Strategic Plan

of

Department of Information Technology

for

the next five years

Contents

S.No.	Chapter		Page No.
1.	Vision, Mission, Objectives & Functions ----------		1-2
		Core Areas of Strategy	
2.*	Assessment of the situation	e-Government ------	3-14
3.*	Outline of the Strategy	e-Industry ----------	15-24
4.*	Implementation Plan	e-Innovation/R&D	25-31
5.*	Linkage between Strategic Plan & RFD	e-Learning ----------	32-42
6.*	Cross Departmental & Cross functional Issues	e- Security ----------	43-53
		e- Inclusion ----------	54-76
7.	Measure and Track Progress in e-Development-----		77-78

* Chapters 2 to 6 are covered in each core area of Strategy of the Department relating to e-Government, e-Industry, e-Innovation/R&D, e-Learning, e-Security and e-inclusion

DEPARTMENT OF INFORMATION TECHNOLOGY

Vision

- **e-**Development of India as the engine for transition into a developed nation and an empowered society.

Mission

- **e-**Development of India through multi pronged strategy of e-Infrastructure creation to facilitate and promote e-governance, promotion of Electronics & Information Technology- Information Technology Enabled Services (IT-ITeS) Industry, promotion of e-inclusion, enabling creation of Innovation/Research & Development (R&D) infrastructure in ICT&E, building Knowledge network and securing India's cyber space.

Objectives

- **e-Government**: Providing e-infrastructure for delivery of e-services
- **e-Industry**: Promotion of electronics hardware manufacturing and IT-ITeS industry
- **e-Innovation/R&D**: Enabling creation of Innovation /R&D Infrastructure in emerging areas of ICT&E
- **e-Learning**: Providing support for development of e-Skills and Knowledge network
- **e-Security**: Securing India's cyber space.
- **e-Inclusion:** Promoting the use of ICT for more inclusive growth.

Functions (Allocation of Business Rules)

- Policy matters relating to Information Technology, Electronics and Internet.
- Initiatives for development of Hardware / Software industry including knowledge based enterprises, measures for promoting IT exports and competitiveness of the industry.
- Promotion of IT and IT enabled services and Internet.
- Assistance to other departments in the promotion of E-Governance, E-Infrastructure, E-Medicine, E-Commerce, etc.

- Promotion of Information Technology education and Information Technology-based education.
- Matters relating to Cyber Laws, administration of the Information Technology Act. 2000 (21 of 2000) and other IT related laws.
- Matters relating to promotion and manufacturing of Semiconductor Devices in the country.
- Interaction in IT related matters with International agencies and bodies.
- Initiative on bridging the Digital Divide, Matters relating to Media Lab Asia.
- Promotion of Standardization, Testing and Quality in IT and standardization of procedure for IT application and Tasks.
- Electronics Export and Computer Software Promotion Council (ESC).
- National Informatics Centre (NIC)
- All matters relating to personnel under the control of the Department.

E-Government

Background

The Government of India launched the National e-Governance Plan (NeGP) in May, 2006, with the vision to make all government services accessible to the common man in his locality through common service delivery outlets and to ensure efficiency, transparency and reliability of such services at affordable costs to realize the basic needs of the common man. Under NeGP, 27 Mission Mode Projects (MMPs) and 8 Support Components have been identified that cover activities related to the individual Line Ministries / Departments under the Central and State Governments.

While NeGP is in the fifth year of its implementation, the Department of Information Technology (DIT), under the Ministry of Communications and Information Technology, Government of India, is in the process of developing its strategic plan for the next five years. Accordingly, six core areas viz. e-Government, e-Inclusion, e-Security, e-Learning, e-Innovation and e-Industry have been identified which would together constitute the overall strategic plan of DIT for the next five years. Furthermore, six Working Groups corresponding to each core area have also been constituted for developing the individual strategic documents.

