the role of ICTs in banking operations; and
- describe the role of computerisation in facilitating the treasury system.

9.1 INTRODUCTION

The enormous potential of Information and Communication Technologies (ICTs) to fundamentally transform the nature of economic growth and development has induced both wide-ranging hopes and apprehensions. ICTs are fast flowing phenomenon with rapid and successively overlapping waves of technical advancements and market transformation. The induction of ICTs has provided a platform for economic growth in the countries across the world.

In this Unit, we will discuss the applications of ICT in the financial and commercial sector of the economy. We will discuss about various applications such as e-payment, e-trading, e-markets, e-banking and e-treasury that facilitate e-commerce. To begin with, we will explain the meaning of e-commerce and various tools facilitating it.

9.2 E-COMMERCE: MEANING AND TOOLS

Conducting business electronically using networks and internet is known as electronic commerce. Electronic commerce (EC) is an emerging concept that describes the buying and selling of products, services and information via computer networks, including the internet. EC uses several technologies ranging from Electronic Data Interchange (EDI) to e-mail for commercial transaction processing.

EC applications began in early seventies with innovations, such as, electronic transfer of funds. However, the applications were limited to large corporations and a few small businesses. Then came Electronic Data Interchange (EDI), which expanded EC from financial transactions to other kinds of transaction processing and extended the types of participating companies from financial institutions to manufacturers, retailers and other forms of business. Today, EC is rapidly outgrowing its limited operational sphere to everywhere in the entire globe.

Intranet, Extranet and requisite computer hardware and software are used in processing EC transactions. We will now discuss these tools individually.

9.2.1 Intranet Commerce

The use of intranet is increasing rapidly not only as an internal communication system, but also as a facilitator of electronic commerce. It uses internet-based technology to provide access to a variety of information on a firm, most of which would otherwise require multiple software licenses, substantial data conversion time and different user interfaces. Intranets can facilitate electronic commerce inside a corporation, as they can be used in selling corporate products to employees and/ or selling or trading services and products among business units. Intranet can facilitate external trade as well.

Intranet can facilitate transaction processing in the following ways:

- **Efficient Transaction Entry**

Wherever appropriate, data needed by systems to support financial functions are entered only once and are updated through electronic means, consistent with the timing requirements of normal business or transaction cycles. This helps in reducing errors in transactions, as they are now maintained electronically.

- **Common Transaction Processing**

Common procedures are used for processing similar kinds of transactions, which permit the transactions to be reported in a consistent manner.

- **Consistent Internal Controls**

Internal controls over data entry, transaction processing and reporting are applied consistently throughout the system to ensure the validity of information and the protection of financial resources (Source: unknown).

Intranet is well suited to replace many paper-based information delivery systems within a firm, resulting in lower costs, easier accessibility and greater efficiency. Client access to certain parts of a firm's intranet via an extranet is a value-added service at relatively low cost that acts as a powerful marketing and communication tool.

9.2.2 Extranet Commerce

The exact definition of an extranet is still evolving, but the most universally accepted one is a network that links business partners to one another over the internet by tying together their intranets. The term 'extranet' comes from 'extended intranet'. The main goal of extranet is to foster collaboration between organisations.

An extranet uses the same basic infrastructure components including services, TCP/IP, e-mail and web browsers as the internet. It makes communication over the internet secured. It links the company's intranet with suppliers, customers and trading partners. Extranet may be used, for example, to allow inventory databases to be searched by outsiders or to transmit information on the status of an order. An extranet enables people who are located outside a company to work together with the company's internally located employees.

An extranet, like an intranet, is typically protected by a firewall and is closed to the public. It is open to selected suppliers, customers and other business partners who access it on a private wide area network over the internet or on a Virtual Private Network (VPN), which increases security and functionality.

9.3 E-COMMERCE: BENEFITS

Few innovations in human history encompass as many benefits as electronic commerce. The global nature of technology, low cost, opportunity to reach millions of people, interactive nature, variety of interaction possibilities and resourcefulness and rapid growth of the supporting infrastructure, especially the internet, result in many benefits to organisations, individuals and society. These benefits are just starting to materialise, but they will increase significantly as EC expands.

We will discuss the benefits of EC in terms of:

- Organisations
- Consumers; and
- Society

9.3.1 Organisations

EC expands the market place to national and international markets. With minimal capital outlay, a company can easily and quickly locate more customers, best suppliers and most suitable business partners world wide. In addition, it:

- decreases the cost of creating, processing, distributing, storing and retrieving paper-based information;
- allows reduced inventories and overhead by facilitating 'pull-type supply chain management'. In a pull-type system, the process starts from customer order and uses just-in-time processing. This allows product customisation and lower inventory cost;
- reduces the time between the outlay of capital and receipt of products and services;
- supports Business Re-engineering Process efforts. When processes are changed, productivity of salespeople, knowledge workers, and administrators can increase by cent percent or more;
- lowers telecommunications cost; internet is much cheaper than value-added networks (VANs);
- helps small businesses to compete with large companies;
- enables organisations to reach customers outside their immediate area at a minimum cost;
- allows organisations to reach a wide range of suppliers, thereby reducing the cost of supplies and services;
- permits the creation of efficient markets in an industry in which buyers and sellers can share benefits;
- allows companies to auction surpluses or obsolete products quickly with little expenses; and
- facilitates global trade, allowing companies to penetrate foreign markets.

9.3.2 Consumers

EC:

- provides customers with more choices; they can select from many vendors and from more products;
- frequently provides customers with less expensive products and services by allowing them to shop in many places and conduct quick comparisons;
- allows quick delivery of products and services;
- enables customers to shop or do other transactions 24 hours a day, year round, from almost any location;
- permits customers to receive relevant and detailed information in seconds, rather than in days or weeks;

- enables consumers to get customised products from PCs to cars at competitive prices;
- makes it possible to participate in virtual auctions;
- allows customers to interact with other customers in electronic communities and to exchange ideas as well as compare experiences; and
- capitalises on the general movement from a market-centric to a customer-centric environment.

9.3.3 Society

EC:

- enables more individuals to work at home and to do less travelling, resulting in less traffic on the roads and lower air pollution;
- allows some merchandise to be sold at lower prices, so less affluent people can buy more and increase their standard of living;
- enables people in third world countries and rural areas to enjoy products and services that otherwise are not available to them. This includes opportunities to learn professions and earn college degrees; and
- facilitates delivery of public services, such as government entitlements, by reducing the cost of distribution and increasing the quality of the distributing system.

9.4 ELECTRONIC COMMERCE: LIMITATIONS

There are technical and non-technical limitations in the successful implementation of EC in the country. We will discuss the technical and non-technical limitations separately.

9.4.1 Technical Limitations

The technical limitations are as below mentioned:

- there is lack of system security, reliability, standards and communication protocols;
- there is insufficient telecommunication bandwidth;
- software development tools are still evolving and changing rapidly;
- there are difficulties in integrating the internet and EC software with some existing applications and databases;
- there is need for special web servers, in addition, to the network servers (additional cost);
- there is possible problem of interoperability, meaning that some EC software do not fit with some hardware or is incompatible with some operating systems or other components; and
- accessibility to the internet is still expensive and/or inconvenient for many potential customers.

However, these limitations can be overcome with time. Appropriate planning can help in minimising them.

9.4.2 Non-Technical Limitations

Other than technical issues, there are non-technical issues that centre EC. These issues are given below:

- many legal issues are yet unresolved;
- government regulations and standards are not refined enough for many circumstances;
- benefits of EC, such as, web advertisements are difficult to measure. In addition, the methodologies for justifying EC are still in the developmental stage;
- EC is still evolving and changing rapidly. Many people are looking for the situation to stabilise before they enter EC operation;
- customers resist change. To switch from a real to a virtual store may be difficult for many people. It seems that people do not yet sufficiently trust paperless, faceless transactions;
- there are not enough support services. For example, copyright clearance centres do not exist and quality evaluators or qualified EC tax experts are rare;
- there is a perception that EC is expensive and unsecured, so many do not want to use it yet;
- there is not yet sufficiently large number (critical mass) of sellers and buyers that is needed for profitable EC operations; and
- EC could result in breakdown of human relations.

Despite these limitations, rapid progress is occurring in EC. As experience accumulates and technology improves, the ratio of EC benefits to cost will increase, resulting in a greater rate of EC adoption.

9.5 ELECTRONIC PAYMENTS

In EC, payments between buyers and sellers can take place electronically or can be done off line. There are different modes of e-payments. Some of them are briefly mentioned below:

- **Electronic Cash**

Despite the use of cheques, credit cards and other methods of payments, cash is still the most prevalent consumer payment instrument. Merchants prefer cash as they do not have to pay commission to credit card companies and they can put the money to use as soon as it is received. In addition, some people pay with cash because they do not have cheques or credit cards, or they want to preserve their anonymity.

- **Electronic Cheques**

E-cheques are similar to regular cheques. They are secured by public-key cryptography and are even suitable for some micro payments. Here is how they work:

Step one

The customer establishes a electronic cheque service with a bank or financial institution;

Step two

The customer contacts a seller, buys a product or a service, and e-mails an encrypted electronic cheque; and

Step three

The merchant deposits the cheque in his or her account; money is debited in the buyer's account and credited to the seller's account.

Like regular cheques, e-cheques carry an encrypted signature that can be verified. The payer can attach additional information to the cheque. Properly signed and endorsed e-cheques are exchanged between financial institutions through electronic clearinghouses. An e-cheque can also be used as a payment instrument in EDI applications.

- **Electronic Payment Cards**

Electronic payment cards have been in use for several decades. The best known are credit cards, which use magnetic strips that contain limited information, such as the card's number. A more advanced form of this card is the one that you use in your library to pay for photocopies or to pay for telephone calls. Such cards store a fixed amount of prepaid money and each time you use the card the respective amount is reduced.

However, e-payments are not commonly made use of due to the following reasons:

- **Lack of Security**

Securing payments is complicated and expensive. There is no single established standard for providing security for transactions on the internet. Multiple competing standards create confusion for customers and merchants.

- **Handling Micro Payments**

Many electronic commerce transactions are valued at only a few dollars or cents. The cost of processing such micro payments needs to be very low as one would not want to pay \$5.00 to process a purchase valued at only a few dollars, especially, when many payments are even less than \$1.00.

- **Inconvenience**

The buyer must find the transaction convenient. Buyers like to select a payment method, such as, using a credit card that gives them free use of money for up to 50-60 days. However, credit card processing is too costly for micro payments.

- **Incompatibility**

There must be compatibility between the buyer and seller with respect to the methods and standards of payment. If you like to pay with electronic cash, for example, the vendor must be able to accept it.

For these reasons, many EC transactions include non-electronic or semi-electronic payments. For example, when you place an order electronically, you give your credit card number over the telephone or mail a cheque. However, paying with such traditional and non-electronic methods too has several limitations.

To increase security of e-payments, a sender can sign a message electronically with what is called a digital signature. Again, electronic certificates can be issued by a trusted third party, called a Certificate Authority (CA) to verify that specific public keys belong to specific individuals. In addition to a name, a certificate may verify age, gender and other attributes of the individual to whom the public key belongs. In addition, if the CA is not well known to the user of the certificate, it may be necessary to certify the CA by another more trustworthy legal body. Certificates are valid till the expiration date. It has to be signed by the CA. To assure that a specific sender has indeed sent a given message, the sender attaches his or her digital signature by using his or her own private key. The receiver can use the sender's public key to verify that the specific sender has sent the message. The given message and the digital signature are transmitted together but are encrypted in two different keys by the sender and decrypted in two different keys by the receiver. This will help in ensuring security for both the sender and receiver.

9.6 ELECTRONIC TRADING SYSTEM

ICTs have created paradigm shift in the securities market operations through electronic trading system. Stock exchanges all over the world have realised the potential of the new technologies and have moved on to electronic trading systems. The major changes that have swept the international financial markets since 1975 have been accelerated by the use of computers. Enormous strides were taken towards the computerisation of trading systems in both financial markets and brokerage office. In the late 1980s and in the 1990s the developing countries also moved towards liberalisation of stock markets as part of their reform programmes and attempted to attract foreign capital.

The electronic trading system (ETS) pioneered by US plays a critical role in stock trading. ETS is a set of computer terminals connected via high-speed communication lines to a central host computer. It involves the use of the internet as the medium to communicate orders to the stock exchange through a broker's website. Bids (buying), offers (selling) and trade requests can be entered from even remote terminals. Once a trade is done, confirmation is almost instantaneous and reported immediately to the investor. Computerised order routing and trading has not only enhanced the efficiency of order execution but has also led to the development of new products and trading techniques. ETS has been employed in some instances to replace and in others to complement traditional physical open outcry markets.

9.7 ELECTRONIC MARKETS

Electronic markets are rapidly emerging as a tool for conducting business and commercial transactions. A market is a network of interactions and relationships where information, products, services and payments are exchanged. When the marketplace is electronic, the business centre is not a physical one but a network-based location where business interactions occur.

In electronic markets, the principal participants-transaction handlers, buyers, brokers and sellers-not only are at different locations but seldom even know one another. They meet online or through the web and all necessary transactions including transfer of money are handled electronically through the net.

Electronic Retailing and Malls

For generations home shopping from catalogues has flourished and television-shopping channels have been attracting millions of shoppers for over a decade. However, television shopping is limited to what is shown on the screen and paper catalogues are sometimes inaccurate. Who would not enjoy the convenience of shopping just by sitting down in front of a computer? The web is open 24 hours a day, 7 days a week, offering a wide variety of products including the most unique items, usually at a lower price. And even if you have to pay the same price, you do not have to spend time for the same or wait for salespeople or push your way through hordes of shoppers. And frequently, you can get your package the next day at no extra cost. Finally, you can shop from anywhere at any time.

Electronic retailing is direct sale (business to customers) through electronic storefronts, usually designed around a catalogue format. Some companies, such as, Wal-Mart sell to corporations as well, usually at discounts for larger quantities. Electronic retailing is mushrooming on the web. There are two types of vendors, namely, solo storefronts and electronic malls. Solo storefronts maintain their own internet name and web site and may or may not be affiliated with electronic malls. Whereas, electronic mall, also known as cyber mall, is a collection of individual shops under one internet address. The basic idea of an electronic mall is the same as that of a regular shopping mall, to provide a place that offers many products and services at one location. Some cyber malls include diverse stores, while others deal with one type of goods, such as, clothing or sporting goods etc.

ICT also enables one stop shopping over multiple malls known as meta malls. Meta malls allow customers to shop in different department stores and many individual stores using one search engine to find items. In addition, it enables the customers to pay only once in a highly secure system. Meta mall can provide other services, such as, comparative pricing and finding substitute products.

9.8 ICT AND BANKING

ICTs are also being used in the banking sector facilitating banking operations and transactions. With the application of ICTs in banking operations and computerisation of banks, banking activities have become easy, efficient, speedy and transparent. With the setting up of ATMs one may get the banking services at any place in the country.

This has lessened long queues in the banks. Rendering online banking services has offered users an unprecedented level of control over their finances. Electronic banking has enabled capabilities ranging from paying bills to securing loans electronically.

There's no waiting until the monthly statement to find out the awful truth about that sudden shopping spree. With a few mouse clicks you can move money to or from other accounts, maximising the interest you receive on savings or minimising bank charges.

While online banking gives you control, many of us may still be worried that if we can view such sensitive information online, then so can others. The banking industry insists that

its security technology has improved and the customers can have confidence in the system.

9.9 COMPUTERISATION OF TREASURY SYSTEM

With computerisation of treasuries, the efficiency and accuracy of financial transactions had been improved tremendously. The Treasury Information System (TISNIC) – version 3.0 software helps in:

- bill passing;
- budget controlling;
- on line cheque generation;
- receipt accounting; and
- accounting through computer at the treasury level and generating information for the State Government, Financial and Statistical Directorate, DDO's, HOD's, etc.

9.10 CONCLUSION

There is a profound impact of ICTs on the functioning of vital sectors of the economy today. Commerce, trade, agriculture, banking, rural development is affected by the electronic transformation being brought about by various technologies like internet and web. Financial and commercial transactions have been facilitated through electronic mode of payments, electronic trading system, electronic markets and electronic banking. Infrastructure in the form of institutions for software development, more resources in terms of finances and professionals and security is very much required to make e-economy more viable.

9.11 ACTIVITY

1. By now you would have got enlightened with the role and applications of ICTs in various sectors of our economy. Please let us know the role played by ICTs in budgetary functions of the government.
2. Narrate about any experiment or software existing for rural economic development in our country.

9.12 KEY CONCEPTS

E-commerce	: business that is conducted over the internet using any of the applications that rely on the internet, such as e-mail, instant messaging, shopping carts, web services, UDDI, FTP, and EDI, among others. Electronic commerce can be between two businesses transmitting funds, goods, services and/or data or between a business and a customer.
EDI	: short for Electronic Data Interchange, the transfer of data between different companies using networks, such as VANs or the internet. As more and more

companies get connected to the internet, EDI is becoming increasingly important as an easy mechanism for companies to buy, sell and trade information. ANSI has approved a set of EDI standards known as the X12 standards.

- Extranet : a buzzword that refers to an intranet that is partially accessible to authorised outsiders. Whereas an intranet resides behind a firewall and is accessible only to people who are members of the same company or organisation, an extranet provides various levels of accessibility to outsiders. You can access an extranet only if you have a valid username and password and your identity determines which parts of the extranet you can view. Extranets are becoming a very popular means for business partners to exchange
- TCP : abbreviation of Transmission Control Protocol and is pronounced as separate letters. TCP is one of the main protocols in TCP/IP networks. Whereas the Internet Protocol deals only with packets, TCP enables two hosts to establish a connection and exchange streams of data. TCP guarantees delivery of data and also guarantees that packets will be delivered in the same order in which they were sent.
- WAN : a computer network that spans a relatively large geographical area. Typically, a WAN consists of two or more local-area networks (LANs). Computers connected to a wide-area network are often connected through public networks, such as the telephone system. They can also be connected through leased lines or satellites. The largest WAN in existence is the internet.
- Pull type : to request data from another programme or computer. The opposite of pull is push, where data is sent without a request being made. The terms push and pull are used frequently to describe data sent over the internet. The World Wide Web is based on pull technologies, where a page isn't delivered until a browser requests it. Increasingly, however, information services are harnessing the internet to broadcast information using push technologies. A prime example is the PointCast Network.
- VAN : Value Added Network refers to a private network provider that leases communication lines to its subscribers. VANs provides specialised services, such as, assisting with EDI, extra security, message delivery or access to a particular database.

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UNIT 10 DELIVERY OF CITIZEN SERVICES: ROLE OF ICT

Structure

- 10.0 Learning Outcomes
- 10.1 Introduction
- 10.2 Citizen Services: Areas of ICT Intervention
- 10.3 Delivering Citizen Services: Role of ICT
- 10.4 Service Delivery Points
- 10.5 Major Essentials
- 10.6 Conclusion
- 10.7 Activity
- 10.8 Key Concepts
- 10.9 References and Further Readings

10.0 LEARNING OUTCOMES

After studying this Unit, you should be able to:

- explain the role of ICTs in rendering citizen services;
- describe the various service delivery points for citizen services; and
- discuss the major essentials to render effective public service delivery.

10.1 INTRODUCTION

ICTs are transforming the way life goes about. They have a huge potential to transform the paradigms of governance. ICTs entail connectivity and networking thereby making the delivery of services offered by governments better. While talking of governments, local self-governments deserve maximum attention as they are at the cutting edge and immensely affect the daily lives of citizens.

Local governments are the principal users and disseminators of information at the local level. However, the general perception is that they are not able to do a good job of it. Just as the survival of any business depend upon the material and mental satisfaction of its customers, survival of local bodies hinges on the contentment of its citizens. The exploration of this interface - the areas where government and citizens meet- is vital to our understanding of where and how technology should intervene to make this interface more transparent and less bothersome for both the partners.

In this Unit, we will be discussing the vital areas of citizen-government interface at the local level and how ICTs can be used in making this interface effective.

10.2 CITIZEN SERVICES: AREAS OF ICT INTERVENTION

There are number of areas in citizen services where ICTs can make a marked difference, especially, in the quality and speed of delivery. These services are encapsulated below:

- **Access to Public Documents**

Various government orders, schemes, programmes, annual budgets, gazette notifications, legislation materials like ordinances and bills, etc. can be accessed through the net. This category would cover all those areas where the citizens need information, quick and accurate from the government, which at present they get it with great difficulty. With ICTs citizens get information in real time without exorbitant communication costs.

- **Authentication Statements**

This would include the areas where the citizens need certificates of authentication from competent authorities in government like the copy of land records, registration certificate of sale and property deeds birth/death certificates, and other permissions required under various acts of government. This requires comprehensive database, which are sorted, consolidated, maintained, calculated and read with the help of computers. Hence, retrieval of certificates becomes easy and less cumbersome.

- **Online Payments**

Payment of taxes, duties, rents and rates including user charges for facilities offered by government departments is possible through internet. Payment of electricity, telephone, and water charges would also come under this.

- **Complaints, Grievances and Suggestions**

Filing, redressal and follow up of complaints pertaining to the facilities offered by government can be done online. ICTs can enable citizens to ventilate their grievances online and also help government to get feedback of their policies, pronouncements and actions.

10.3 DELIVERING CITIZEN SERVICES: ROLE OF ICT

ICTs play a crucial role in delivering citizen services. We will discuss this role in some of the vital areas.

- **Online Filing of Complaints and Grievances**

This will enable online filing, redressal and follow up of complaints pertaining to services offered by government. It will help citizens to ventilate their grievances online and also help government to get feedback on their policies, pronouncements and actions.

Hence, it becomes possible for departments to attend to grievances and complaints with alacrity and promptness. Every grievance gets acknowledged and transferred online for field level action. This can also provide for forwarding and transfer of complaints from one officer to another thereby minimising time which it would take in the normal course. One can also find out the number of grievances pending with various officials at a given instant that would prove to be very useful in monitoring the efficiency of various sections.

As internet connectivity and linking is there, it becomes possible for any officer to monitor the complaints received by him from anywhere and allows him the facility to issue virtual instructions for taking immediate remedial actions. Equally, citizens can also verify and track online the status of grievance disposal.

- **Online Application Registration**

There are hosts of services and programmes for which citizens approach various tiers of government. These services range from getting a loan under self-employment schemes to applying for an old age pension or asking for subsidised agricultural inputs. Instead of moving from offices to offices and getting harsh responses, citizens can use the net for availing information and downloading applications of various programmes. This facility can provide for online forwarding, transmission, handling and disposal of such requests and therefore minimise the disposal time.

- **Issuance of Certificates Online**

There are many kinds of certificates citizens require from governments, the important ones' being of caste, nativity and income. Online facility will permit hospitals to send the births and deaths information online to municipal departments. Information from the registrant would come through the virtual mode instantly without any mediation. Citizens will be able to get their certificates delivered to them in real quick time. By maintaining the database of births and deaths on the computer, the process of sorting, searching and accessing the database becomes very simplified. The citizens will be able to get their records updated as they have the facility of checking whether their name is registered or not through the web site.

The underlying principle behind this is that citizens always loathe approaching a government department for the fear of getting discourteous behaviour and being subjugated to corrupt practices. Such modules can, therefore, improve this interface, making it more accountable, open, transparent and subject to public scrutiny.

- **Online Tracking of Building Plans**

Municipal corporations engage in the task of approving building plans, sub-division of plots and regularisation of structures within city limits. With this facility citizens are able to know the status of their respective cases. With municipal websites, all information pertaining to building plans are made available to public. They are able to know the status of their application at a click of a button.

With this module, entire process of scrutinising, processing and sanctioning of building plan can be computerised. This would allow online tracking and monitoring of movement of any concerned paper within the town planning section. This would also allow the section in meeting statutory deadline set for release of plans and would also allow citizens gain access to status of disposal of their applications. In longer run, it would be important to create the building plan data base so that citizens are able to know the exact nature of approvals given and are not lured into buying unapproved buildings creating future complications for themselves.

- **Issuance of Land Records Online**

Information relating to land plays a very important role. These may include primary information about land presented in terms of its geological information like the shape, size, landforms and soils; economic information related to land use, irrigation and crops; and information pertaining to legal rights, registration and taxation. The manual system of land records maintenance is highly opaque wherein village accountants maintain land records and they enjoy a virtual monopoly over these records. Records are not open to public scrutiny and are updated many a times only on various considerations. Many a times, farmers face harassment and extortion at the hands of village officials for provision of land records and also for processing requests for change in land titles.

The Seventh Five-Year Plan document rightly opined, ‘land records form the base for all land reforms and therefore, regular periodic updating of land records is essential in all states.’ This module aims to fulfil this statement and supports development of a citizen-centric land records system. It places land records data into the public domain and provides for a transparent and effective land record delivery system fully addressing the insecurities and concerns of farmers.

Now farmers are able to get records in time by applying for it online. Updating has become easy and the process of mutation (change in land title) has also become manageable. It is now even easy to check the pendency of such applications.

- **Online Auction and Bidding**

One fundamental reason for rural-urban divide is lack of well-developed markets in rural areas, hindering efficient sale and purchase of goods by rural people. As a result, most of the decisions made by farmers and rural poor are based on insufficient information and are, therefore, sub-optimal and in majority of cases go against them. The online auction and bidding facility can try to fill in these information gaps and allow the farmers and rural folks the facility to post their products for online auctions. This would also allow online bidding. With the portal being vertically integrated through internet, online queries from other parts can improve the available choices.

The kind of products that can be put for auction may include agricultural commodities, farm implements, land or buildings, etc. that is, literally anything that a rural household would like to buy or sell in rural areas. It also opens possibility for self-help groups to market their products directly, without any middlemen, to people horizontally within the district and vertically outside. This can open windows of opportunities to rural populace to have more informed choices in their trades.

- **Online Mandi (Market) Rates**

Ideally, average households make a decision to buy or sell goods and products on the basis of information they collect locally. Communication facilities like telephone, television, etc. has widened their information base. Nonetheless, it would have been much better if they had an easy access to rates prevailing as on that moment in various other markets within the district and elsewhere. Such modules can help do that. The rates in other markets can be available for citizens to watch the trends and make right decision after weighing all options.

- **Online Payment of Dues**

Financial management of governments hinges on a sound, transparent, efficient and foolproof tax collection system. Equally, citizens require an easy and flexible system to pay their taxes and dues. This module enables a friendlier environment for both government and citizens through online collections. This would provide the benefit of expeditious collections, collection costs saving and collection performance monitoring.

- **Easy Access to Information**

In pursuance of the Right to Information Act, this facility allows access to all kinds of valuable information to citizens with respect to government programmes, databases pertaining to old age pensions, ration cards, multi purpose household survey records, beneficiaries under various self-employment schemes, civil works, etc. This induces transparency in the implementation of these programmes and facilitates weeding out of ineligible cases, so that corresponding benefits can be passed down to the needy. Such mechanisms would reaffirm that real right to information is possible only if the information is put into the public domain and new technologies provide the most cost effective solutions for doing that.

In order to deliver the services mentioned above, multiple service delivery points are needed. We will now discuss these delivery points individually.

10.4 SERVICE DELIVERY POINTS

Websites, internet and civic service centres are delivery points of citizen services. These are discussed as below:

- **Websites**

The world wide web or the internet provides the most cost-effective method of reaching out to people. The web not only helps in speedy dissemination of information but also enables citizens to gain access to various services, which hitherto required their physical presence. In order to realise this objective, a web site for an organisation is must.

Evolution, development and maintenance of web site can be done on a public private partnership platform to infuse more energy, ideas and vibrancy in the effort. While developing web site, it should be made clear that it should not merely be information driven but should be utility driven and should act as a window to the outsiders to gain access to the organisation's intranet and local area network. While the static page information can be hosted on a foreign server, the dynamic pages should be hosted in the organisation and should be accessed through it. By doing this, the necessity of continuous updating and uploading of information, which has become the bane of most web sites, can be avoided. All the dynamic pages would take their inputs regularly as part of the in house computerised network and would get updated sub consciously.

Website at the click of a button should enable the citizens to see, for example, their property dues as on that moment or access birth and death records to check their entries. Citizens can also look at the infrastructure works being taken up in their cities while contractors can access the various tender notices. A builder can check the status of disposal of building application made by him while citizens should be able to track the

status of disposal of complaints or grievances made by them through the site. All relevant government rules and procedures should be notified in the web. In addition, it should provide the entrepreneurs possibilities and business opportunities, which the town entails. Web site can also carry linkages to the office intranet for the management, allowing them to gain access to it from any where by using their specific password.

Besides all these utilities, web site should also give the citizens information relevant to their city like weather, news, places to visit, train and bus timings, etc.

- **Civic Service Centres - A One Stop Civic Shop**

Not everybody in the country like ours has access to internet or much more so the knowledge of computers. To mitigate this, it would be necessary to establish computerised civic centres, which can act as an outlet for citizens to have access to civic services. The civic centres would have string of computers on the network and would allow citizens to avail facilities like getting a death/birth certificate, filing a water tap/ drainage connection request, applying for building plan approval, lodging a complaint/grievance, making miscellaneous payments, etc.

A unique registration number can be allotted to every applicant, which can be later used to track the status of his or her application. The system would also enable system managers and management to carry out internal monitoring about the disposal and redressal of such applications, thereby putting an end to delays, harassment, nepotism and corruption. The operations of the city civic centre can also be connected to the web thereby bringing in transparency about the number of applications received and the concerned department to which they relate.

With networking in place, the geographical expansion and spread of such centres should not be very difficult for meeting future needs. In rural areas, such centres can be opened through self-help groups, entrepreneurs, NGOs or corporate interested in expanding their rural market base.

10.5 MAJOR ESSENTIALS

To render the citizen services effective, the following essentials or principles must be kept in mind:

- **Networking**

Networking is essential to maximise gains. ICT rests on connectivity; a stand-alone computer can offer only minimal utility. As interactions go digital, they can be coordinated over greater distances, creating new communities of interest and new challenges for governance. While talking of networking, speed and security should be the prime concerns.

- **Computerisation**

Computerisation should not be an end in itself; it should only be the means for a larger goal. The larger goal here would be to maximise citizen satisfaction about delivery of civic services. The design of the system should, therefore, keep citizens as the centre-point and every process should be designed keeping them in view. This meant that the back-

end computerisation should not be attempted unless it has a public outreach. The attempts to improve the internal efficiency should also be directed at citizens.

- **Web Enabling**

Design of the systems should be such that it is amenable to web, as web offers the easiest method to citizens gaining access to information they need. Website, instead of carrying reams and reams of static information, should be utility driven and carry dynamic linkages to the office intranet. This would also help citizens avail host of civic services online without leaving the comforts of their homes.

- **Technology**

Intranet applications could be developed by using tools like ASP, SQL Server, Visual Basic, and Oracle on Windows NT operating system. Internet applications have to be developed by using ASP on IIS 4.0, JSP, SQL Server 7.0, and Oracle 8.0. The operating system can comprise of Windows NT, Windows 98, Unix, and Linux, while the Relational Data Base Management Systems can either be on SQL Server 7.0, or Oracle 8.0. The Component Object Module can be used as a middle ware while the front-end can be on Visual Basic 6.0, ASP 2.0, and JSP. The entire system for a local body of one million population can comprise of over 10 server class computers and over 100 nodes with peripherals connected through a broadband network. There is a movement on to reduce the accent on proprietary software and to use the open architecture policies and the freely available Linux platforms.

- **Public-Private Partnership**

Public-private partnership model should be adopted that would involve cost and revenue sharing with the private sector. As e-government projects require huge financial and material resources, government may feel the resource crunch. Thus, for this reason, such projects should be taken up as public-private initiative and entrepreneurs can be invited to invest in the project.

The citizen-based e-projects would involve many distinct areas ranging from data collection to computerisation to networking and establishment of civic centres as outlet for citizens to access the services. The same could be broken up into manageable tasks and outsourced to entrepreneurs ready to work as partners in the project. While the data entry and updating can be carried out internally, the software and programme development can be taken up as joint exercise between the in house team and private developers ready to take stakes in the project. Although every organisation has its own set of requirements, it is always possible to implement a software programme available in generic modes after adequate customisation. Many of the call centres can be opened in the local bank branches that are interested to invest in the provision of necessary hardware in lieu of which they can be allowed to retain collected funds for a fixed period giving them liquidity advantage. By roping in many stakeholders, the project can be completed in a faster time without putting any additional burden on the stretched financial resources of the government.

Such a model will, therefore, not only help in mobilisation of resources, but by being self-sustaining it will lead to more accountability due to multiple stakeholders.

- **Public Awareness**

The process of empowering the citizens by using ICT involves many areas ranging from creating conducive environment within the organisation to stimulating positive responses outside. The challenge is to develop public awareness about ICT and making the citizens use the medium created by the project for accessing civic services.

- **Political Acceptability**

Political acceptability to citizen-based e-projects is another point that has to be met in a democracy. This can be successfully met by sensitising the political leadership and involving them right from the beginning and explaining to them the benefits that citizen would derive from such projects.

- **Bureaucratic Acceptability**

The resistance to change is inevitable, especially so, if the status quo gives the vested interests additional clout. These projects can also meet with a similar response as the bureaucracy ever so reluctant to open up may create many hurdles to see that the power they wield over the information they control is not reduced by bringing it into public domain through net. Besides this, the openness and transparency in administration, which the project would attempt to achieve, could also be feared by those sections of employees who do not want to get exposed for their inefficiency. It would require sustained pressure and coercion for taking out the desired information from them. Bureaucracy need to be reoriented through training and refresher programmes for implementing technological applications in their day-to-day working.

- **Security**

One important consideration during the digital maintenance of any database in network is protection and security. Every user sharing this database through intranet would, therefore, have to be given a secret password without which access to database would be denied. Access to database would also have to be limited to the requirement of the individual user. Day to day transactions would have to be posted in an encrypted format in a separate database so that the existing information is available for comparison with the encrypted information for detecting and avoiding any tampering, hacking or misuse. In future, the possibilities of introducing additional firewalls and other security measures would also have to be explored and implemented.

- **Sustainability**

While taking up the projects of this type it is important that these are sustained eternally. The service delivery agencies and the project should become inseparable. On one hand, management should internalise the project while citizens should embrace it on the other. There should be no going back to old ways, as citizens once used to a better delivery of services would settle for nothing less. The project should generally have huge political acceptability because of its citizen centred focus. Although the levels of computer literacy and penetration are still not very high, presence of civic centre and collection centres would alleviate this need to a large extent.

Most of the resources should either be internal or complimentary with no future commitments. The project may, however, need additional resources for up scaling which

may come from the user charges that can be put for such projects. It is definitely true that the citizens are ready to pay more if they get the commensurate ease of getting the services.

It is true that informatics by itself cannot surpass social, political and economic barriers to development and good governance, but one should plan to use it as a *sine qua non* condition, as an indispensable step for any social project that attempts to do so. The widening knowledge and information gap has a potential to widen the already existing class gap in this country. It is, therefore, desirable that such projects should play a major role in reducing the gap through unhindered access and become a harbinger for uniting the communities and making them feel better.

10.6 CONCLUSION

There are major learning lessons when it comes to implementing citizen-based e-projects. Such projects should recognise that citizens are the central focus and this should be the guiding principle. Computerisation may improve the internal efficiency of organisation but it holds no meaning unless there is utility to public out of that improved efficiency. Such projects should throw open information relevant to people and use it for greater public good.

For such projects to be successful, there is need of will and persuasion to tag along partners by giving them stakes in a seemingly public non-commercial activity. Paucity of funds and limited understanding of IT solutions are a major constraint in implementing projects of this nature. This should be resolved by involving multiple stakeholders and explaining to them the monetary and other benefits accruing to them out of the project. The project should be an example of how big tasks are easily done if broken down into small doable tasks and assigning them to various stakeholders at the right time.

The biggest challenge for any computerisation exercise is meeting of minds of the system designer who may be external to the organisation and the system developer who is internal to the organisation and knows the nitty-gritty much better but lacks skills. The insiders possessing computer skills with some professional support can develop a better model in limited time than external consultants. There is a hidden lesson in this.

Another important issue is to ensure that such projects are done with transparency and financial propriety. This is very important while dealing with public money so that there is no criticism on this account. Such criticisms would always have the possibility of sabotaging and jeopardising the progress and the project would not even be able to take off. Resistance of employees and their associations should also be tackled by firmness and strict resolve.

10.7 ACTIVITY

1. Narrate some of the ICT initiatives taken up in your State for rendering citizen services.
2. Please let us know whether the citizens are using the ICT based services. Ask them as how they are benefiting from such services. Also give their comments and suggestions.

10.8 KEY CONCEPTS

- ASP : Active Server Pages is Microsoft's server-side technology for dynamically generated web pages that are marketed as an add-on to Internet Information Services (IIS).
- SQL : commonly expanded to Structured Query Language is the most popular computer language used to create, modify and retrieve data from Relational Database Management Systems.
- SQL Server : Microsoft SQL Server is Relational Database Management Systems produced by Microsoft. It supports Microsoft's version of Structured Query Language (SQL), the most common database language. It is commonly used by businesses for small- to medium-sized databases and also large enterprise databases.
- Oracle : based in Redwood, California, Oracle Corporation is the largest software company whose primary business is database products. Historically, Oracle has targeted high-end workstations and minicomputers as the server platforms to run its database systems. Its relational database is the first to support the SQL Language, which has since become the industry standard. Oracle has been one of the leading champions of network computers.
- Window NT : a version of the Windows operating system, Windows New Technology is a 32-bit operating system that supports preemptive multitasking. There are actually two versions of Windows NT: Windows NT Server, designed to act as a server in networks, and Windows NT Workstation for stand-alone or client workstations.
- UNIX : pronounced yoo-niks, a popular multi-user, multitasking operating system developed at Bell Labs in the early 1970s. Created by just a handful of programmers, UNIX was designed to be a small, flexible system used exclusively by programmers. UNIX was one of the first operating systems to be written in a high-level programming language, namely C. This meant that it could be installed on virtually any computer for which a C compiler existed. This natural portability combined with its low price made it a popular choice among universities. (It was inexpensive because antitrust regulations prohibited Bell Labs from marketing it as

a full-scale product). Bell Labs distributed the operating system in its source language form, so anyone who obtained a copy could modify and customise it for his own purposes. By the end of the 1970s, dozens of different versions of UNIX were running at various sites. Due to its portability, flexibility and power, UNIX has become a leading operating system for workstations.

LINUX

: pronounced lee-nucks or lih-nucks is a freely distributable open source operating system that runs on a number of hardware platforms. The LINUX kernel was developed mainly by Linus Torvalds. Because it's free, and because it runs on many platforms, including PCs and Macintoshes, LINUX has become an extremely popular alternative to proprietary operating systems.

10.9 REFERENCES AND FURTHER READINGS

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UNIT 11 ICTs IN INDIAN RAILWAYS

Structure

- 11.0 Learning Outcomes
- 11.1 Introduction
- 11.2 ICTs in Indian Railways
- 11.3 Centre for Railway Information Systems
 - 11.3.1 Passenger Reservation System
 - 11.3.2 National Train Enquiry System
 - 11.3.3 Alpha Migration
 - 11.3.4 Internet Enquiry
 - 11.3.5 Booking on Internet
 - 11.3.6 Unreserved Ticketing System
 - 11.3.7 Freight Operations Information System
- 11.4 Security
- 11.5 Conclusion
- 11.6 Activity
- 11.7 Key Concepts
- 11.8 References and Further Readings

11.0 LEARNING OUTCOMES

After studying this Unit, you should be able to:

- explain the role of ICTs in Passenger Reservation System of Indian Railways;
- highlight the use of ICTs in National Train Enquiry System;
- describe Alpha Migration facility of Indian Railways;
- discuss the facilities of Internet Enquiries and Ticket Booking; and
- explain Unreserved Ticketing System of the Indian Railways.

11.1 INTRODUCTION

Indian Railways (IR) is the world's second-largest railway, with 6,853 stations, 63,028 kilometres of track, 37,840 passenger coaches and 2,22,147 freight cars. Annually, it carries some 5.50 million passengers and 492 million tons of freight. Everyday it carries 15 million people. It meets nearly 22% of the total passenger transportation needs and nearly 60% of long distance travel needs of the people of the country. Passenger business accounts for 31% of its revenue. During the year 2004-05, 5490 million passengers were carried with 570 billion passenger kilometres and Rs. 14,035 crores passenger earnings.

IR is one of the most advanced ministries in India, with an innovative and extensive IT environment. ICTs are playing a vital role in IR vast operation and many of its services and functions are now being facilitated by the applications of ICT. In this Unit, we will be discussing more on this theme.

11.2 ICTs IN INDIAN RAILWAYS

ICTs are playing an important role in this largest public sector of the country in delivery of various services. IR is one of the first few government departments to introduce computers in the country. Computerisation on IR started in the late 60s with the induction of IBM 1401s in the nine zonal railways, three production units and the Railway Board. Many applications were computerised, such as, Passenger Revenue and Goods Accounting, Financial Management, Inventory. Operating Statistics etc. While these systems proved to be beneficial to the Railways, they were soon found to be inadequate to cater to the increasing requirements. It was in the VIIth plan period from 1985-90 when these IBM 1401s were replaced with third and fourth generation computer systems. Computerisation in the production units and the zonal railways were strengthened, and computers were introduced in the divisions, workshops and stores. Also, many new areas for computerisation such as Passenger Reservation System (PRS), Freight Operations Information System (FOIS) etc. were initiated. These developments are now beginning to show impacts on both the Railway system and its users.

In 1986, the Ministry of Railways established a separate organisation to take up all computer activities on IR. This organisation came to be known as the Centre for Railway Information Systems (CRIS).

We will now discuss the functions of this Centre in detail.

11.3 CENTRE FOR RAILWAY INFORMATION SYSTEMS

In 1986, Ministry of Railways established the Centre for Railway Information Systems (CRIS), New Delhi to be an umbrella for all computer activities on Indian Railways. The Centre started functioning from July 1987. It is an autonomous organisation headed by a Managing Director. CRIS is mainly a project-oriented organisation engaged in development of major computer systems on the Railways. It has acquired special knowledge and expertise in the field of informatics.

The need for a separate organisation was considered better suited to take up all computer activities on IR mainly for the following reasons:

- to avoid duplication of efforts by individual Railways;
- to ensure standardisation of computer hardware and software on the Railways;
- to undertake design and development of major applications on Railways requiring higher levels of expertise, faster decision making and system wide applicability;
- to insulate the organisation from day to day working of the Railways so that its objectives are not lost sight of;
- need for a combined effort of Railways and computer specialists, considered best suited for the development of the computer applications on Railways;

- need for development of expertise in highly specialised fields like Operation Research, Simulation, Expert System, CAD/CAM, Process Control etc; and
- need for greater flexibility to keep pace with the fast changing technology.

CRIS looks into seven main projects, namely:

- Passenger Reservation System (PRS)
- National Train Enquiry System (NTES)
- Alpha Migration
- Internet Enquiries
- Booking of Tickets on Internet; and
- Unreserved Ticketing System (UTS)
- Freight Operations Information System (FOIS)

We will now discuss them individually.

11.3.1 Passenger Reservation System

As mentioned in the earlier paragraph, IR has a very vast scope of operation. It is the world's second-largest railway, annually carrying some 5.50 million passengers and 492 million tons of freight. Of the 15 million passengers who climb aboard one of 8,520 trains each day, about 550,000 have reserved accommodations. Their journeys can start in any part of India and end in any other part, with travel times as long as 48 hours and distances up to several thousand kilometres. The challenge is to provide a reservation system that can support such a huge number-regardless of whether it's measured by kilometres, passenger numbers, routing complexity, or simply the sheer scale of country.

Passenger Reservation System (PRS) started in 1985 as a pilot project in New Delhi. The avowed objective was to provide reserved accommodation on any train from any counter preparation of train charts and accountal of the money collected. When initial pilot project was implemented at Delhi, the software (referred to as version I) had a number of limitations. These were mainly removed in next version, that is, version II implemented in 1987. With the addition of new locations and many redefinitions needed, the new version III evolved in 1990. Even the version III (of the earlier software called Impress) fell far short of the growing expectations of the travelling public and the need was felt to have a software which has the capabilities of providing the networking of the five independent PRS nodes namely Secundrabad, Delhi, Kolkata, Mumbai and Chennai. On 18th April 1999, all the five PRS nodes were finally networked together.

Now anywhere to anywhere reserved ticketing became a possibility on any PRS booking terminal. In order to facilitate the availability, PNR status, and other journey planning information to the common public, various interfaces like the Interactive Voice Response System (IVRS) on the telephone, Touch Screens at

selective locations, RAPID, DISPLAY, Passenger Operated Enquiry Terminals (POET) and Daily Press Availability Reports through newspapers have been provided.

There are now 705 Computerised Reservation Centres all over the country providing 9.5 lakh reservations every day. 150 new Passenger Reservation System (PRS) locations are to be commissioned very soon. In the coming years, all district headquarters will be provided with computerised reservation facility, so that one does not have to go far off distances for reservation or wait for telegram system, which takes many days.

CRIS has implemented and hosted IR own Website namely 'www.indianrail.gov.in' and offers PRS enquiries on the internet. The enquiries pertain to accommodation availability, PNR status, station code, train schedule and train fares. Enquiries are also made available through short messaging service on mobile. The site receives a maximum of 1.7 million hits per day.

PRS uses the following infrastructure to implement the reservation and ticketing system, namely:

- HP's Alpha Server hardware
- operating system-Open VMS 7.3-2
- routers to implement a network of 5 PRS Centres over 2 Mb leased DOT lines
- over 4000 terminals connected to the 5 Centres over DOT and leased lines; and
- DecNet phase V/TCP-IP networking software.

11.3.2 National Train Enquiry System

The National Train Enquiry System (NTES) was implemented as a pilot project in August 1998. NTES is a centralised information system, which provides up-to-date and accurate information to the passengers regarding:

- arrival/ departure of passenger trains including expected time of arrival (ETA) of trains;
- platform berthing of passenger trains;
- journey planning;
- facilities available at stations; and
- Railway rules

This information is collected from stations, control offices and other database administrators. Under NTES, position of trains running on real time basis is fed to computers after every half an hour in 61 control offices all over the country. Thus, when a train starts from a starting station, position of its running is known all over the country and is supplied to enquiries and IVRS. This helps in improving the quality of information also.

IVRS has been installed at 100 stations and is being extended to other stations, so that passengers can get train running position as well as reservation status on telephone.

Besides IVRS, information is also made available to the user through Display Boards, Public Address System, Face-to-Face Enquiry, CCTV and Internet.

At present, reservation information on cell phones is provided in the cities of Kolkata and Delhi. Availability of reservation and status is also given on the IR Website- www.indianrail.gov.in.

NTES phase II is presently running at all five PRS sites. All 5 servers (Secunderabad, New Delhi, Kolkata, Mumbai and Chennai) running the NTES application have been networked. It now runs on Alpha server machine and under UNIX using Sybase as the RDBMS.

11.3.3 Alpha Migration

One of the key technical achievements of CRIS is a sophisticated reservation and ticketing application called Country Wide Network for Enhanced Reservation and Ticketing (CONCERT).

The primary challenge for CRIS is to provide an efficient passenger service by ensuring maximum uptime for its reservation/ticketing and enquiry application. Railway must prepare charts that map passengers with their seats, and must post these charts outside each coach. CONCERT software enables the preparation of skeleton charts in advance for each train for the next three journey days.

The current CONCERT application represents a steady progression of using the latest technologies available. In the mid-1980s, IR first computerised its reserved ticketing operation on VAX™ systems running VMS™. This was done from five regional passenger reservation centres, each of which was a stand-alone site with its own local database. During the mid- to late 1990s, CRIS introduced CONCERT, which linked the five-passenger reservation centres so that reserved tickets from any station of IR could be issued to any other station from a single window.

The entire CONCERT application, since its inception, had been hosted on 5 VAX-VMS clusters located at the five PRS sites, that is, New Delhi, Mumbai, Kolkata, Chennai and Secunderabad.

With the tremendous growth of PRS terminals all over the country and the extra load of various interface software, such as internet enquiries, the overall load on the backend PRS system had increased manifold. Hence, a need was felt to move the existing application from the VAX-VMS servers to Alpha VMS servers. This has helped in harnessing time.

11.3.4 Internet Enquiries

Since Railways is the most commonly used mode of transport by common people in India, information regarding journey planning, fare enquiries, PNR status, accommodation availability and like enquiries are of utmost importance to the common public.

Till now, the following methods were available to access this information:

- enquiry counters at Railway stations;
- press availability reports published in daily newspaper;
- announcements on TV and radio; and
- IVRS system on telephones

However, the people faced difficulties with these methods. They had to stand in long queues in front of the enquiry counter to get the latest information. Also, most of the time information was not updated. The telephone lines were found congested, which made it difficult to make prompt enquiries.

CRIS developed and deployed the IR Website ‘www.indianrail.gov.in’ for the purpose of information dissemination to general public since February 2000, with a view towards overcoming the many shortcomings mentioned above. The site provides information pertaining to trains between a pair of stations, that is, all the trains between the selected source and destination station; accommodation availability that is, latest seat availability position of the chosen class, date, train and route; PNR status, that is, latest updated status of passengers; and train schedule giving complete path information of a particular train with the arrival and departure time at a station.

Besides, the Website also displays static information pertaining to:

- rules- reservation rules, refund rules, break journey rules, luggage rules, etc.
- general matters- season tickets, circular journey, booking locations, concession forms for physically challenged, general reservation forms, telebooking and tatkal booking;
- tourist and travel agents; and
- special trains-Rajdhani trains, Shatabadi trains, tatkaal trains, etc.

11.3.5 Booking of Tickets on Internet

On 28th February 2000, all the common enquiries like trains between a given pair of stations, reservation availability, PNR status, fare, train schedule and station codes were made available to the common public through the Internet. It has in a very short span of time become one of the most popular web sites in India, with peak daily hits of the order of 1.7 million hits per day.

The information is also available through SMS service on mobile phones, all over India.

Now, passengers can access Rail reservation site ‘www.irctc.co.in’ for information and booking. After the train date and class is chosen and other particulars filled in, the transaction is processed through electronic payment gateway of ICICI Bank, which authorises the payment. Thereafter, ticket is booked and PNR is generated and advised to the customer. Entire transaction is

fully secured and all information remains confidential and travels in encrypted form through telecommunication channels. Credit card details are not stored in IRCTC database or anywhere.

Ticket can be delivered at doorstep through courier and the option of collection of ticket from nominated counters is also available. A service charge is also levied on total value of transaction for credit card usage. In addition, passengers have to pay a nominal fee per ticket for sleeper/ordinary chair car and upper classes.

Internet booking can be availed from 0800 hrs to 2000 hrs from Monday to Saturday and from 0800 hrs to 1400 hrs on Sundays. Likewise, tickets can also be cancelled from any of the Railway PRS counters. Refund amount is reflected in the credit card bill. There is no cash refund.

11.3.6 Unreserved Ticketing System

More than 1.2 crore Rail passengers travel in unreserved coaches and trains every day and thus form the bulk of rail users. For this category of passengers, Railways have introduced the facility of Computerised Unreserved Ticketing System (UTS). The first stage was introduced as a pilot project on 15 August 2002 at 10 railway stations of Delhi. Another 13 stations of Delhi area were provided with UTS counters in the second stage on 2nd October 2002. It has since been extended in an integrated manner to more than 180 stations now all over the country. UTS system has been planned to take over the printed card tickets or tickets issued by self-printing ticket machines gradually.

UTS will provide the facility to purchase unreserved ticket three days in advance of the date of journey. A passenger can buy a ticket for any destination from the UTS counter for all such destinations, which are served by that station.

Cancellation of tickets has also been simplified. Passengers can cancel their tickets one day in advance of the journey from any station provided with a UTS counter. On the day of journey, the ticket can be cancelled from station from which the journey was to commence.

11.3.7 Freight Operations Information Systems

Besides the above mentioned, CRIS is concerned with the task of design, development and implementation of the Freight Operations Information Systems (FOIS), along with its associated communications infrastructure. Though the Government of India had set up FOIS for the Indian Railways in 1982, but with the establishment of CRIS in 1986, all computer activities on IR were given to it.

With the rapid growth of freight traffic from 73.2 million tonnes in 1950-51 to over 522 million tonnes in 2001-02, FOIS has come a long way in enabling booking and delivery of consignment on computer, station accounting, railway receipt generation and transmission, and better interface with customers. It has helped in terminal management with networking of 132 additional points, 84 nodal consist reporting points, and 48 originating terminals. Wagon wise consignment tracking, clearing of stock holding, invoice based consignment tracking, invoice based loading originating tonnage and revenues, wagon wise inter change, statement of missing wagons, and linking of unconnected consignments has been possible with FOIS.

11.4 SECURITY

In recent years, computerised information has become increasingly important. Corporate networks and the Internet connect organisations across the globe. In order to ensure that the data residing on these networks remain secure, individual nations have to set up their National Computer Emergency Response Team (CERT). The Indian CERT (CERT-in) was set up in 2003. IR being part of the critical information infrastructure of the nation, has set up the sectoral CERT called CERT-Rail to secure the various databases and networks on IR, that is, PRS, FOIS, COIS, MIS, AFRES, PRIME, etc.

Cyber security is needed to prevent intrusion of unwanted elements in the network/computer. It involves protecting information by preventing, detecting and responding to attacks. Among the dangers of security failing are stealing/loss of vital information, altering of data/files or crash of the entire system.

The issue of cyber security has been addressed by CERT-Rail, which helps in:

- creating security awareness among the users;
- conducting training and research;
- predicting future activity and providing early warning;
- formulating security policies/guidelines for IR;
- vulnerability assessment on Railway applications and networks;
- setting up an Incident Response Team;
- evaluating various security products for the IR; and
- maintaining liaison with Indian Computer Emergency Response Team (CERT-in), the apex organisation for providing response to cyber security incidents in India.

Security has been ensured through the system of authentication, authorisation and accounting through digital signatures or certificates; data confidentiality, data integrity, and data non-repudiation.

Security is provided at four levels, namely hardware level, operating system level, network level and application level.

At the hardware level, there are servers located at the five Centres, manned and controlled by Railway personnel. All accesses to the system are through secure terminals and access is restricted.

At the operating systems level, Open VMS is being used as the OS for CONCERT, True64 Unix is being used for Web site and NTES, and DECNET network protocol is being used for all the applications. Use of proprietary OS and networking protocol, whose usage is limited, makes it difficult for hackers and intruders to affect the system. Both Open VMS and True64 Unix are very secure OS and regular updates and patches are applied, whenever they are released. Open VMS provides for high grade of security features such as 'proprietary' and 'closed features' of the OS. There are passwords at two levels. Also, there are

limited user accounts with privilege policy according to user specific needs. The protection privileges of the critical application programmes have been set, so that they can be run only from the specified user accounts. Both OVMS and True64 have extensive logging and auditing features, which can be enabled.

At the application level, there are security privileges at two levels, that is, user level and terminal level. Enquiry is only readable access to the database, booking has writing access for ticketing only, and supervisory privileges entail updates on the database for implementing special functionality.

Security in call centres/enquiries is ensured with backend PRS/NTES connected to the call centre in a secure manner. Security of Website is ensured through firewall, which provides maximum security by virus checking, URL blocking and blacklisting and comprehensive logging. Periodic changes of passwords at the firewall, web server, mail server and Internet backend servers are the regular steps taken for web security. There is regular checking of firewall status and its log files. Checking of web server files, directories and user accounts is done consistently. There are regular backups of configuration files and source code files. All logins on the Internet backend server are logged and monitored.

The IR aims to conduct periodic audit of the system, provide security related training for its personnel, make all PRS servers sit behind firewall, and resort to digital signatures and certification agencies in near future.

11.5 CONCLUSION

IR is constantly looking for new ideas to simplify and streamline procedures for the convenience of passengers. In this endeavour, they have introduced several path-breaking technologies on the Railway system over the years.

Today, IR is offering several technological facilities for passengers such as Passenger Reservation System, National Train Enquiry System, Alpha Migration, Unreserved Ticketing System, Internet Booking, etc. ICT has benefited the customers by enabling the facilities of online enquiries, online reservation, comfortable ticket purchasing, and advance planning of unreserved journey.

These technological innovations have also improvised the IR by reducing the overload of its enquiry counters and reservation counters. IR is able to plan extra trains and coaches as per trend of sales registered in the system. Unreserved itinerary planning and tickets availability from any station to any station has been made possible.

11.6 ACTIVITY

Discuss a major national ICT experiment e.g. Posts and Telegraphs of India.

11.7 KEY CONCEPTS

VMS: Visual Memory System, known also as OpenVMS, an operating system.

VAX: was originally an acronym for Virtual Address Extension, because the VAX was

seen as a 32-bit extension of the older 16-bit PDP-11, and the first models were, in fact, called VAX-11 for the same reason. It is a 32-bit computing architecture that supports an orthogonal instruction set and virtual addressing. It was developed in the mid-1970s by Digital Equipment Corporation (DEC). VAX has been perceived as the quintessential CISC processing architecture, with its very large number of addressing modes and machine instructions, including instructions for such complex operations as queue insertion/deletion and polynomial evaluation. VAX computer systems can run several operating systems, usually BSD UNIX or DEC's VMS, Ultrix, and VAXeln. The VAX architecture and VMS operating system were engineered concurrently to take maximum advantage of each other.

CISC: Complex Instruction Set Computer is a microprocessor Instruction Set Architecture (ISA) in which each instruction can execute several low-level operations, such as a load from memory, an arithmetic operation, and a memory store, all in a single instruction.

Poly- are an important class of simple and smooth functions. Here, simple means they are constructed using only multiplication and addition. Smooth means they are infinitely differentiable, i.e., they have derivatives of all finite orders. Because of their simple structure, polynomials are very easy to evaluate, and are used extensively in numerical analysis for polynomial interpolation or to numerically integrate more complex functions.

DEC-: is a proprietary suite of network protocols created by Digital Equipment Corporation, originally released in 1975 in order to connect two PDP-11 minicomputers. It evolved into one of the first peer-to-peer network architectures, thus making DEC into a networking powerhouse in the 1980s.

11.8 REFERENCES AND FURTHER READINGS

<http://www.encyclopaedia.thefreedictionary.com/>

Indian Railways Websites have been the major source of reference for this Unit. These Websites are mentioned as below:

<http://www.indianrail.gov.in>

http://www.indianrail.gov.in/cc_reservation.html

<http://www.indianrail.gov.in/abcris.html>

<http://www.indianrail.gov.in/abcrisntes.html>

<http://www.indianrail.gov.in/abcrisam.html>

<http://www.indianrail.gov.in/abcrisprs.html>

http://www.indianrail.gov.in/abcris_web.html

<http://www.indianrail.gov.in/abcrisuts.html>

<http://www.irsuggestions.org/servicetopassengers.htm>

<http://www.rb.railnet.gov.in>

UNIT 12 SAUKARYAM: ICT PROJECT IN VISAKHAPATNAM MUNICIPAL CORPORATION, ANDHRA PRADESH

Structure

12.0 Learning Outcomes

12.1 Introduction

12.2 ICT in Municipal Corporation

12.3 Project Saukaryam: Fundamental Requirements

12.4 Saukaryam: ICT Project of Visakhapatnam Municipal Corporation

12.5 Project Saukaryam: Major Constraints

12.6 Conclusion

12.7 Activity

12.8 Annexe

12.0 LEARNING OUTCOMES

After studying this Unit, you should be able to:

- discuss the advantages of ICT applications in urban local self-government bodies, such as, municipal corporations;
- describe the fundamental requirements for initiating an ICT project in municipal bodies;
- explain the online civic services rendered by the Saukaryam Project of Visakhapatnam Municipal Corporation; and
- examine the limitations of the Project.

12.1 INTRODUCTION

‘Men well governed should seek no other liberty, for there is no greater liberty than a good government.’ This in times, when the waves of change point towards a liberal economic framework and exit of state from sectors that could be better done through private enterprise has far reaching implications. While this is so, it definitely does not mean curtains for governments since as long as the civilisations exist, governance of some form has to exist to ensure order and fair play. The areas of operation may change but the societal dependence on state is inevitable and if that is the case, it is important that the state does its task in the manner giving least inconvenience and maximum facility to its citizens. Never before was the craving for looking at options and alternatives to improve governance stronger than now. Though there are many ways of achieving that, one has to find out methods that are easiest and cost effective, and it is here that the tools of ICT score over others.

Everyday when one sees thousands of citizens approach the governments, especially the local government, for various services, one can't help asking a question- whether it is possible to live up to their expectations. The expectations those are huge while the resources at disposal are thin. To make matters worse, the systems to administer the resources are primitive and inefficient. There are constraints; sometimes due to lack of resources and manpower, while many a times there are vested interests not allowing it to be done in a particular way. On many occasions, the general lethargy and casualness that has crept into our system becomes the major impediment.

The vast apparatus of governance that we've got need to be transformed for catering to the requirements of all. If we've to improve the administration of governments anywhere, we would have to do some serious introspection, look inwards, do a system analysis and figure out where the rub lies.

A thorough system analysis would however confirm, that nine out of ten times, both the prevention and cure of these problems is possible only if we allow technology to take precedence over the norm. Internally, technology solutions would ensure that the non-performers can't hide themselves and the decision support systems are on a stronger wicket with properly processed information base. Externally, technology would ensure that the discretionary advantages and favours possible in the tech-less system are eliminated allowing level playing field to everybody, which in essence, is the purpose of all governments. This however, does not mean that technology by itself can make governments transparent, smart and responsive, as there are host of other factors that influence the working of governments. But it is also true that technology is a *sine qua non*, an indispensable condition for achieving a responsible government- national, provincial, or local.

In this Unit, we will explain and examine the applications of ICT in areas of local self-administration of Visakhapatnam Municipal Corporation, Andhra Pradesh. We will also deal with the ICT based 'Project Saukaryam' (meaning facility) initiated and being implemented by the Corporation.

12.2 ICT IN MUNICIPAL CORPORATION

ICT is all about connectivity. Connectivity brings proximity that makes the delivery of services offered by governments become better, and while talking of governments, local self-governments deserve maximum attention as they are at the cutting edge and immensely affect the daily lives of citizens.

Dependence of citizens on municipal bodies for multifarious services is huge. But these bodies suffer from lack of transparency, accountability and take excessive time for processing information. This makes the citizens wait in long queues, receive insensitive and harsh responses and bribe officials for getting their things done.

Internally too, the system due to huge paper work leads to inadequate monitoring and wastage of employee hours. For the task as elementary as paying their dues, citizens have to visit various offices and meet insensitive people. They have to visit these local bodies for basic services like drinking water supply, or street lighting, or sanitation, and wait endlessly for getting the things done. They also have no clue as to the status of their respective cases.

The result is an apathetic municipal organisation with no accountability to its citizens.

Just as the survival of any business depends upon the material and mental satisfaction of its customers, survival of local bodies also hinges on the contentment of its citizens. The exploration of this interface - the areas where municipalities and citizens meet- is vital to our understanding of where and how technology should intervene to make this interface more transparent and less bothersome for both the partners.

Information is municipality's biggest equity and it is essential that it uses it for greater public good. Quick access to this information is possible by throwing it open into the public domain. It is here that ICT can play an important role in the display and dissemination of information to the citizens. ICT can also improve things in the delivery of civic services by municipalities. These services may include bill payments, certifications and grievance redressal to the citizens. The interface between the municipalities' and the citizens that presents a relationship of a benefactor - beneficiary has to be transformed to a principal-client one. And it is in this regard that technology can act as a strong catalyst and push the representative democracy towards becoming a popular one.

Perhaps, it will be worthwhile for us to mention few areas where ICT can make a material difference to the quality and speed of delivery of services by municipalities:

- **Access to Public Documents:** this category would cover all those areas where the citizens need quick and accurate information from the government. This may include documents pertaining to various schemes, orders, programmes, annual budgets, gazette notifications, ordinances, bills, examination results, etc. This would enable the citizens to get information in real time without exorbitant communication costs.
- **Authentication Statements:** this would include the areas where the citizens need the certificates of authentication from competent authorities in government like the copy of land records, registration of sale and property deeds, birth/death certificates, and various other permissions required under various acts of the central, state and local self governments. The entire process of sorting, calculating and reading through a huge database is best done with the help of software and hardware.
- **Online Payments:** payment of taxes, duties, rents, rates, etc. including the payment of user charges while using the facilities offered by government departments, come under this category. Payment of electricity, telephone and water charges would also come under this.
- **Complaints, Grievances and Suggestions:** filing, redressal and follow up of complaints pertaining to the facilities offered by government are included here. This may act as an online forum for government to get the feedback about their policies and actions, and for citizens to render their opinions and ventilate their grievances.
- **Partnering with Government:** this would include areas where government does business with the private sector-outsourcing work contracts, leasing out services or making purchases. An online and transparent government would inspire confidence resulting in improved communication in such partnerships.
- **Within the Government:** the gains of technology can be applied equally to improve the systems within the government. Various departments and wings of the government

depend on and feed into each other. Time and energy taken to process and send information between various sections within a department and between various departments can be immensely saved and this can curtail corruption and render effective decision-making.

The list is exhaustive, as the areas where technology can make governments do their job better are endless. In fact, it is difficult to find anything that government does, which can't be improved by using technology. The good news is that most governments have woken up to it and let us hope that this is not going to be too little or too late.

An example of how ICTs could impinge upon human lives and can help governments perform better, is a Project called 'Saukaryam' (meaning facility), which the author could help conceive, develop and implement in Visakhapatnam Municipal Corporation in Andhra Pradesh. Project 'Saukaryam' is about delivery of civic services online at the Municipal Corporation level of the urban local-self government, and is a vibrant example of how community informatics can improve the lives of citizens. This Project is first of its kind in this country built on a public-private partnership platform and improves the delivery of municipal services through ICTs. On one hand, the Project uses the medium of internet through its utility website, while on the other hand, it provides local broad basing through call centres connected through a broad band network spanning all over the city in an area of over 120 square kilometres. The guiding principles while developing the Project has been complete internal computerisation and networking, and at the same time putting the intranet application in a user friendly format on the net for public use.

We will now briefly discuss some of the fundamental requirements in initiating such projects.

12.3 PROJECT SAUKARYAM: FUNDAMENTAL REQUIREMENTS

The following fundamental requirements have to be kept in mind before a project like Saukaryam is initiated and implemented:

- **Connectivity and Networking:** as Municipal Corporation deals with huge database, the first and foremost requirement is using computers to store database, and connecting and networking them for sorting, querying, and manipulation of the data for improved delivery of services to citizens. The priority should be to create an internal backbone by computerising the data and networking. As interactions go digital, they can be coordinated over greater distances, creating new communities of interest and new challenges for governance. While talking of networking, speed and security should be the prime concerns.
- **Multi-stakeholder Approach:** connectivity and networking can then be followed by thorough brain storming sessions with all stake holders to get into the root of the problem and a core team can then be put into place for data computerisation and software and hardware support. There is also a need to look for private entrepreneurs ready to invest as stakeholder in the project. This is sometimes necessary due to paucity of funds but becomes a major catalyst for broad basing and early completion of the project.

- **Citizen-Centredness:** computerisation should not be the end in itself; it should also be the means for a larger goal. The larger goal here would be to maximise citizen satisfaction by efficient delivery of civic services. Design of the system should, therefore, keep citizens as the centre-point and every process should be designed keeping them in view. Attempts to improve internal efficiency should also be directed at citizens. Priority should be to create front end through web site, and civic centres for citizens to have access to data for various services.
- **Web-Enabled:** design of the system would be such that it is amenable to web enabling, as web offers the easiest method of citizens gaining access to information they need. Website, instead of carrying reams and reams of static information, would therefore be utility driven and would carry dynamic linkages to the office intranet. This would help citizens avail host of civic services online without leaving the comforts of their homes.
- **Involvement of Insiders in System Designing:** the biggest challenge for any computerisation exercise is meeting of the minds of the system designer who may be external to the organisation and the system developer who is internal to the organisation. The system developer knows the nitty-gritty of the system much better but lacks skills. The insiders possessing computer skills, therefore, need to be involved to develop the model for the computerised system improvement plan in a much better manner.
- **Public-Private Partnership and Mobilisation of Resources:** to take up the project of this scale, huge financial and material resources would be required. The major constraint is paucity of funds as the case is with most of the public bodies in India. This exactly is the reason why such projects could be taken up as public-private initiative, getting private entrepreneurs to invest in the project. This would involve cost and revenue sharing with the private sector.

The project would involve many distinct areas ranging from data collection to computerisation to networking and establishment of civic centres as outlet for citizens to access the services offered. The same could be broken up into manageable tasks and outsourced to private partners. While the data entry and updation can be carried out by Corporation staff, the software and programme development can be taken up as joint action by the in-house team and private developers. Although every municipal body has its own requirements, it is always possible to implement a software programme available in generic modes after adequate customisation. Networking all across the city is the most important part of this technology exercise. It can either be done through internal resources or can be a part of the MOU with the private stakeholders. Many of the call centres can be opened in the local bank branches that are interested to invest in the provision of necessary hardware, in lieu of which, they can be allowed to retain collected funds for a fixed period, giving them liquidity advantage. By roping in many stakeholders, project could be completed in a faster time without putting any additional burden on the stretched financial resources of the Corporation.

The Municipal Corporation being the central stakeholder would have to invest the major bulk of the resources in creating the back end involving hardware/software, and the front end through civic centres. Website could also be developed as a joint

venture for sharing the cost, allowing the stakeholders to share the accrued revenues. Such a model being self-sustaining is more accountable with the presence of multiple stakeholders.

All the above-mentioned requirements would then form the backdrop against which such projects of municipal information systems can be conceived and started.

12.4 SAUKARYAM: ICT PROJECT OF VISAKHAPATNAM MUNICIPAL CORPORATION

Based on the fundamental principles mentioned above, Visakhapatnam Municipal Corporation went ahead with the task of setting up a utility driven Website - www.saukaryam.org. All the services rendered online by the Project are with the facility of the World Wide Web and the internet, rendering the most cost-effective method of reaching out to the people. The Corporation Website www.saukaryam.org is being done on a public-private partnership platform and is not merely be an information driven Website. It acts as a window to the outsiders to gain access to the Corporation's Intranet and Local Area Network. While the static page information has been hosted on the foreign server, the dynamic pages are being hosted on the Corporation server and also being accessed through it. By doing this, the necessity of continuous updation and uploading of information, which becomes the bane of most websites, has been avoided. All the dynamic pages take their inputs regularly, as part of the in-house computerised network and get updated in the process.

The Project also set up City Civic Centres – One Stop Civic Shops. Being well aware of the fact that not everybody in the country, like ours, have an access to the internet and a basic knowledge of computers, it decided to establish computerised City Civic Centres, which could act as an outlet for the citizens to have access to civic services. The Civic Centre has a string of computers on the network and allows the citizens to avail facilities like getting birth and death certificates, filing a water tap/ drainage connection request, applying for building plan approval, lodging a complaint/grievance, making miscellaneous payments, etc.

As the Civic Centre is on the network and is connected to the main server, which in turn, is connected through the Global Internet Protocol, the citizens can track the status of their application on the Corporation Website. For doing so, a unique registration number is allotted to every applicant, which can be later used to track the status. The system also helps Corporation managers to carry out internal monitoring about the disposal of such applications and check delay, harassment and corruption. Also, these Centres bring in transparency about the number of applications received and the concerned department to which they relate.

The popularity of the Civic Centres can be gauged by the responses that they get from the citizens everyday. A City Civic Centre is frequented by not less than 200 persons everyday seeking various services. As the broadband network is being used for the Local Area Networking, the geographical expansion by opening more of such Centres would not be very difficult for meeting the future needs.

The Vishakapatnam Municipal Corporation renders the following services through its Website and City Civic Centres:

- **Online Payment of Municipal Dues**

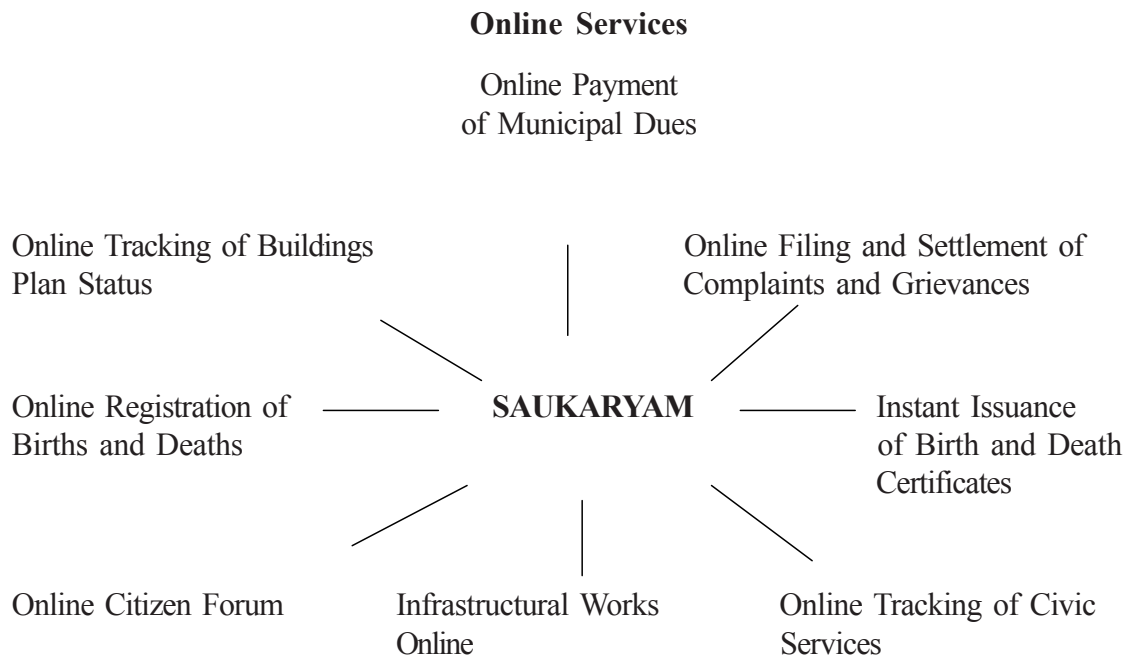
All governments depend on the taxes and charges they raise from the citizens. Financial management of governments hinges on a sound, transparent, efficient and foolproof tax collection system, and the ease and flexibility with which the citizens are able to pay their dues. Before the Project was put into place, citizens were required to go to the ward office and get in touch with the tax collector for calculating and preparing the payment challans. As the entire operation was done manually, searching through the records and carrying out the required calculations would invariably take time, and in the event when the tax collector was not present, the citizens had no option but to waste their precious time and energy. The citizens also did not have any idea about the calculations the Corporation made while determining their dues. They had to visit various Municipal Corporation offices for such calculations. The system, also, led to a huge amount of paper work at all levels, entailing huge costs and time delays. Reconciliation and remittance of the amount to the Municipal account was also a time consuming job.

But with the adoption of ICT, the system of payment has become easy. Corporation has computerised all the assessments. All records are being maintained in a server available in the Municipal Corporation office. The server has been connected through a LAN with computer nodes available in the local bank branches. Only those banks have been handpicked, which have voluntarily come forward to provide the necessary hardware required for this facility. A private partner has connected these nodes to the main server through a broadband network running in the city. The assessee now carry the demand notice to any of the earmarked bank branches, where after entering the assessment number, they instantly get full information with updated calculation of the demand and the arrears along with the interest, if any. Once the citizen pays the amount, the bank just updates the records, at the click of the mouse, on the main server. The bank is able to acknowledge the payment through a printout receipt issued to them on the spot, all in real time. All partners are benefited-the banks get ready cash, the net worker gets business, and the citizens are provided with easy mode of payment.

The system enables the Corporation to get real time Demand Collection Statement, ward-wise, which helps in clear monitoring of the backlog cases, and prevents delinquents from escaping the tax net. As the system also provides for automatic posting of penal interests for delayed payments, the discretion of the tax collectors in waiving such amounts gets eliminated. The system has also led to improvement in tax collection efficiency, which is corroborated by the figures for this year, as we could collect 50 per cent over and above the last year with the same staff and similar costs.

The updated information is also listed on the Corporation Website so that the citizens, if need be, can avail the updated version of their property taxes by entering their assessment number.

Saukaryam: ICT Project of Visakhapatnam Municipal Corporation, Andhra Pradesh



- **Online Filing and Settlement of Complaints and Grievances**

The Municipal Corporation's Website provides the citizens the facility to lodge their complaints and grievances online. The grievances get forwarded to the concerned officer for necessary action and also go into the database for monitoring grievance settlement. An important feature of this facility is that all the complaints and grievances, which the Corporation receives, either through internet, or through the Civic Centre, or in person, go into a common database and are available for rigorous monitoring. The module also provides the facility for forwarding and transferring of complaints from one officer to the other, thereby minimising the time, which it used to take in the normal course.

One can also find out the number of grievances pending with various officers at a given instance, which is proving to be very useful in monitoring the efficiency of various sections. The entire status of the complaints and its disposal process also gets instantly communicated to the complainant, so that he or she can see the action being taken in order to give the necessary feed back. Although the disposal of any complaint has to be done at the field, the Project provides a mechanism to monitor such disposals in order to prevent hardships to the people. As the whole module is linked through the internet, it is possible for any officer to monitor the complaints received by him from anywhere. It allows all the officers the facility to issue virtual instructions for taking immediate remedial actions.

- **Online Tracking of Building Plan Status**

The Municipal Corporation engages in the task of approving the building plans, subdivision of plots, and regularisation of structures within the city limits. The citizens have no information pertaining to such matters. Website has opened the floodgates of information to the public through the internet. Now at the click of the mouse, status of the application is known without running from pillar to post. The entire

process of scrutinising, processing, and sanctioning of building plan approvals has been computerised. This allows online tracking and monitoring of the movement of any such paper within the town planning section. This also helps the section in meeting the statutory deadline set for the release of the plans, and likewise allows the citizens to gain access to the status of their applications. The Project also envisages creation of the building plan data base and its subsequent hosting on the site so that citizens are able to know the exact nature of the approval given and are not lured into buying unapproved buildings/plots, creating future complications for themselves.

- **Online Registration of Births and Deaths**

Every citizen is a valuable human resource of the country. Registration of births and deaths is, therefore, mandatory. Earlier, the entire task of collecting the information from the hospitals and maintaining it in the master records used to take years together. It was primarily the responsibility of the citizens to ensure that the official concerned sent the required data to the Corporation office. The whole database, which used to be maintained manually, was the preserve of few Corporation officers that used to take a lot of time and effort for searching the required records. But now, the Corporation Website provides to all hospitals registered with them, the facility to send the birth and death information online, with minimal charges of incremental costs. Now, the information from the registrant comes through the virtual mode instantly, without any mediation.

- **Instant Issuance of Birth and Death Certificates**

By maintaining the database of births and deaths on the computer, the process of sorting, searching, and accessing the database has become much easier. Citizens are able to get their certificates delivered to them in real quick time. They are also able to get their records updated, as they have the facility of checking whether their name is registered or not, through the Website. Likewise, they can now get necessary rectification done in their records without any delay. The City Civic Centre provides the facility to the citizens to collect their certificates on demand instantly.

- **Online Tracking of Civic Services**

The Municipal Corporation, on one hand is responsible to keep the city clean and sanitised, while on the other, it has to arrange for water supply in the city. The Corporation also provides and maintains street lighting, roads and basic infrastructure. Now, at the click of the mouse, citizens can see the sanitation plan of their street or the water supply plan of their ward, and are now able to know how all this is being done and by whom.

The process of lifting the garbage from the city and taking it to the landfills was previously not documented and was only manually accounted for. This practice led to corruption, inefficiency and ineffectiveness. With computerisation, the collection of garbage at the landfill and its weight is computerised and the same data is uploaded. It is, therefore, possible for the citizens to check the status of garbage removal from their wards at any specific date. The system has also helped the Corporation to internally streamline its operations and fix responsibility for poor sanitation.

- **Infrastructural Works Online**

The entire process of sanctioning and processing of infrastructural works has been computerised. This has helped the Corporation to monitor and keep a track of the execution of such works. This has also helped in keeping better control over any excess expenditure, which hitherto used to be the case. The entire module has also been linked to the Website so that the citizens are also able to see and monitor the status of the infrastructural works being taken up in their respective ward areas. This has also brought in transparency, as the furnished details clearly indicate the name of the contractor, the amount sanctioned, and the status of such projects, online. Thus, the entire procedure has become more open, transparent and accountable.

- **Online Citizen Forum**

The Website is providing a virtual meeting place for the citizens to discuss various issues and problems related to the city and come out with some prospective solutions. They now freely interact with each other, post their ideas and opinions and contribute towards social change. The Project inspires citizens to adopt parks, traffic points and render community development works-actually anything that they wish to do for the betterment of their city.

The Website provides an opportunity to the citizens to ventilate their grievances. They can have an online chat with the Mayor and the Commissioner about their problems and also render suggestions. They give them feedback of the development works and pursue them for the work not done. With internet kiosks spreading all over, the Project is unifying the communities and making them feel better.

Security

Besides the services, one of the most important considerations is that of protection and security. Every user sharing this database through the intranet is, therefore, given a password without which the access to the database is denied. The access to the database is also limited to the requirement of the individual user. Day-to-day transactions are also posted in an encrypted format in a separate database, so that the existing information is available for comparison with the encrypted information for detecting and avoiding any tampering, hacking, or misuse. In future, the possibilities of introducing firewalls and other security measures is also being explored and implemented.

12.5 PROJECT SAUKARYAM: MAJOR CONSTRAINTS

The major constraints to the development of the Project were as follows:

- resistance to change was inevitable, especially, from the vested interests that preferred to maintain the status quo. This Project also met with a similar response from the bureaucracy, which created many hurdles to see that the power they wielded over the information was not reduced by putting information into the public domain;
- openness and transparency in administration, which the Project attempted to achieve was also disliked by few sections of employees who feared getting exposed for their inefficiency;

- paucity of funds was also a limitation faced by the Project. This exactly was the reason that the Project took up public-private initiative of getting entrepreneurs to invest in the Project. The effort involved in laying the broadband line through the length and breath of the city was a Herculean task, especially so, when it was to be done in such a short time;
- developing public awareness about ICT and making the citizens use the medium for accessing civic services was also a challenging task; and
- political acceptability to the Project was another challenge, but that seemed to be successfully met when the Chief Minister of the State decided to replicate it elsewhere across the State.

12.6 CONCLUSION

For projects like Saukaryam, a Metro Area Network would have to be created through broad band/leased circuits. A large number of banks for accepting municipal payments and various municipal offices can be put on this Metro Area Network and connected to each other. A LAN encompassing all wings of the Municipal Corporation should form the backbone to this Metro Area Network. This Network can be, in turn, web-enabled that can provide access to citizens for multiple services. For the citizens who do not have access to the computer or internet, a fully computerised city civic centres on the Network can be created, delivering the same set of services.

Project Saukaryam of the Visakapatnam Municipal Corporation, based on such a network, is unique in the following ways:

- it has thrown open relevant information required by the citizens into the public domain. With this, the Project aims to bring in transparency, accountability and efficiency in service delivery;
- it has hosted a utility driven Website rendering online civic services to the people, hence, mitigating harassment of the citizens at the hands of corrupt and insensitive bureaucracy;
- it has set up one-stop shop providing all services at one place, thereby reducing the unnecessary movement of the citizens to number of government offices;
- it is providing multi-dimensional services, covering all aspects of governance ranging from taxation to public works to city sanitation;
- it has hosted a dynamic Website based on a fully computerised office system that enables instantaneous and automatic updation;
- it is enabling a virtual meeting place for the citizens who are freely taking part in city development; and
- it is rendering unhindered access, closing information gaps and uniting the communities.

The results for the Project have been stupendous. Ever since it has been commissioned, there is a tremendous increase in Corporation's revenue. Rather, it has made community involvement, multi-stakeholders participation, decentralisation, partnership, empowerment,

openness, efficiency and right to information possible at the level of urban local-self government.

The National Institute of Urban Affairs, the nodal agency for urban local bodies in the country has presented the award of 'Best Website' to the Visakhapatnam Municipal Corporation. The Project has also won the National IT Award instituted by the Computer Society of India for 'Best IT Usage' 2001. It has also won the UNDP's prestigious 'Cyber City Award,' and a grant of US \$20000 to expand the initiative to other cities.

12.7 ACTIVITY

Narrate an ICT project or an experiment of a similar nature being implemented in your State or Region or other states/region. You can highlight the background of the Project and the facilities and services rendered by it.

12.8 ANNEXE

New IT link for Rajasthan District Departments

District-level officers now need not send information manually but can update data periodically

The Hanumangarh district administration in Rajasthan has, with the help of National Informatics Centre (NIC), introduced a web-enabled software named 'District Info way' to collect, compile and consolidate information from various departments within the district. With the 'District Info way' in place, the District Level Officers (DLOs) need not send information manually but can update their data periodically.

The software simplifies the cumbersome procedure of collecting information of various schemes and programmes run in the districts for socio-economic development at grass-roots level. As the State Government frequently demands information from the districts, the administration has to compile and consolidate such information manually and after much paper work.

'Web-enabled District Info way is a new gateway of information at district level. The software consists of features to collect works and baseline notes rapidly with ample amount of purity. The Government Departments located at district and remote areas of the district can be connected to the intranet server using the dial up connectivity and submit the required information in electronic form by just roll of fingers on desktops,' T. Ravikant, Collector of Hanumangarh, observed talking about the IT initiative in his district.

Prior to developing of the software, an extensive survey was conducted to take stock of the IT resources available at all the Government offices in the district. The district administration set a deadline for the offices to install the required hardware. Meanwhile, NIC's District Informatics Officer Vishwanath Sharma and his associate Parvinder Singh prepared the software.

A Linux-based server installed at NIC automatically compiles and consolidates the information. "It is a ready reckoner," asserted Mr. Ravikant.

The Hindu n. d.

UNIT 13 E-SEVA: ICT PROJECT IN SELF-HELP IN ANDHRA PRADESH

Structure

- 13.0 Learning Outcomes
- 13.1 Introduction
- 13.2 Evolution of E-seva Project
- 13.3 Services Offered through e-seva Project
- 13.4 E-Seva: A Way Forward
- 13.5 Conclusion
- 13.6 Activity

13.0 LEARNING OUTCOMES

After studying this Unit, you should be able to:

- explain the concept of ‘e-seva;’
- describe the services rendered under the e-seva project; and
- examine some of the lessons learnt.

13.1 INTRODUCTION

The Project ‘e-seva’ (e-services) began in the district of West Godavari that falls in the State of Andhra Pradesh. The Project is a tool to bridge the digital divide and has used ICT for providing access to various citizen-to-citizen (C2C) and citizen-to-government (C2G) services to the people living in rural areas. Under this Project, web enabled rural kiosks (centres) have been established in the villages. The unique thing about these centres is:

- they are run and managed by the women self help groups; and
- they have been able to position the rural women as information leaders to help bridge the gender divide.

The Project, thus, provides information leadership to these groups and helps them act as change agents and makes it possible for them to grow in strength and stature with the Project.

These rural kiosks or centres are run on a district portal (<http://www.westgodavari.org>) that allows access to various citizen centric services. The computers in the kiosks are on a district wide network (a hybrid of dial up 802.11 and WiLL) helping kiosks interact with the district server hosting the local portal. To save on the networking cost, the Project has developed a unique synchronisation tool that allows the kiosks to work offline and

allows the databases to be periodically synchronised in minimal time. Besides, the horizontal portal is put on the global World Wide Web and allows vertical integration with the expanding frontiers of universal knowledge and information bank.

The Project uses the opportunities that the ICT offers in empowering the citizens and allows e-enabled education inputs to children to build their creative insights. It offers a wide range of services from the issuance of various certificates to getting information about various programmes and also networking citizens and allowing them the flexibility and convenience of mutually beneficial transactions. It also allows access to hitherto marginalised communities and helps in bridging the existing information gaps. It is, therefore, a step towards digital unite.

It would be meaningful to have a look at the growth of this Project over a period of time. The broad dates are discussed as below.

13.2 EVOLUTION OF E-SEVA PROJECT

The stages of evolution of e-seva Project is mentioned as below:

June 2002

A pilot ICT initiative to strengthen the self-help groups started in one block of the district of West Godavari.

November 2002

A comprehensive programme to deliver civic services at rural points in convergence with self-employment schemes envisaged and conceptualised.

January 2003

The Project e-seva in West Godavari district for providing access to various C2C (citizen-to-citizen) and C2G (citizen-to-government) services to the people living in rural areas through web enabled rural kiosks started in 46 places.

June 2003

The Project getting evolved and institutionalised recording over 300000 transactions by this time.

September 2003

Partnership with Azim Premji Foundation forged to initiate model whereby children from the elementary government schools can daily come and learn at the centres through multi media CDs.

November 2003

- 120 more centres added to the Project fold;
- E-enabled education reaches to over 28000 students, transactions cross 600000 in number.

July 2004

- Number of students taking e-enabled education increases to 70000;
- Centres getting a bigger look and their own buildings.

October 2004

- Number of transactions cross 1.5 million;
- Over 350 million rupees collected against electricity bills.

December 2004

The centres and the Primary Health Centres start the tele-medicine to seek expert advice for the poor patients; over 50 patients receiving the benefits every day.

January 2005

- Transactions cross 2 million;
- Project conferred the 'National Award for Exemplary Implementation of E-Governance Initiative,' 2004 ('Gold Icon') under the Innovative Operations and Best Practices – Professional Category, by the Government of India.

February 2005

A strategy titled 'Closing School' for intensively training graduate unemployed youth in computers, English and communication and other managerial skills for corporate placement launched.

The Project has been developed using local knowledge and local content by local professionals. The development of the portal and operationalisation of the applications and tools has been designed for local situations and network speeds. All the kiosks have, in turn, been handed over to women and youth self-help groups for running on business lines. These individuals have also been trained and have shown remarkable improvement in their possessed skills. The content on the citizen petitions is also in local language. Although Roman alphabets are being used currently, steps are on to switch over to the local language fonts.

13.3 SERVICES OFFERED THROUGH E-SEVA PROJECT

A number of services are made available to the people through the e-seva Project. We will discuss them individually.

- **Online Filing of Complaints and Grievances**

The Project allows citizens to file their grievances in these centres. Every grievance is acknowledged and transferred online for bringing in field level action. Concerned departments can easily monitor registered grievances by logging with their user id and passwords specifically assigned to them. The real time summary statistics and performance summary statement of the individual departments can be seen and verified. The citizens can verify and track the status of their grievance disposal online. The Project works on the principle that the citizen need not go himself to the authorities if someone can carry his grievance and in this case if a telephone wire can do that, where is the need for them to act

otherwise? Citizens now need not wait if there is a drinking water problem or a non-functioning fair price shop or a government functionary not doing his duty. All this is only one click away now. Till date, over 12000 different grievances relating to various departments have been received from the citizens and over 11000 of them pertaining to various problems have been redressed.

- **Online Application Registration**

The citizens avail various development and welfare programmes of the government. This may range from getting a loan under self-employment schemes to applying for an old age pension or asking for subsidised agricultural inputs. Instead of moving from offices to offices and getting harsh responses, the citizens just need to come to the kiosk and apply online. They get their acknowledgement number and the rest is taken care of. The module provides for online forwarding, transmission, handling and disposal of such requests, which would, therefore, minimise the disposal time and the concomitant (simultaneous/concurrent) citizen effort to get their cases redressed. The interconnectivity and linkage with the citizen database also helps in weeding out bogus and repeat cases. The old age pensions were computerised and put on the Project Website along with the photographs and the citizen identification number that helped the administration to weed out over 7000 bogus names saving over Rs. 7 million for the State.

- **Issuance of Certificates**

There are many kinds of certificates that the citizens require from the governments, the important among them being the caste and the nativity certificate. The citizen now need not go to the Mandal Revenue Office for these works. He can apply directly at the e-seva centre from where the request is transmitted online; the certificates are prepared and made available to the applicant at the kiosk itself without any inconvenience and without any drudgery of sifting through offices. The philosophy behind this intervention is that citizen always loathes approaching a government department for the fear of getting discourteous treatment and being subjugated to corrupt practices. The Project, therefore, improves upon this interface and expects them to come to a centre run by their own peers, a place that is much more accountable, open, transparent and subject to public scrutiny. Over 350000 certificates have so far been issued to the citizens that tantamount (sufficient) to a saving of over Rs. 30 million to the citizens, an indirect cost that the hapless citizen incurs due to rampant corruption in issuance of such certificates.

- **Issuance of Land Records**

The Seventh Five-year Plan document rightly opined, 'land records form the base for all land reforms and, therefore, regular periodic updating of land records is essential in all states.' The information relating to land plays a very important role. The Project has cast this data into the public domain to support development of a citizen centric land records system. The result is evolution of a transparent and effective land record delivery system that fully addresses the insecurities and concerns of the farmers.

- **Online Auctions and Bidding**

One fundamental reason for the rural-urban divide is the lack of well-developed markets in the rural areas hindering efficient sale and purchase of goods. As a result, most of the decisions made by the farmers and the rural poor are based on insufficient information and are, therefore, sub-optimal and in majority of the cases go against them. The Project

has been trying to fill in these information gaps and allow the rural people to post their products for online auctions at any of the e-seva kendras/centres. This has also opened the possibility for the DWACRA (Development of Women and Children in Rural Areas) and self-help groups to market their products directly, without any middlemen, horizontally within the district and vertically outside. There is also a facility for citizens to send in gifts to their near and dear ones.

- **Online Mandi (market) Rates**

Ideally, an average household makes a decision on buying or selling goods and products on the basis of information they collect locally. Every kendra uploads the market rates prevailing in their area, which are then available to everyone. The rates in other markets elsewhere in the State are also available for the citizens to watch the trends and make the right decision after weighing all options.

- **Payment of Dues**

The kendras offers the facility to the citizens to pay their electricity bills, telephone bills or dues of land revenue. The departments, too, gain because of expeditious collections. They save on collection costs and time and are able to monitor performance simultaneously.

The women self-help groups through these e-seva centres have so far collected over 1.4 million bills amounting to Rs.400 million without any difficulty.

- **Easy Access to Information**

The Right to Information act is well served by the E-seva kendras. The kendras through the district portal allows access to all kinds of necessary information to the citizens. Apart from the governmental programmes, one is able to access the databases pertaining to old age pensions, ration cards, multi-purpose household survey records, self-employment schemes, civil works, etc. This induces transparency in the implementation of these programmes and facilitates weeding out ineligible cases to enable corresponding benefits to reach the needy.

- **Matrimonial Services**

An online marriage bureau has been operationalised so that prospective brides/grooms can place their bio-data eliciting suitable offers, making search for life partners easier and cost effective.

- **Tele-medicine**

Videoconference with specialists through the e-seva portal is proving to be of great help to the needy in remote areas where medical expertise may not be available. In such areas it can be possible that instead of the patient travelling all over for medical advice and treatment, the request for the same can travel on wire to a distant medical centre/medical specialist and the right prescription/diagnosis can travel back to the patient wherever he/she may be. This has enabled better medical and health services in the rural areas.

- **Tele-agriculture**

A lot of questions relating to farm practices many times go unanswered, resulting in incorrect input applications. The Portal acts as a round the clock helpline for handling such queries.

- **Forms Download**

There are various forms that every department has for use by the citizens. The kendra acts as a one-stop shop for downloading all such forms. Any changes in them would also get reflected in real time.

- **Citizen Forum**

The kendra through the Portal provides a virtual meeting place for the citizens to discuss issues relating to their district/villages and come out with prospective solutions. The citizens can now freely interact with each other, vent their ideas and jointly work towards social change. This also provides opportunity to conduct opinion polls on important matters, hence, leading to improved and participative decision-making. There is also a feature called I-look for citizens to post news and views.

- **E-education**

The digitised inputs on computer enabled education made available in the e-seva centres has enriched the analytical and thinking abilities of the rural students. This has opened to them the advanced frontiers of knowledge. The Project has tied up with an NGO for the supply of computer enabled CDs and all centre in-charges have been given training. Over 70000 elementary school students are currently taking classes, thrice in a month, at their nearest e-seva kendra. This also underscores the point that the advantages of ICT cannot be limited to a few sections of the society and everybody has an equal right to access the same. Internet being the worlds' biggest library helps the citizens to gain access to a brave new world of information.

- **Common Accounts Keeper for Self-Help Groups**

The kendras help in synergising and pooling the efforts of women self-help groups. Instead of individual groups maintaining their own accounts, the self-help groups are in a position to use the Project computer for maintaining their internal lending records and also enter into online transactions with their banks. Some of the banks are also planning to put the ATM counters in some kendras, which would further facilitate the monetary transactions of these groups.

13.4 E-SEVA: A WAY FORWARD

The Project has had a tremendous impact in furthering the gender and digital unite. It has been able to strengthen the women self-help groups and provide services to the citizens in a hassle free manner. With over 160 kiosks in the district, the Project has completed more than 2 million transactions in 2005. An amount of over Rs 4500 million has been collected as electricity bills without any difficulty. All these centres are doing good business and are becoming self-sustainable. They are earning between Rs 10000 to Rs 25000 per month. Many of the centres are also adopting innovative methods of revenue generation. 13000 different grievances have been received from the citizens, out of which over 12000 have been redressed. The Project has led to a citizen centric land records system resulting in evolution of a transparent and effective land record delivery system fully addressing the insecurities of the farmers. The Project has also opened the possibility for the self-help groups to market their products directly, without any middlemen,

to citizens horizontally within the district and vertically outside. The Project portal is gaining grounds and has large number of pages and databases related to the district and the citizens. The data pertaining to over 4 million citizens in varied form is available on the Website. The Website has also become a major dissemination and broadcasting tool for the various welfare programmes. The Project has helped in the creation of a knowledge and information economy thereby bringing in more opportunities and prosperity to the impoverished areas of the district. The Project has also induced transparency in the implementation of the government programmes and has facilitated the benefits to reach down to the poor.

The Project has won the 'Gender ICT Award' at the World Summit on Information Society, Geneva, December 2003. The Project has also won the first prize in the National Awards of the Computer Society of India, 2003. Recently, it has bagged the 'Golden Icon Award,' Government of India for its innovative operations.

The Project recognises that no matter what the rhetoric is, real right to information is possible only if the information is put into the public domain and new technologies provide the most cost-effective solutions in doing that.

13.5 CONCLUSION

The Project is now 43 months old and it would be apt if we have a look at the following findings and lessons learnt.

- the Project has proved that by combining the resources and energies of groups and individuals to pursue self-employment, a viable low cost alternative to bring in the benefits of ICT can be created and sustained;
- the initiative has demonstrated that such projects can bring in transparency in the functioning of the administration to a plausible extent and allow an independent domain and space to the citizens to interact with government;
- such a Project can address a wide range of services that can bring additional returns to the operator and provide opportunities to the citizens to become part of the tech savvy world; and
- such a Project requires a strong will at the highest level, political and administrative, so as to overcome the pressures and obstacles of vested interests.

The Project can be replicated by other state governments to render effective public services to the people and create a responsive administration at the rural level.

13.6 ACTIVITY

Let us know about ICT projects/experiments of similar nature being implemented in your State or other states and regions.

UNIT 14 INFORMATION POLICY: RIGHT TO INFORMATION ACT 2005

Structure

- 14.0 Learning Outcomes
- 14.1 Introduction
- 14.2 Need for the Right to Information
- 14.3 A Brief History
- 14.4 Right to Information Act 2005
- 14.5 Duties and Responsibilities
- 14.6 Information Commissions-Central and State
- 14.7 Powers and Functions of Information Commission
- 14.8 Role of Government
- 14.9 Reporting Procedure
- 14.10 Important State Initiatives
- 14.11 Right to Information Act 2005-Critical Gaps
- 14.12 Suggestions
- 14.13 Conclusion
- 14.14 Activity
- 14.15 References and Further Readings

14.0 LEARNING OUTCOMES

After studying the Unit, you should be able to:

- explain the need to have a right to information;
- describe the brief history of the efforts made in the direction of right to information in the country;
- discuss the Right to Information Act 2005;
- describe the duties and responsibilities of the officials concerned;
- explain the powers and functions of the Information Commission; and
- analyse the critical success gaps in the implementation of the Act and suggest ways towards its effective implementation.

14.1 INTRODUCTION

The time that we live in is also known as the information age. The technological revolution has brought us to an era where information is easily transmitted from one corner of the world to another. But, the functioning of the government is still marred by the hangover of the permit licence raj and there is an inherent unwillingness amongst government servants to part with information regarding the working of the government. However, over the last few years, there has been an increasing demand for greater accessibility to information, mostly in order to curb corruption and promote greater accountability of government agencies towards the citizens.

In India, the Constitution has established a government that is of the people, for the people and by the people. Thus, the people have a right to know how the government is functioning. A series of Supreme Court verdicts has also recognised that the right to know is an intrinsic part of the right to freedom of speech and expression. The court has opined that the citizen has a fundamental right to information, that is, to 'know', in order to formulate and express his or her views. The fundamental right to know is also further strengthened by the right to life and personal liberty, and also by the right to equality, both of which are provided for by the Constitution of India, since this implies that all stakeholders must have an access to the facts that affect their lives.

The right to information has been a subject of discussion not only in India, but also at the international level. Article 19 of The International Covenant on Civil and Political Rights (ICCPR), signed among others by India, defines the parameters of people's right to information. It lays down that every citizen shall have the right to freedom of opinion and expression, which shall include 'freedom to seek, receive and impart information and ideas of all kinds, regardless of frontiers, either orally, in writing or in print, in the form of art or through any other media of his choice.' The Covenant has at the same time placed 'reasonable restrictions' on this right only to the extent of safeguarding 'rights or reputation of others' and 'protecting national security or of public order, or of public health and morals.'

Thus, it is quite clear that right to information lies at the root of all fundamental rights. Failure of the state to provide access to information or state suppression of information can lead to any number of human rights violations. The right to information is fundamental to the realisation of rights as well as effective democracy, which requires informed participation by all.

This Unit seeks to familiarise the learners with the need for a right to information law and the background in which the Right to Information Act 2005 has been brought into force. It will also familiarise the learners with the key provisions of the Act and some of the important state initiatives that have been taken to ensure its effective implementation

14.2 NEED FOR THE RIGHT TO INFORMATION

Every citizen has a right to know how the government is functioning. Right to information empowers every citizen to seek any information from the government, inspect any government documents and seek certified photocopies thereof. Some laws on right to information also empower citizens to inspect any government work or to take sample of

material. In a democratic set up, the governments are by the people, of the people and for the people. The taxes collected by the government from the people are used to finance the functioning of the government. Hence, the people have a right to know how they are being governed and how the public money is being used.

In recent years, there has been an increasing concern about transparency in the working of government in the context of responsive administration and accountability. Transparency implies that a decision is taken on announced norms and criteria, based on principles of fairness and equity and such decision making is made visible to those concerned. It has been pointed out that while even routine information is not available as freely as it was some years ago and enquiry reports and study reports in the preparation of which large sums of money have been spent are seldom published in time for public information, the citizen has absolutely no means of knowing how a government decision is arrived at.

The preamble to the Right to Information Act 2005 very succinctly sums up the need to have a law for right to information.

'Whereas the Constitution of India has established Democratic Republic;

And whereas democracy requires an informed citizenry and transparency of information which are vital to its functioning and also to contain corruption and to hold governments and their instrumentalities accountable to the governed;

And whereas revelation of information in actual practice is likely to conflict with other public interests including efficient operations of the governments, optimum use of limited fiscal resources and the preservation of confidentiality of sensitive information;

And whereas it is necessary to harmonise these conflicting interests while preserving the paramountcy of the democratic ideal;

Now, therefore, it is expedient to provide for furnishing certain information to citizens who desire to have it.'

Therefore, right to information is essential for citizens of a truly democratic state for the following reasons:

- **To ensure a transparent government which is accountable to the people-** the right to information ensures that the people have access to the information regarding the working of the government, which in turn leads to transparency, uniformity and accountability in decision making. It forces the government to adopt the same set of rules and procedures for all people and any deviations from the norms can be brought into the public domain.
- **To establish a two-way dialogue between the citizens and the government-** openness and information sharing establishes a two-way dialogue between citizens and the state, reducing distance between government and people and thereby combating feelings of alienation. It enables people to be a part of the decision-making processes and scrutinise it. It also reduces the citizens' feelings of powerlessness. Also, access to information and the ability to scrutinise the processes also lead to reduced incidence of public perception of exclusion from opportunity or unfair advantage of one group over another.

- **To enable a citizen to make well-informed decisions-** the ability to find out about the functioning of government agencies and the performance of elected representatives helps the citizens to make well-informed choices. This is particularly so while casting their votes, since a well-informed citizen can base his choice on the basis of performance, rather than narrow considerations of caste or groupism.
- **To tackle corruption-** this is one of the most important areas which the right to information affects. Once the functioning of the government is open to public scrutiny, it becomes difficult for government functionaries to get away with corrupt practices.
- **To ensure better monitoring of the services provided by the government-** in India, the campaign for right to information has focussed a lot on this aspect and a number of people have actually exercised the right to information to get information about ration shop quotas and how they are distributed, or to scrutinise fake muster rolls and point out the loopholes in execution of development works. Thus, having a right to information ensures better monitoring of government services. It is also useful in setting the parameters for those services that have been privatised or are being provided through the NGOs and private operators.

However, it is not sufficient just to recognise the citizen's right to information. The law also needs to provide machinery for enabling the citizen to exercise this right. Moreover, no right is absolute. Thus, there is also a need to define the parameters within which the citizen can exercise the right to information, without jeopardising the security of the nation and infringing on the privacy of another individual. It is also important to spell out the responsibilities of the government functionaries who have to actually provide the information, so that the citizen is not unduly harassed. A law on right to information sets out, in a systematic manner, all these aspects and provides the machinery for the same. If a citizen goes to a government office and demands an officer to show all his files because it is his fundamental right, the officer is most likely to refuse unless there is a specific provision that binds him to do so. Thus, the right to information laws provide for forms in which one can apply, where one can apply, in how many days one should get the information and what if the information is not provided within the stipulated time frame.

14.3 A BRIEF HISTORY

The formal recognition of a legal right to information in India occurred more than two decades ago, when the Supreme Court of India ruled in the case of *State of UP vs. Raj Narain* in the year 1975 that the right to information is implicit in the right to freedom of speech and expression explicitly guaranteed in Article 19 of the Indian Constitution. Subsequently, the Court has affirmed this decision in numerous cases and has even linked the right to information with the right to life enshrined in Article 21 of the Constitution.

Prior to the enactment of a comprehensive law on access to information, access via Central legislation was available only in a piece-meal form. For example, the Factories Act 1948 provides for compulsory disclosure of information to factory workers regarding dangers, including health hazards, and the measures to overcome such hazards arising from their exposure to dangerous materials. Further, the Environment (Protection) Act 1986 and the Environmental Impact Assessment Regulations provide for instances of public consultation and allow access to information about the pollution caused by industries covered by the Regulations.

The active campaign for the right to information grew out of the demand for minimum wages in rural India. The Mazdoor Kisan Shakti Sangathan (MKSS) headed by Smt Aruna Roy, spearheaded the campaign against the ghost entries in the muster rolls and rampant corruption in the system, and asked for the information recorded in official files. The movement soon spread across India. From very modest beginning in the villages of Rajasthan, the demand for information regarding development works, copies of muster rolls, taking samples of the material used in construction and inspection of work carried out soon spread to other states in India.

In 1993, the Consumer Education and Research Council, Ahmedabad (CERC) proposed a draft RTI law. In 1996, the Press Council of India headed by Justice P. B. Sawant presented a draft model law on the right to information to the Government of India. The draft model law was later updated and renamed the PCI-NIRD Freedom of Information Bill 1997. Unfortunately, the Government seriously considered none of the draft laws.

Meanwhile, MKSS's advocacy gave rise to the National Campaign on People's Right to Information (NCPRI), which was formed to advocate for the right to information at the national level. Constituted in 1996 in New Delhi, the NCPRI aims to provide active support to grassroots struggles for the right to information and to lobby government to enact and implement the effective access to information legislation.

In 1997, efforts to legislate for the right to information at both the Centre and States gained momentum. A working group under the chairmanship of Mr. H. D. Shourie (the Shourie Committee) was set up by the Central Government and given the mandate to prepare draft legislation on freedom of information. The Shourie Committee's Report and draft law were published in 1997. Notably, the draft law was criticised for not adopting a high enough standard of disclosure.

However, the growing demand for the right to information ultimately led to the formulation of the Right to Information Act by Tamil Nadu in 1997 and Goa in 1998. Thereafter, seven other States have passed legislation - Rajasthan (2000), Karnataka (2000), Delhi (2001), Maharashtra (2002), Assam (2002), Madhya Pradesh (2003) and Jammu and Kashmir (2003). Campaign efforts in other States have also had some success. Uttar Pradesh framed an executive code on access to information in 2000. Kerala and Orissa also have now prepared draft bills for the same.

The Shourie Committee draft law passed through two successive governments, but was never introduced in Parliament. Meanwhile in 1999, Mr Ram Jethmalani then Union Minister for Urban Development, issued an administrative order enabling citizens to inspect and receive photocopies of files in his Ministry. However, this order never came into effect.

Eventually, the Shourie Committee draft law was reworked into the Freedom of Information Bill 2000. The 2000 Bill was sent to the Parliamentary Standing Committee on Home Affairs, which consulted with civil society groups before submitting its Report in July 2001. The Committee recommended that the Government address the flaws in the draft Bill pointed out by civil society groups. Unfortunately, the Government did not implement that recommendation.

The Freedom of Information (FOI) Act 2002 was passed in January 2003. However, a date for the Bill coming into force was never notified, such that it never actually came into operation.

In 2004, a public interest litigation case being pursued by Advocate Prashant Bhushan on behalf of the NCPRI and Centre for Public Interest Litigation, tried to compel the Government to come out with the FOI Act immediately. The Supreme Court heard the case on 20 July 2004. The Supreme Court's Order set a deadline of 15 September 2004 for the Central Government to advise when the Act will be notified and if not, when interim administrative guidelines would be issued. In the meantime, on 12 August 2004, the Department of Personnel and Training, Ministry of Personnel, Public Grievances and Pensions finally released Draft Rules under the Freedom of Information Act 2002.

In May 2004, United Progressive Alliance (UPA) Government came into power at the Centre. The national campaign for right to information received a major boost with UPA Government's Common Minimum Programme promising to make the Right to Information Act more progressive, participatory and meaningful.

The Right to Information Bill 2004 (RTI Bill 2004) was tabled on 23 December 2004 in the Lok Sabha. It was referred by Parliament to the Department Related Standing Committee on Personnel, Public Grievances, Law and Justice for consideration. A range of civil society activists appeared before this Committee and gave their recommendations. The Report of the Committee (including a proposed amended version of the RTI Bill) was tabled in the Lok Sabha on 21 March 2005. The Lok Sabha passed the bill on 11 May 2005 and Rajya Sabha on 12 May 2005. On 15 June 2005, President A.P.J. Abdul Kalam gave his assent to the national Right to Information Act 2005. With Presidential assent, the Central Government and State Governments had 120 days to implement the provisions of the Bill in its entirety. The Act came into force on 12 October 2005.

14.4 RIGHT TO INFORMATION ACT 2005

As per the Right to Information Act 2005 (RTI Act 2005), the right to information includes the right to:

- inspect works, documents, and records;
- take notes, extracts or certified copies of documents or records;
- take certified samples of material; and
- obtain information in form of printouts, diskettes, floppies, tapes, video cassettes or in any other electronic mode or through printouts.

Important Definitions

Some of the important terms used in the RTI Act 2005 and their definitions as per the Act are as given below:

- **Information:** records, documents, memos, e-mails, opinions, advice, press releases, circulars, orders, logbooks, contracts, reports, papers, samples, models, data material held in electronic form and information about private bodies can be accessed under existing laws by a public authority.
- **Public Authority:** any authority or body or institution of self- government established or constituted by or under the Constitution or by any other law made by Parliament

or the State Legislature, and includes any body or a non-government organisation owned, controlled or substantially financed, directly or indirectly by funds provided by the appropriate government.

- **Record:** includes any document, manuscript and file; any microfilm, microfiche and facsimile copy of a document; any reproduction of image or images embodied in such microfilm (whether enlarged or not); and any other material produced by a computer or any other device.
- **Central Public Information Officer and State Public Information Officer:** the Central Public Information Officer (CPIO) designated under sub-section (1) and includes a Central Assistant Public Information Officer (CAPIO) designated as such under sub-section (2) of Section 5. It is the duty of every public authority to designate as many officers as the CPIOs or SPIOs, as the case may be, in all administrative units or offices under it, as may be necessary to provide information to persons requesting for the information under this Act, within one hundred days of the enactment of this Act. Besides, as per sub-section (2), every public authority shall designate an officer, within one hundred days of the enactment of this Act, at each sub-divisional level or other sub-district level as a CAPIO or a SAPIO, as the case may be, to receive the applications for information or appeals under this Act for forwarding the same forthwith to the CPIO or the SPIO or senior officer specified under sub-section (1) of Section 19 or the Central Information Commission (CIC) or the State Information Commission (SIC), as the case may be. It is the duty of the Central or State PIO to deal with requests from persons seeking information and render reasonable assistance to the persons seeking such information, and for this purpose he can take assistance of any other officer or official as he deems fit.
- **Appellate Authority:** the officer immediately senior in rank to the PIO, and appointed by the appropriate public authority as such.
- **Central Information Commission:** the CIC is constituted under sub-section (1) of Section 12 of the Act. It consists of a Chief Information Commissioner and such number of Information Commissioners, not more than ten, as deemed necessary. They are to be appointed by the President on recommendation of a Committee consisting of the Prime Minister, the Leader of Opposition in the Lok Sabha and a Union Cabinet Minister nominated by the Prime Minister.
- **Chief Information Commissioner and Information Commissioner:** the Chief Information Commissioner and Information Commissioner are appointed under sub-section (3) of Section 12 of the RTI 2005 by the Central Government. Every Information Commissioner shall hold office for a term of five years from the date on which he enters upon his office or till he attains the age of sixty-five years, whichever is earlier, and shall not be eligible for reappointment.
- **State Information Commission:** the SIC is constituted under sub-section (1) of Section 15. The Commission shall consist of the State Chief Information Commissioner, and such number of State Information Commissioners, not exceeding ten, as may be deemed necessary. They are to be appointed by the Governor on recommendation of a Committee consisting of the Chief Minister, the Leader of Opposition in the

State Legislative Assembly and a State Cabinet Minister nominated by the Chief Minister.

- **State Chief Information Commissioner and State Information Commissioner:** the State Chief Information Commissioner and the State Information Commissioner are appointed under sub-section (3) of Section 15. The State Chief Information Commissioner and the State Information Commissioners shall be persons of eminence in public life with wide knowledge and experience in law, social service, management, journalism, science and technology, mass media or administration and governance.
- **Competent Authority**
 - (i) Speaker in the case of the House of the People or the Legislative Assembly of a State or a Union territory having such Assembly; and the Chairman in the case of the Council of States or Legislative Council of a State;
 - (ii) Chief Justice of India in the case of the Supreme Court;
 - (iii) Chief Justice of the High Court in the case of a High Court;
 - (iv) President or the Governor, as the case may be, in the case of other authorities established or constituted by or under the Constitution; and
 - (v) Administrator appointed under Article 239 of the Constitution.
- **Third Party**

A person other than the citizen making a request for information and includes a public authority. If information is given by third party and treated as confidential by the third party then PIO must give it written notice inviting objections, if any. Third party must be given notice within 5 days of receiving information request. It may give verbal or written submissions to PIO within 10 days of receiving notice, and may approach the appellate authority within 30 days and the Information Commission within 90 days.

Procedure for Obtaining Information

The detailed procedure for applying for obtaining information under this Act has also been laid down by the Government. The applicant can apply in writing or through electronic means in English or Hindi or in the official language of the area, to the PIO, specifying the particulars of the information sought for. The applicant is not obliged to give the reasons for asking for the information. The applicant has to make the application along with the prescribed fee. However, no fee is to be paid by a person living below the poverty line.

Information has to be provided to the applicant within 30 days of making application to the PIO. In case the application has been made to the APIO, 5 more days are added. However, in cases involving life and liberty of an individual, information has to be made available within 48 hours. In case information sought involves the interests of a third party, the maximum time limit will be 40 days, that is, 30 days plus 10 days given to the third party to make its representation.

However as per Section 8 and 9 of the Act, the PIO can reject the application if the information asked falls under the category of information not to be disclosed, or if it

infringes the copyright of any other body than the state. If the PIO fails to provide the information within 30 days, it would be deemed to be a refusal, and the applicant will have a right to go into appeal to the Appellate Authority or the Information Commission. The Act also provides for a fine on the PIO at the rate of Rs. 250 per day, subject to a maximum of Rs. 25,000, if there is a delay beyond 30 days in providing information.

The first appeal is an internal appeal to the Appellate Authority within the organisation who has to decide the appeal within 30 days. The second appeal is external, and is made to the Central or State Information Commission, as the case may be, within 90 days of the rejection by the Appellate Authority. However, the delay in filing appeal beyond 90 days may be condoned if sufficient cause is shown. There is no time limit for the Information Commission to decide the appeal. The burden of proof for rejecting the application lies on the PIO. An appeal can be made against the order of the Information Commission only before the High Court and not to any lower courts.

Information that cannot be Disclosed

The Act lays down the information that cannot be disclosed. As per Section 8 of the Act, the following information is not open to disclosure:

- information, disclosure of which would prejudicially affect the sovereignty and integrity of the nation; the security and strategic, scientific or economic interests of the State; and relation with foreign state;
- information disclosure of which may lead to incitement of an offence;
- information, which has been expressly forbidden to be published by any court of law or tribunal or the disclosure of which may constitute contempt of court;
- information, the disclosure of which would cause a breach of privilege of Parliament or the State Legislature;
- information including commercial confidence, trade secrets or intellectual property, the disclosure of which would harm the competitive position of a third party, unless the competent authority is satisfied that larger public interest warrants the disclosure of such information;
- information available to a person in his fiduciary relationship, unless the competent authority is satisfied that the larger public interest warrants the disclosure of such information;
- information received in confidence from foreign government;
- information, the disclosure of which would endanger the life or physical safety of any person or identify the source of information or assistance given in confidence for law enforcement or security purposes;
- information, which would impede the process of investigation or apprehension or prosecution of offenders;
- cabinet papers including records of deliberations of the Council of Ministers, secretaries and other officers; and

- information, which relates to personal information the disclosure of which has no relationship to any public activity or interest, or which would cause unwarranted invasion of the privacy of the individual.

However, notwithstanding any of the exemptions listed above, a public authority may allow access to information, if public interest in disclosure outweighs the harm to the protected interests. Partial disclosure of the information is also allowed. If the record asked for contains any information, which cannot be disclosed under the Act, that part, which is exempt from disclosure, will be removed and the remaining information is provided to the applicant.

As per Section 24 of the Act, central intelligence and security agencies specified in the Second Schedule-Intelligence Bureau, Research and Analysis Wing, Directorate of Revenue Intelligence, Central Economic Intelligence Bureau, Directorate of Enforcement, Narcotics Control Bureau, Aviation Research Centre, Special Frontier Force, Border Security Force, Central Reserve Police Force, Indian Tibetan Border Police, Central Industrial Security Force, National Security Guard, Assam Rifles, Special Service Bureau, Special Branch (CID), Crime Branch-CID, Lakshadweep Police- and agencies specified by the state governments through a notification will be excluded from providing information. The exclusion, however, is not absolute and these organisations have an obligation to provide information pertaining to allegations of corruption and human rights violation. Further, information relating to allegations of human rights violation could be given but only with the approval of the Central or State Information Commission, as the case may be.

14.5 DUTIES AND RESPONSIBILITIES

The various authorities and officers constituted and appointed under the RTI Act 2005 have been assigned specific duties under the Act. The Act is quite unambiguous in this regard, and specific time frame has been laid down to fulfil these responsibilities.

Public Authority

A public authority has been defined as any authority or body or institution of self-government established or constituted by or under the Constitution or by any other law made by Parliament or the State Legislature, and includes any body or a non-government organisation owned, controlled or substantially financed, directly or indirectly by funds provided by the appropriate government.

The obligations of the public authority are to proactively disclose the following details about itself:

- particulars of its organisation, functions and duties;
- powers and duties of its officers and employees;
- procedure followed in its decision-making process, including channels of supervision and accountability;
- norms set by it for the discharge of its functions;
- rules, regulations, instructions, manuals and records used by its employees for discharging the functions;

- statement of the categories of the documents held by it or under its control;
- particulars of any arrangement that exists for consultation with or representation by the members of the public, in relation to the formulation of policy or implementation thereof;
- statement of the boards, councils, committees and other bodies consisting of two or more persons constituted by it. Additionally, information as to whether the meetings of these are open to the public, or the minutes of such meetings are accessible to the public;
- directory of its officers and employees;
- monthly remuneration received by each of its officers and employees, including the system of compensation as provided in its regulations;
- budget allocated to each of its agency, indicating the particulars of all plans, proposed expenditures and reports on disbursements made;
- manner of execution of subsidy programmes, including the amounts allocated and the details and beneficiaries of such programmes;
- particulars of recipients of concessions, permits or authorisations granted by it;
- details of the information available to or held by it, reduced in an electronic form;
- particulars of facilities available to citizens for obtaining information, including the working hours of a library or reading room, if maintained for public use;
- names, designations and other particulars of the public information officers; and
- any other information.

Also, it is the duty of each public authority to appoint PIOs in each and every office under its jurisdiction and also to appoint Assistant PIOs at sub-divisional level. The public authority is also obliged to appoint appellate authorities within the organisation.

Public Information Officers

PIOs are officers designated by the public authorities in all administrative units or offices under it to provide information to the citizens requesting for information under the Act.

The duties of a PIO are as follows:

- PIO shall deal with requests from persons seeking information and where the request cannot be made in writing, to render reasonable assistance to the person to reduce the same in writing;
- if the information requested for is held by or its subject matter is closely connected with the function of another public authority, the PIO shall transfer, within 5 days, the request to that other public authority and inform the applicant immediately;
- PIO may seek the assistance of any other officer for the proper discharge of his/her duties;

- PIO, on receipt of a request, shall as expeditiously as possible, and in any case within 30 days of the receipt of the request, either provide the information on payment of such fee as may be prescribed or reject the request for any of the reasons specified in S.8 or S.9. Where the information requested for concerns the life or liberty of a person, the same shall be provided within forty-eight hours of the receipt of the request;
- if the PIO fails to give decision on the request within the period specified, he shall be deemed to have refused the request;
- where a request has been rejected, the PIO shall communicate to the requester - (i) the reasons for such rejection, (ii) the period within which an appeal against such rejection may be preferred, and (iii) the particulars of the appellate authority;
- if allowing partial access, the PIO shall give a notice to the applicant, informing
 - (i) that only part of the record requested, after severance of the record containing information which is exempt from disclosure, is being provided;
 - (ii) the reasons for the decision;
 - (iii) the name and designation of the person giving the decision;
 - (iv) the details of the fees calculated by him or her and the amount of fee which the applicant is required to deposit; and
 - (v) his or her rights with respect to review of the decision regarding non-disclosure of part of the information, the amount of fee charged or the form of access provided.
- if information sought has been supplied by third party or is treated as confidential by that third party, the PIO shall give a written notice to the third party within 5 days from the receipt of the request and take its representation into consideration; and
- third party must be given a chance to make a representation before the PIO within 10 days from the date of receipt of such notice.

14.6 INFORMATION COMMISSIONS- CENTRAL AND STATE

The Central Information Commission (CIC) is constituted by the Central Government through a Gazette notification. It shall consist of a Chief Information Commissioner and Information Commissioners, not exceeding ten in number, who will be appointed by the President of India on recommendation of a Committee consisting of the Prime Minister, the Leader of Opposition in the Lok Sabha and a Union Cabinet Minister nominated by the Prime Minister. The President of India according to the form set out in the First Schedule will administer oath of office. The Commission shall have its Headquarters in Delhi. Other offices may be established in other parts of the country with the approval of the Central Government. Commission will exercise its powers without being subjected to directions by any other authority.

Similarly, the state government through a Gazette notification shall constitute the State Information Commission. It will have one State Chief Information Commissioner and not more than 10 State Information Commissioners to be appointed by the Governor on

recommendation of an Appointments Committee headed by the Chief Minister. Other members include the Leader of the Opposition in the Legislative Assembly and one Cabinet Minister nominated by the Chief Minister. The Governor according to the form set out in the First Schedule will administer oath of office. The headquarters of the State Information Commission shall be at such place as the state government may specify. Other offices may be established in other parts of the state with the approval of the state government.

Eligibility Criteria

Candidates for Chief Information Commissioner/Information Commissioners must be persons of eminence in public life with wide knowledge and experience in law, science and technology, social service, management, journalism, mass media or administration and governance. Chief Information Commissioner/Information Commissioner shall not be a Member of Parliament or Member of the Legislature of any state or Union Territory. He shall not hold any other office of profit or connected with any political party or carrying on any business or pursuing any profession.

The qualifications for appointment as State Chief Information Commissioners/State Information Commissioners shall be the same as that for Central Commissioners.

Terms and Conditions of Appointment

The Chief Information Commissioner shall be appointed for a term of 5 years from date on which he enters upon his office or till he attains the age of 65 years, whichever is earlier. Chief Information Commissioner is not eligible for reappointment. Salary will be the same as that of the Chief Election Commissioner. This will not be varied to the disadvantage of the Chief Information Commissioner during service. (S.13)

The Information Commissioner shall hold office for a term of five years from the date on which he enters upon his office or till he attains the age of sixty-five years, whichever is earlier and shall not be eligible for reappointment as Information Commissioner. His salary will be the same as that of the Election Commissioner. This will not be varied to the disadvantage of the Information Commissioner during service. Information Commissioner is eligible for appointment as Chief Information Commissioner but will not hold office for more than a total of five years including his/her term as Information Commissioner.

The salary of the State Chief Information Commissioner will be the same as that of an Election Commissioner. The salary of the State Information Commissioner will be the same as that of the Chief Secretary of the state government.

Removal

The Chief Information Commissioner or any Information Commissioner shall be removed from his office only by an order of the President on the ground of proved misbehaviour or incapacity after the Supreme Court, on a reference made to it by the President, has, on inquiry, reported that the Chief Information Commissioner or any Information Commissioner, as the case may be, ought on such ground be removed.

If the Chief Information Commissioner or an Information Commissioner in any way, is found to be concerned or interested in any contract or agreement made by or on behalf

of the Government of India or participates in any way in the profit thereof or in any benefit or emolument arising there from otherwise than as a member and in common with the other members of an incorporated company, he shall, for the purposes of sub-section (1), be deemed to be guilty of misbehaviour.

The President may suspend from office, and if deem necessary prohibit also from attending the office during inquiry, the Chief Information Commissioner or Information Commissioner in respect to whom a reference has been made to the Supreme Court under sub-section (1) until the President has passed orders on receipt of the report of the Supreme Court on such reference.

Notwithstanding anything contained in sub-section (1), the President may by order remove from office the Chief Information Commissioner or any Information Commissioner due to any of the following reasons:

If he/she-

- is adjudged an insolvent; or
- has been convicted of an offence, which in the opinion of the President, involves moral turpitude; or
- engages during his/her term of office in any paid employment outside the duties of his/her office; or
- is in the opinion of the President, unfit to continue in office by reason of infirmity of mind or body; or
- has acquired such financial or other interest as is likely to affect prejudicially his functions as the Chief Information Commissioner or Information Commissioner.

Similarly, the State Chief Information Commissioner or a State Information Commissioner shall be removed from his office only by an order of the Governor on the ground of proved misbehaviour or incapacity after the Supreme Court, on a reference made to it by the Governor, has on inquiry, reported that the State Chief Information Commissioner or a State Information Commissioner, as the case may be, ought to be removed from office on such ground.

14.7 POWERS AND FUNCTIONS OF INFORMATION COMMISSION

The powers and functions of the Central and State Information Commissions are given as below:

CIC/SIC has a duty to receive complaints from any person who:

- has not been able to submit an information request because a PIO has not been appointed;
- has been refused information that was requested;
- has received no response to his/her information request within the specified time limits;
- thinks the fees charged are unreasonable; and

- thinks information given is incomplete or false or misleading

CIC/SIC also can receive complaints on any other matter relating to obtaining information under this law and has the power to order inquiry if there are reasonable grounds. They will have the powers of Civil Court in such matters, such as:

- summoning and enforcing attendance of persons, compelling them to give oral or written evidence on oath and to produce documents or things;
- requiring the discovery and inspection of documents; and
- receiving evidence on affidavit;
- requisitioning public records or copies from any court or office;
- issuing summons for examination of witnesses or documents; and
- any other matter, which may be prescribed.

All records covered by this law (including those covered by exemptions) have to be given to CIC/SIC during inquiry for examination.

They have the power to secure compliance of their decisions from the public authority. This includes:

- providing access to information in a particular form;
- directing the public authority to appoint a PIO/APIO where none exists;
- publishing information or categories of information;
- making necessary changes to the practices relating to management, maintenance and destruction of records;
- enhancing training provision for officials on RTI;
- seeking an annual report from the public authority on compliance with this law;
- requiring it to compensate for any loss or other detriment suffered by the applicant ;
- imposing penalties under this law; or
- rejecting the application. (S.18 and S.19)

Also, the Information Commission can impose a penalty on the PIO at the rate of Rs. 250/- per day up to a maximum of Rs. 25,000/- for any of the following reasons:

- refusal to receive application;
- not furnishing of information within time limit without reasonable cause;
- male-fide denying of information without reasonable cause;
- knowingly giving incorrect, incomplete, misleading information;
- destroying information which was the subject of request; and
- obstructing furnishing of information in any manner.

For persistent violation of the law the IC can recommend disciplinary action against the errant official.

14.8 ROLE OF GOVERNMENT

The RTI Act 2005 lays down a very comprehensive role for the Central and state governments. As per Section 26 of the Act, the appropriate government may, subject to the availability of physical and financial resources:

- develop educational programmes for the public, especially disadvantaged communities, on RTI;
- encourage public authorities to participate in the development and organisation of such programmes;
- promote timely dissemination of accurate information to the public;
- train officers and develop training materials;
- compile and disseminate a User Guide for the public in the respective local language; and
- publish names, designation, postal addresses and contact details of PIOs and other information, such as, notices regarding fees to be paid, remedies available in law if request is rejected, etc. (S.26)

As per Sections 27 and 28 of the Act, Central Government, state governments and the Competent Authority as defined in S.2 (e) are vested with powers to make rules to carry out the provisions of the Right to Information Act, 2005.

If any difficulty arises in giving effect to the provisions of the Act, the Central Government may by order published in the Official Gazette make provisions necessary for removing the difficulty. (S.30)

14.9 REPORTING PROCEDURE

The Act prescribes a detailed reporting procedure for all public authorities, Information Commissions and officers under the Act.

Each Ministry has a duty to compile reports from its Public Authorities and send them to the Central Information Commission or State Information Commission, as the case may be.

Each report will contain details of number of requests received by each public authority, number of rejections and appeals, particulars of any disciplinary action taken, amount of fees and charges collected, etc.

Central Information Commission will send an annual report to the Central Government on the implementation of the provisions of this law at the end of the year. The State Information Commission will send a report to the State Government.

Central Government will table the Central Information Commission report before Parliament after the end of each year. The concerned state government will table the report of the

State Information Commission before the Vidhan Sabha (and the Vidhan Parishad wherever applicable).

14.10 IMPORTANT STATE INITIATIVES

The Central Government has appointed retired IAS officer from Jammu and Kashmir Shri Wajahat Habibullah as the first Central Information Commissioner under the RTI Act. With this appointment, the government has set in motion the process of setting up a Commission, a mandatory provision under the RTI Act 2005.

The Department for Personnel and Training (DOPT), Government of India in association with the National Informatics Centre has started a Right to Information Portal, which has all the circulars, instructions, notifications, etc. available at one place. A template for the Information Handbook has also been prepared to provide uniformity across departments. All the departments and ministries under the Centre as well as the states and other public authorities have notified their PIOs and APIOs under the Act.

The Government of NCT of Delhi has gone a step further and placed all the information pertaining to PIOs and APIOs of various departments on its websites. The seventeen manuals under which information has to be disclosed proactively have also been placed on this website. There is also a facility to find out the status of an application made under the Act, and to monitor the disposal of such applications by various departments.

14.11 RIGHT TO INFORMATION ACT 2005- CRITICAL GAPS

The RTI Act covers a wide spectrum of bodies and officials from the Central Government, the state governments, Panchayati Raj Institutions, local bodies and significantly all bodies including non-governmental organisations (NGOs) that are established, constituted, owned, controlled or substantially financed by the government. By bringing private bodies within the purview of the law, it will ensure that the government collects information from them.

It may be said that this Act is much more comprehensive than all the previous laws that were proposed under the right to information. It has within its purview a much wider spectrum of public bodies and the scope of information exempted from disclosure is also much limited. Moreover, the exemption from disclosure is also not absolute, since the public authority can decide to disclose the information if it is essential in public interest. An important feature of the legislation is that it overrides the provisions of the Official Secrets Act, 1923, or any other law that could be used to obstruct access to information. For the first time security forces and intelligence agencies will not be completely exempt from the application of such a law. Citizens can seek information from these agencies in matters relating to allegations of corruption or violations of human rights, subject to the approval of the Information Commission.

However, a lot of controversy has been generated around the issue of exempting file notings from the purview of RTI Act 2005. The civil society has raised strong objections against the directive of the DoPT that file notings will not be provided. It has been argued that the note sheet reflects the mind of government, bares the intention of an individual officer and whether his advice and consent were grounded on established rules. It is only

by allowing thorough public scrutiny of the evidence of how the government works at every level that corruption can be fought. However, the government has argued that the notings, opinions, advice of senior government officials on files and the like should be excluded from coverage under the Act, as their opening up is likely to inhibit officials in their decision-making, thus slowing down the processes of government in the long run.

The fact that people would have to pay a fee to obtain information has also been debated. It is the view of some sections of the civil society that this would make the information accessible to only those privileged few who can pay for it. Even though the Act provides that the fee charged should be reasonable and also that persons below poverty line should be exempted from paying the fee, it is felt that this may be a hurdle in making information accessible to all sections of the society.

Another issue that has been raised is regarding the proactive disclosure of information. It is felt that very little information is sought to be disclosed proactively by the public authorities. Some activist groups have argued that public authorities should disclose even that information which is sought by a majority of applicants under the state RTI Acts. For example, the various public authorities should automatically disclose the information regarding their major projects, the cost of construction and the expected date of completion.

An additional weakness concerns the appointment of the Information Commissioners. Information Commissioner will hear appeals from people who believe that government officials have wrongly withheld information from them. Setting up Information Commissioners is a radical new initiative under the new Act and is a very positive step towards transparency. To ensure the independence and autonomy of the Information Commissioners, the original Bill provided that a selection committee for appointing Information Commissioners would consist of the Prime Minister, the Leader of the Opposition in the Lok Sabha and the Chief Justice of India. However, the final Act has dropped the Chief Justice and replaced him with a Cabinet Minister nominated by the Prime Minister. Similarly, at the state level, the Chief Minister will nominate a Cabinet Minister to the Committee. This dominance of the Appointment Committee for Information Commissioners/Chief Information Commissioners by government representatives could lead to bias and political intervention in the selection process.

Another concern that is raised is that the structure of penalties imposed may not be enough of a deterrent. Even though the penalties have been strengthened in the new Act, in practice, there may be some confusion about how they will be imposed. The penalties clause imposes daily penalties not only for delays in providing information but also for destruction and falsification of records or the deliberate provision of inaccurate or misleading information. However, it is not clear as to how a daily penalty can be calculated for destroying a record. It is also argued that the penalties are not stringent enough in so far as that only fines can be imposed, and not prison sentences for very serious offences. But what if someone destroys documents revealing major corruption. Hence, severe penalties must be available to fit the crime. Also, there are no penalties if a public authority does not comply with the Act and does not appoint the PIOs under the Act.

It has also been suggested that rather than asking the state governments to frame their

own rules, the Central Government should frame the uniform rules for the entire country so as to ensure uniformity. Also, the Act provides that state governments should set up Information Commissions, but in some cases the state government may not have sufficient resources for the same. The relationship between the Central and the State Information Commissions is also not clearly defined. In some cases, the state governments have already enacted a state Right to Information Act. However, the future of these state Acts is not clear. The RTI Act 2005 does not clearly indicate whether the state Acts will continue, and what happens if there is a conflict between the two.

It has also been argued that as part of globalisation and privatisation, a lot of information is now available with private agencies. Hence, it is important to bring the private sector also under the purview of this Act.

Besides the above, training and awareness of the officials, employees and masses should be undertaken.

14.12 SUGGESTIONS

The RTI Act 2005 lays the framework for one of the most comprehensive and broad based right to information legislation. However, in order to make the Act an effective vehicle for bringing about greater accountability and transparency in the government, there is a need for disseminating greater awareness both amongst the general public and the government officials. There is a need to focus on some of the following issues:

- it would be very helpful for the central government to clarify the position on how to implement the new law in the states, particularly in those states that already have an RTI Act. It is felt that if the Central Act is well implemented, State Acts might eventually fade away;
- the Act contains a number of ambiguities in relation to the practical functioning of the new Information Commissions, which remain in need of urgent clarification. The relationship between the Central and the State Information Commissions also needs to be clearly laid down;
- each public authority must clarify who would be responsible for managing, monitoring and interfacing with the Information Commission and the state's nodal agency for the Right to Information law. Governments must also put in place application and appeals monitoring systems, to ensure that proper information can be collected for the annual reports required to be produced by the Information Commissions;
- the rules should be consistent across the country to minimise confusion in implementation;
- there is an urgent need to develop a training strategy as a matter of immediate priority, which should identify the officials for undertaking training and monitoring of training programmes and preparing training modules and materials. It should be time-bound;
- there is a need to sensitise government employees at all levels the provisions of the RTI Act 2005 and their role in its effective implementation. Also, there is a need to

change the systems of record keeping in government to ensure ready access and formatting in the desired form. This may also need a substantial investment in infrastructure and office automation. The employees will also have to be trained for digitisation of information and the amendment in office procedures that may be required for the same;

- the new RTI law places obligations on all public authorities to raise awareness about the law, its key provisions and how to access it as a right amongst the public. The obligations involve developing, organising and producing educational materials and programmes. However, this involves setting up of a huge infrastructure, which may require a lot of financial support. The Central Government may need to provide financial assistance and guidance to the state governments in this regard; and
- the Act also needs to put in place a mechanism to ensure that all public authorities implement the Act in its true spirit. At present, only the Information Commissions have the power to ensure this. However, there are no specific penal provisions against the non-compliant public authorities. The penal provisions have to be clearly spelt out.

14.13 CONCLUSION

The Right to Information Act 2005 is a landmark piece of legislation. If implemented well, it could be a major step towards more accountable and transparent government. However, given the culture of secrecy in the government sector and the unwillingness of government servants to part with information, the task is certainly not a simple one. It is all the more so because of the lack of awareness on part of the masses who actually stand to benefit from this legislation.

However, if the government is in a position to process requests for information under the Act, it will have to start managing information better. Information will have to be kept in such a form where it is readily accessible and also possible to be easily formatted. This may involve a substantial amount of digitisation and computerisation of information, which will in turn help the government to function better with officials now able to access information easily and quickly. This will lead to greater transparency and effective monitoring.

If the public authorities are indeed able to rise up to this responsibility of effectively implementing the RTI Act 2005, it will indeed bring a sea change in the way the government functions and will lead to a truly vibrant and strong democratic nation.

14.14 ACTIVITY

Most of the states have implemented the Right to Information Act. Let us know about the implementation of the Act in your State.

14.15 REFERENCES AND FURTHER READINGS

<http://persmin.nic.in/RTI/WebActRTI.htm>

UNIT 15 ICT IMPLEMENTATION IN GOVERNANCE:ISSUES AND CHALLENGES

Structure

- 15.0 Learning Outcomes
- 15.1 Introduction
- 15.2 ICT Implementation in Governance: Issues, Challenges and Suggestions
- 15.3 Conclusion
- 15.4 Activity
- 15.5 References and Further Readings

15.0 LEARNING OUTCOMES

After studying this Unit, you should be able to:

- highlight the issues and challenges facing ICT implementation in governance; and
- suggest measures to address these issues and challenges.

15.1 INTRODUCTION

Technology is transforming governments, especially, in the performance of their functions. This is the sole reason for governments all over the world embracing technology and becoming electronically viable. ICT enables and facilitates good governance agenda of transparency, accountability, empowerment, decentralisation and fiscal reforms. It is this agenda that governments of today are aspiring to achieve. Governments are using ICTs in restructuring their traditional organisational set up, re-engineering the work processes, interacting with citizens and stakeholders, rendering services and information, and efficient human resources management, financial management and decision-making.

Hence, ICTs are playing a significant role in enabling governments to pursue the agenda of good governance. However, skilled manpower, ICT infrastructure, ICT architecture, resources, political leadership, committed bureaucracy, and citizen awareness are required to enable ICTs to perform this role. But lack of human resources, organisational and technological infrastructure, etc. have posed hindrances to the effective implementation of ICT in governance. This has resulted in its minimal use. Many of the ICT-based projects have, therefore, resulted in wasteful expenditure and ineffective service delivery. The challenge is to overcome these hindrances and provide for an optimal exploitation of ICT in governance.

In this Unit, we are going to discuss the issues that pose a challenge to the optimal use and implementation of ICT in governance. We will also be dealing with measures, which help in addressing these issues and challenges effectively. However, for information of our students, we have used the words 'e-governance', 'e-government' and 'ICT-based projects' interchangeably, even though they mean different and are distinct.

15.2 ICT IMPLEMENTATION IN GOVERNANCE: ISSUES, CHALLENGES AND SUGGESTIONS

Today we have a society where there are multiple interests, groups and stakeholders in the form of civil society, communities, corporate, private sector, media, academia, professionals, etc. who expect the government to excel and render various services to the mark. ICT applications can help government to excel and render services to the people consistent with their needs and demands.

But implementation of ICT based projects or programmes usually suffer in terms of certain vital factors. We will discuss these factors individually.

Work Plan

The 'Working Group on E-Government in the Developing World' considers infrastructure, economic health, education, information policies, private sector development, institutional frameworks, human resources, budgetary resources, inter-department communication flows, etc. as crucial factors for the success of e-governance projects. If these factors are well in place then they can lay down the roadmap for effective e-governance implementation. Countries like India, face problems of low connectivity, technical professionals, finances, and other resources coupled with inappropriate planning. Hence, it becomes difficult to develop specific applications and services.

Therefore, for successful implementation of e-governance projects, a work plan has to be chalked out. The work plan should include six key elements, as pointed by the Working Group:

- **Content development**-including development of applications, open standards, local language interfaces, user guides and e-learning materials. Time should be invested in building appropriate content
- **Competency building**-human resources and training programmes must be implemented at all levels
- **Connectivity**-local networks and internet connections must be applied across the relevant agencies or enterprises
- **Cyber laws**-to provide a legal framework that supports the objectives of e-government policies and projects
- **Citizen interfaces**-a proper mix of delivery channels is needed to ensure that e-government is accessible and affordable for users
- **Capital**- e-government business plans must identify revenue streams like user charges, subscriptions or budgets that will help achieve financial equilibrium.

Vision and Priorities

We suffer from the lack of clear vision and priorities when it comes to e-governance. In the words of Anathakrishnan, 'in the absence of a national mission to evolve technical standards and share resources, citizens have ended up funding costly piecemeal programmes with few tangible results. There is no consensus on interoperable standards that will enable exchange of data, no sharing of best practices and no realistic vision on how to effect change.'

Our vision is not broad and does not involve the interests of various groups in the society. Vision for e-governance should emanate from societal concerns of multi-stakeholders. These concerns will become the bases for drawing up and designing the priority areas for e-governance. E-government plan/project should be open and collaborative based on multi-stakeholders' participation. Public meetings, opinion polls, participation in committees, etc. should be the basis of drawing the vision and securing vital inputs of different sectors. The Working Group emphasises on the need to define a vision that

represents the priority objectives of government and the shared vision of all stakeholders. A shared vision of e-government means a shared stake in the outcome.

Robert Schware and Bhatnagar mention about the involvement of users in the 'Computer-aided Administration of Registration Department (CARD) Project' in Andhra Pradesh. A group of users were selected to participate in the various tasks to redesign business processes in the Registration Department and subsequently participate in the design and development of the software. No external technical personnel were recruited, which provided a sense of system ownership and even control on technology by the users. This fostered a sense of ownership and trust in the Project. Likewise, the SmartGov initiative in Andhra Pradesh involved the stakeholders and end-users at all stages of the Project.

Re-engineering

E-government applications should be preceded with re-engineering of the administrative processes in the government departments or organisations. Most often, e-government applications are implemented in a 'quick time frame' without adequate re-engineering of the existing organisational structure and work procedures. If ICT has to enable efficiency in governmental functioning, it is necessary that the departments carry out a rearrangement and reorganisation of their administrative structure and work processes. If e-government application is implemented without re-engineering, it becomes difficult to make subsequent changes in the work processes once the e-government application is implemented. Hence e-government may not work and the resources may get wasted. Therefore, the complex work processes and procedures have to be simplified before initiating ICT projects or programmes.

Subhash Bhatnagar emphasises that the reforms should be in place before an e-government application is implemented so that the immediate impact and efficiency and transparency gains associated with e-government application can be acquired. Re-engineering administrative processes, according to him, therefore requires implementation of substantive reform in organisational structure, a change in culture and mindset, training and improvement of skills, and putting in place the appropriate supporting ICT infrastructure to enable online processes that are timely and efficient to both the user and the government department.

Citizen-Centredness

E-governance projects must be citizen-centric. Such projects should provide for improved service delivery, public participation, accessibility to comprehensive and qualitative information, and improved quality of life for large number of citizens. They should focus on how citizens use and process increasing amounts of information in their everyday life. Websites should be designed to give complete information so that an individual may not have to follow up it with a visit or call. Projects facilitating citizen services should be based on the needs of the people and how they can be best delivered electronically. This will enable projects to address to specific needs of identified communities and gain public trust and wider usability.

But as G. Anathakrishnan points out that for most citizens the only brush with e-government is a visit to rudimentary websites put up by individual departments that offer no alternative to the difficult relationship they have with government to get their entitlements. In theoretical terms, Anathakrishnan says that e-governance in the country is still largely in the information phase and faces an uphill task to reach interactivity and actual delivery of services. Merely computerising the departments and automating the traditional and old procedures will not result in responsive e-government.

According to Jaju, the bane of most of the government databases is that it is driven by individuals rather than systems and hence most of it is never updated once the individual

departs. It is therefore, essential that transactions be compulsorily routed through the database so that it is routinely and sub-consciously updated and remains relevant and dynamic at all times to the benefit of all, that is, the government as well as the people.

ICT has to be used as a tool to lead to an information and knowledge based society 'where the citizens feel empowered and enriched by accessibility to information and social, economic and political opportunities' (Working Group) and also participating and interacting in policies and decisions affecting them.

Also, use of local languages will definitely help more citizens to avail the services. Technologies such as GIST and language software can be used for transliteration from English to other languages. Subhash Bhatnagar points out to the need to build local language interfaces, especially when addressing the rural population. He finds that intermediaries, such as, volunteers/ kiosk owners/paid employees play a positive role in applications where information is disseminated to rural/illiterate populations. Hence, he recommends employing the intermediaries when it comes to ICT interface with rural population.

Further, there must be feedback mechanisms and interactive dialogues to get the opinion of multi-stakeholders on the working and benefits of the projects. As Bhatnagar puts it that advisory groups must be set up with the users, former officials, experts and civil society members for this purpose.

Communication Strategy

The benefits of e-government projects must be properly communicated to the beneficiaries through an effective communication strategy using media. This has to be taken into account most significantly, as the best use of projects can be made possible when it reaches the larger target groups or clientele. Usually, people are not aware of the same and/or are not even mobilised. E-government projects usually fail to become an additional channel to deliver services owing to a limited proportion of citizens using them. Without a critical mass using the e-government applications, the cost recovery does not seem promising. Public should be made aware of the changes and benefits that e-projects and programmes can accrue for them. Equally, the government should also explain the reasons when benchmarks are not met.

Gopa Kumar Krishnan states that conscious efforts are required to drive citizens to the portal through advertising campaigns and education. According to the Working Group, the interest and commitment to e-government can be sustained with strong promotion effort through various media channels such as radio, posters, public meetings and newspapers that can generate public excitement and also increase political will.

E-literacy

For communication strategy to be effective there must be a literate and e-literate community to use the e-government system. The citizens, especially the rural, must be provided with training in basics of computer, internet and web. In Kerala, e-literacy programme has been taken up in full swing, which ensures one member from a family to be computer literate. This innovative experiment known as Akshaye Project has bridged the digital gap by making at least one member in each family e-literate and creating shared access through computerised kiosks-Akshaye Kendras- for citizens to get information in the local language (G. Anathakrishnan). There are going to be over 3,000 information hubs, that is 'Akshaye Kendras' across the State to provide several value-added services on a single platform to the citizens. Such projects promote e-literacy, which enables wider usability of e-government applications. Such projects must be replicated by other states as well.

Political Will and Leadership

Political will and leadership is a needed for initiation, successful implementation and sustenance of e-government programmes and projects. Political support and commitment to ICT projects can really bring in the desired change in governance. Political leaders need to have the will, resolve and leadership to take on risks, overcome resistance, secure funds and publicly subscribe, uphold and support e-government. Rather, the political leaders must be made e-literate that can help them to understand the benefits accruing of such projects, and motivate them to employ ICT in their departments and deliver effective public services to the people.

The greatest problem is of sustenance, as with change in political power e-governance projects are not carried further with the same zest and zeal by the new minister. As Bhatnagar points out that frequent changes in the ministers may create problems when the new minister is not supportive of the ideas and innovations implemented by his/her predecessor. Change in the political leadership also result in changes in administrative leadership that may create problems especially through implementation. However, if the backup support from the citizens, businesses and public sanctity through legislature is existing, e-governance projects can be carried forward with the same fervour even when there is a change in political leadership.

Transparency and Accountability

E-government projects or websites do not focus much on the objectives of ensuring transparency and accountability of the government officials or departments. As Katherine Reilly puts it that numerous websites created by government departments are ineffective because they tend to focus on the single objective of providing electronic access to information. Not enough effort is made to ensure that transparency and accountability are increased. Achieving or increasing accountability or transparency is unplanned in the design objectives, as Gopa Kumar Krishnan finds that reduction of corruption is often incidental and not part of the design objectives of e-government initiatives.

According to him, there has to be an implicit hierarchy and sequentiality of objectives on which e-government applications should focus. Increasing access to information, presenting the information in a manner that leads to transparency of rules and their application in specific decisions, and increasing accountability by building the ability to trace decisions/actions to individual civil servants are the successive stages in the hierarchy. These stages will ensure reduction in corruption and openness in administration. Departmental websites should fulfil these objectives. Departments should publish budgetary allocations and expenditure on the web. There should be systems for tracking status of applications for a variety of licenses. There must be sharing of the citizen's charter and performance data on the web. These steps by officials and departments will definitely increase accountability and transparency.

Resistance to Change

The fast and smooth implementation of e-government gets hampered by the officials' resistance to it. If the government is to excel in a corporate way, officials' readiness to bring about this corporate culture within government is essential. 'The level of resistance to change and level of involvement by officials in setting policies and practices will greatly impact how fast or smooth the implementation of e-government will be' (Working Group). Bureaucracy, that is, officials and employees at all levels, resist to e-government initiatives due to reasons, such as fear of losing jobs, losing power, unfamiliarity with technology, increased work, losing unofficial payments, having no monetary and professional gains, etc.

Bhatnagar cites the example of SmartGov initiative in Andhra Pradesh in 2002, which brought about electronic application in workplaces by integrating workflow and knowledge management, and thereby increasing efficiency of file handling processes by introducing the concept of a paper less office. But it faced implementation challenges and

resistance from employees. Many senior officials and staff did not use the ICT applications and applied the manual system in their day-to-day work. They found it time consuming to operate via the SmartGov. The officials felt that they could sign a physical file within seconds than an electronic file. Hence, even after the SmartGov move, the manual system prevailed upon it. Technical and management problems such as, deployment of hardware, getting the software loaded and employees to operate it, and too many vendors for handling different aspects of network maintenance and hardware maintenance created difficulty. In some departments, the number of PCs installed was inadequate. One PC was shared among three people that drastically reduced the efficiency of the officials and staff. As a result files were dealt and transferred physically. Thus, SmartGov did not create enthusiasm among the government departments and evoked resistance from the employees and officials.

To overcome this resistance, it is necessary to involve the officials at the early stage of e-government planning. Their suggestions and feedback to improve the e-government plan at any stage should be welcomed and acted upon. The plan should highlight the benefits accruing from the application of ICT in day-to-day work that can help in boosting their confidence and trust in the system. Equally, they must be imparted training in ICT usage in departmental work, decision-making and service delivery. Successful projects generally spend about ten percent of the budget on training. Training will reorient them with new perceptions in their jobs, develop competencies and make them knowledgeable. Benchmarks and parameters should be set to assess the performance of the employees and officials. 'Officials should find returns in the form of professional opportunities and rewards for successful adoption of new procedures, work practices and responsibilities. Innovative compensation packages and professional perks' should also be offered (Working Group).

Resources

Human and financial resources are required for the effective implementation of e-governance projects. Human capital in terms of skilled professionals with experience in procuring, evaluating and implementing ICT solutions is very much needed in government. Hence more technological institutions are required to provide technological professionals in the country.

Equally, financial resources and budget has to be earmarked to ensure initiation and sustenance of projects. In the words of Subhash Bhatnagar, costs of e-government projects depend on the initial conditions-whether the application is built from scratch replacing an existing manual system or is an extension of an existing computerised system. Major cost elements are hardware and software at the back end, data conversion, training, maintenance, and communications infrastructure to link the public access points to the back end. Costs vary quite dramatically according to scope and scale of application (e.g. AP CARD online services cost was 4.3 million, Mandals online in AP cost was 13 million, Bhoomi online in Karnataka was 4 million, and Warana village information kiosks cost was 500,000-cost is in terms of US dollars). But most often resource constraints force departments to use in-house software developers who are not up-to-date in their technical skills and tend to economise on hardware and software purchase. E-government projects, hence, need to be provided with enhanced budget and financial resources.

Back-end Computerisation

Back-end computerisation is required in all departments to enable better delivery of front-end services to the citizens. It has to be complete and in place before the front end services are delivered. All related database of different departments should be computerised, consolidated and centralised. All departments have to be linked to this shared central database and operate through it so that any transaction done is

automatically updated in the central database. This will help in providing a comprehensive range of services to the multi-benefactors.

However according to Bhatnagar, enough resources, political leadership, and interdepartmental coordination are required, which at present seems lacking. There is absence of countrywide policy on data standardisation and data sharing. Security provisions have also not been adequately handled in designing systems. Bhatnagar refers to the front-end FRIENDS Project of Kerala, which renders online services to citizens. However, the back-end processes of the Project is not computerised and therefore is manual, providing no gains in productivity. Back-end computerisation of government departments takes a lot of time due to paucity of funds and bureaucratic delays. By resorting to partial computerisation, the Kerala government could advance the launch of online payment services by a few years. At best, this model needs to be seen as a temporary solution to buy time till the back-end processes are computerised. In the long run, such hybrid processes are likely to result in errors.

Public-Private Partnership

Public-private partnership is necessary in all stages of e-governance, that is, from planning, and implementation to monitoring and evaluation. Private sector collaboration, partnership and participation can enable the government to draw resources and expertise from the private sector. Equally, private sector can help the government projects to become responsive and committed to its customers and beneficiaries. Techniques of marketing, projects' adaptability to customers' needs, and attracting and retaining customers can be well learnt from the private sector (Working Group). Design, software development, data preparation and training can easily be outsourced to them.

In the Bhoomi and CARD Projects, software development, training, data entry of manual archives and maintenance has been outsourced to the private sector (Bhatnagar). Karnataka was the first State to present an IT policy in 1997 to attract private investment. This has brought a shift from the past centralised public sector led investments towards decentralisation in which the private sector and state government play major roles. Again, the role of public-private partnership was exemplified in the successful diffusion of the ICT application in 600 milk societies through the efforts of a few private companies. Even the implementation of the SmartGov Project exemplifies how partnerships can be successful. The WARANA and APSWAN Projects' provided significant roles for the private sector(Bhatnagar and Schwere)

However everything cannot be outsourced, as the government must retain its prerogative in policy-making and decisions pertaining to accessibility and pricing. In the words of Bhatnagar, systems analysis, which provides the necessary cues for re-engineering, should be conducted internally. Moreover it is better for governments to implement pilots on their own so that cost structure and implementation issues can be well understood. This understanding can be useful in defining contracts when scaled-up versions are being implemented on a wider scale.

Bhatnagar emphasises that for successful execution of public-private partnership strategies, it is important to recognise that contracting arrangement should deliver gains to all partners. Often the fact that private sector needs to make profits is forgotten by the government contracting agencies.

Information Policy

An information policy is imperative. Officials are hesitant to share information with the citizens and other stakeholders. They do not disseminate information across governments or departments. This puts ICT in the reverse gear. ICT is basically information processing and sharing with different sectors and citizens. With the help of ICT, the

citizens can download information pertaining to various services online without visiting the government departments physically. However, officials often resist sharing and dissemination of information to the people, which hampers the smooth and rapid flow of information and prevents a more functional approach to service delivery. Hence, an ICT policy is necessary, which makes it mandatory on part of officials to provide information to the public.

We have recently enacted the Right to Information Act 2005, which enables and empowers every citizen to seek information from government, inspect any government document and seek certified copies thereof. Some laws on Right to Information also empower citizens to inspect any government work or to take sample of material. The government departments are required to host and disseminate information pertaining to development programmes and other services online for the public, businesses and others.

Many of the state governments have not yet implemented the Act, even though the date set for the implementation got over by October 2005. There must be a follow up action and stringent measures against such a callous attitude of the state governments in the full implementation of the Act.

Legal Recognition

Legal recognition is required for easy and smooth ICT transactions. An Act has to be provided to confer legal recognition for transactions carried out by means of electronic data interchange and other means of electronic communication, which involve the use of alternatives to paper-based methods of communication and storage of information, and electronic filing of documents with government agencies. Such an Act renders legal sanctity to ICT based initiatives and facilitates smooth government and business transactions.

Governments all over the world have taken different approaches in implementing a legal framework for e-government and e-commerce. Some have opted for the creation of an umbrella law that encompasses all e-transactions. A large umbrella law saves the need for amending a multitude of laws that address procurement, tax, archives, etc. The 'UNCITRAL Model Law on Electronic Commerce' is a generic law adopted by many countries like Australia, Hong Kong, Korea (Republic), Singapore and the Philippines. The Model Law provides generally that electronic communications should be given equivalent legal effect to paper-based communication;s and specifically addresses how certain types of electronic communications could substitute existing paper-based means of satisfying requirements of writing, signatures, and contract formation (Samtani and Harry).

We have promulgated the Information Technology Act 2000, (see Annexe) which provides for authentication of digital signature, legal recognition of electronic records, use of electronic record and digital signatures in government and its agencies; attribution, acknowledgement and despatch of electronic records; secure electronic record and digital signatures, regulation of certifying authorities of digital signatures, duties of subscribers, penalties and adjudication, Cyber Regulations Appellate Tribunal, offences, and amendments to the Indian Penal Code, the Indian Evidence Act 1872, the Banker's Book Evidence Act 1891, and the Reserve Bank of India Act 1934 (IIPA, July-August 2000).

Legal framework and information security are very important criterion for promoting a positive e-environment for business and commercial transactions. Security, protections, legal reforms, privacy and recognition of digital interactions and signatures are, therefore, the critical prerequisites. This also poses faith and trust of businesses and citizens in e-government applications and enhances usability and sustainability.

New Projects

New and future e-government projects should be initiated after taking cognisance of the already existing or undertaken projects. Proper study and diagnosis of the expenditure, results, and issues/obstacles in the existing programmes should be undertaken. Today, we see a great amount of duplication existing in e-government efforts, which has led to adverse costs, time and energy. Ideas and suggestions from successful ICT projects are not usually obtained or acquired that can be later adapted according to one's own particular context. A handbook with key project findings should be prepared that can be used as a resource guide for developing new projects.

New e-government projects should be started on a pilot basis. Pilot projects expose the potentials and challenges in implementation. This can help in reviewing and revising the projects for better results in future. Such pilot studies enable to judge the aptness of the project, skills and knowledge of employees, adequacy of financial resources, and thereby strengthen the project and its implementation. Problems and challenges can be immediately met that will ensure smooth and effective execution and realisation of the project in future.

E-government projects should be based on realistic targets that can be achieved in quick succession in a definitive way with very little risk involved. For this reason, the projects should be small rather than large and ambitious. According to Bhatnagar, it is necessary to take small steps with activities that are manageable within a relatively short time frame. This allows greater flexibility for tailoring the system and formulating a long-term strategy based on the actual experiences of the organisation and feedback from the client. Many local governments and state governments have seen impressive results because they are well placed to implement small, focused projects that involve low risk. He identifies the Bhoomi Project, which became successful because of using a phased approach in defining its scope. Anathakrishnan points out to the phased effort of the State of Kerala in modernising its local self-government institutions, which began with ten institutions and now is applied to more than 1250 panchayat institutions. The Project has used the local bodies as the base to deliver services, fostering involvement of the rural population and increasing accountability at the grassroots. Rather, what started off with 600 kendras in Malappuram district has expanded to cover 6000 points Statewide.

Bridging the Digital Divide

E-government applications should be widespread so as to cover disadvantageous, rural and remote areas of the country. The disadvantaged population should be able to access internet and web for various services and information that holds value for them. Provision of technological infrastructure must be a necessary element of an e-government effort in these areas. If the targeted clientele are not able to access services owing to the need of technology, e-government plan must ensure the same to enable access. This will help in bridging the digital divide or gap between the rural and urban areas.

Further, grassroots organisations and NGOs have to play an important role in 'interpreting the information-related needs of rural communities and in making information and knowledge usable by such communities' (Bhatnagar).

Monitoring and Evaluation

Independent monitoring and evaluation of e-government projects and programmes is necessary to judge their effectiveness. A legal authority/cell must be constituted in each ministry/department for effective coordination, time management, cost management and monitoring and evaluation of respective projects. Success must be judged or measured on the basis of well-laid down performance criteria, including:

- volume of transactions handled electronically
- response time to inquiries
- length of trouble-free operation

- number and percentage of public services rendered electronically
- number of new services delivered electronically
- percentage of territorial area covered
- number and percentage of constituents/beneficiaries accessing information or services electronically
- increased convenience or efficiency in delivering information or services
- length of time for procuring goods, services and information; and
- reduction in the cost for citizens and government (Working Group)

Bhatnagar states that currently, there are no frameworks or methodologies to accurately measure the success or failure of an e-government project. Success is often judged on the basis of media reports, recognition by international agencies and assessment provided by the project implementers. In all of these cases, clients that are supposed to benefit from these projects supply no feedback. If feedback is recorded, it is usually anecdotal and not based on a systematic survey. It is, therefore, important that e-government projects have an in-built component of periodic assessment by an independent agency. This is, in addition, to a continuing feedback mechanism from the clients.

Detailed audit report can highlight various reasons of project failure such as, poor management, delays in implementation, inadequate documentation of procedures, improper security aspects, inadequate training efforts, lack of connectivity, lack of data collation, non-implementation of citizen charter, and inadequate monitoring and involvement of officials, as in the case of Indian Customs Online Project (Bhatnagar). Hence, a continuous and detailed audit is a must to determine the aptness of e-government projects.

15.3 CONCLUSION

for successful application of ICTs in governance, there is need to give importance to certain crucial factors. These factors pertain to proper planning, well laid down vision and priorities, ICT architecture and infrastructure, professionals and skilled manpower, commitment and leadership of ministers, acceptance by officials, transparency and accountability, citizen-centredness, adequate finances, public-private partnership, legal recognition, well laid down information policy, documentation; and monitoring and evaluation.

These factors can lay down the roadmap for e-governance in countries, especially, of the developing world. Before setting on board an e-governance project, all the above-mentioned aspects need to be addressed to enable the project to make its visible impact. Countries like India must definitely take cognisance of these factors and plan and implement its e-governance strategy effectively.

15.4 ACTIVITY

Narrate some of the issues and challenges faced in implementation of an e-government project. You can explain with the help of some examples. Please let us know how you suggest improving upon them

15.5 REFERENCES AND FURTHER READINGS

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