The present document provides a strategic plan encompassing the "e-Government" core area. The Working Group on e-Government, during its various meetings, discussed the aspirations for the core area in light of the overall aspiration of DIT for the next five years. The Working Group analyzed the Results Framework Document (RFD) and studied the following eight action items defined in the RFD:

- Setting up of State Wide Area Networks
- Setting up of State Data Centres
- Setting up of additional Common Services Centres
- Appraisal of Mission Mode Projects
- Implementation of Capacity Building Scheme
- Strengthening of SeMTs
- Provide High speed & Secured e-Governance Network
- Design, develop and implementation of E-Gov applications

The eight action items as described above were then clubbed into four broader areas under which the Working Group proposed to prepare its strategy document. These four areas are:

- e-Governance, Infrastructure, Network Services and Security
- Emerging Technologies
- Human Resource infrastructure for e-Governance
- Accelerating delivery of services through development of e-Gov applications and identifying enablers for e-Governance

The Working Group has also identified the following goals for DIT under e-Government core area:

- Identify the Non-technology related areas where DIT can intervene
- Define the enablers for e-Governance

- Conceptualize NeGP 2.0 and define outcome based targets
- Analyze the mandate of "Bharat Nirman" and find the specific things that can be derived back into the strategic plan of DIT
- Analyze the technology's use for archival
- Define security in terms of the trust and confidence of the people in e-Governance
- Define the number of touch points that the citizen should have with the Government and concurrently define the number of services that will be accessible to the citizen through these touch points
- Identify the mechanism to encourage the participation of Indian IT industry into e-Governance. The three areas to be studied are:
  - Technology Development
  - Supporting government into building government services
  - Encourage industry into service delivery domain
- Define a methodology to make citizen access points more ubiquitous
- Explore the use of next level of technology i.e., using technology as a service

The strategy plan under e-Government has been developed keeping in mind the four areas identified by the Working Group and aligning them to the identified goals mentioned above.

Vision & Purpose

The following vision and purpose have been identified as part of the strategy for e-Government:

Vision

Inclusive development of India through creation of shared and affordable e-service Infrastructure and to facilitate e-delivery of public services in order to transform India into a truly developed and empowered society by 2020.

Purpose

To leverage Information and Communication Technologies (ICT) in all aspects of governance including its internal business processes, external interfaces with the citizens and the businesses, for delivery of government services.

Long Term Goals, Results and Outcomes

DIT has made significant progress in terms of achieving its intended goals and outcomes. Out of 27 MMPs, all but 4 have already been approved and are under implementation. The core e-Governance infrastructure schemes viz. State Wide Area Network (SWAN), State Data Center (SDC) and Common Services Centre (CSC) have reached advanced stages of implementation. A large number of pilot initiatives have been taken by DIT and other departments in Central/State Governments in order to prove the efficacy of the usage of ICT in Government. The Information Technology Act, 2000 has been suitably amended to facilitate appropriate business model for implementing e-Governance. Unique Identification Authority of India (UIDAI) has been created in order to provide a

Unique Identification (UID) number to every resident of the country. The Capacity Building Scheme was approved that helped setting up State e-Mission Teams (SeMTs) across all 35 states and UTs in the country.

The progress made so far has set a platform for DIT to define its goals and outcomes for the next five years. These goals and outcomes have been categorized into four broad categories as follows:

- **Shared and Secured e-Governance Infrastructure**
  - **Increase access to citizen services through a minimum of 100 Mbps broadband access upto panchayat level :** The current broadband penetration in the country is only 0.74% as compared to a teledensity of 52.74%. There is therefore a need to facilitate the growth of broadband network access at the grass root (panchayat) level. The challenge in covering the entire population of over 800 million in India above the age of 12 years with broadband access is the low availability of broadband services coupled with high cost of broadband. Therefore, DIT intends to initiate necessary steps over the next five years to bring down the cost of broadband access as well as ensure a connectivity of 100 Mbps upto the panchayat level.
  - **Ensure the usage of core common service delivery infrastructure by various user departments/ministries:** As part of the existing NeGP, DIT has to establish core common infrastructure in terms of SWANs, SDCs and CSCs across all States/UTs in the Country. This core common infrastructure is then leveraged by various government departments (for e.g.: Registrar General of India, Ministry of Home Affairs) for providing services to the citizen (For e.g.: enrolment of residents as part of National Population Register (NPR) Project). However as more and more departments adopt this core common infrastructure and start integrating their service delivery mechanism with the common infrastructure, there will be a need to create a mechanism where the service requirements of all the departments are met expeditiously so that the advantages of shared costs and reduced redundancies are maintained in the long run. DIT intends to facilitate this process for creation of a suitable mechanism for this purpose.
  - **Upscale and integrate front-end service delivery channels:** There is a need to upscale the existing service delivery channels so that they provide sufficient number of touch points to the citizen for accessing public services. DIT intends to take suitable initiatives so that multiple frond-end service delivery channels are available for the delivery of all public services at the citizen's door steps.
  - **Address security and privacy concerns in the service delivery infrastructure:** As more and more information is becoming available online, there are twin concerns of cyber security of the systems and data and of privacy of personal information. Therefore, there is a need to develop appropriate security policies on the one hand and to develop and enforce suitable privacy laws on the other hand. Moreover, with the increased participation of private players in the e-Governance space, there is a need to ensure strategic control of all data and information within government. There is also a need to develop uniform standards that will ensure that all government projects follow a well-defined checklist for ensuring security of

information as well as verification/validation of access. DIT intends to facilitate creation of appropriate standards, to be developed/customized and adopted across all government systems that while ensuring the strategic control in the hands of the government, will provide seamless access of public services to the citizen in the most secure and trusted manner.

- **Leveraging Emerging Technologies on continuous basis**
  - **Adopt emerging technologies and systems for expeditious implementation of e-Governance projects:** DIT, as an institution, is a facilitator of Information and Communication Tools and Technologies across various ministries/departments both at central and state level. As new technologies emerge across the world, they are required to be tested for their applicability and usage within the e-Governance arena. Therefore DIT intends to incubate the emerging technologies and systems across the world and to assess/test their efficacy in various e-Governance projects.
  - **Identify and adopt green technologies suitable in Indian context:** A typical challenge in scaling up of e-Governance projects in India and other developing countries is the poor power situation in most parts of the country. Therefore, there is a need to promote green technologies which can be useful in areas with low availability of power sources.
  - **Ensure development of integrated, shared, affordable, standardized and secure infrastructure:** The first phase of NeGP was characterized by focus on creation of a hardware platform, e-enablement of government processes through MMPs and creation of front end delivery outlets. Today the technology makes it possible to create software platforms which will allow each department to focus primarily on e-enablement of its own business processes and plug in the necessary software platforms for delivering services to the public. This approach has the possibility of radically speeding up the e-Governance program besides being more cost effective and stable. Thus, as part of its ongoing mission of creating e-Infrastructure, DIT intends to create an integrated, shared, affordable, standardized and secure infrastructure for the country which can be utilized by various line departments/ministries at Central/State level for delivery of their respective citizen services through electronic means.

- **Human Resource Infrastructure for e-Governance**

Human Resource Infrastructure is one of the most important components for the conceptualization, execution and success of any e-Governance initiative. This encompasses capacity building at all levels, from the highest political and bureaucratic levels to citizens and external users of e-Government services. As part of the existing National e-Governance Plan, DIT is implementing a Capacity Building (CB) Scheme to set up State e-Mission Teams (SeMTs) across all 35 States and UTs in the country. These SeMTs are functioning as the primary support arm for the State IT Departments as well as other user departments for efficient planning, execution and project management of their e-Gov initiatives. As part of this CB Scheme, DIT is also providing e-Gov related trainings to the government authorities at all levels. As part of its strategy for the next five years, DIT plans to achieve the following:

- **Build capacities across the Line Departments and State Governments with a focus on Change Management and Business Process Re-engineering:** The Line Departments and State Governments play an extremely important role as far as the project conceptualization and program/project management of the any e-Governance project is concerned. However, majority of the line departments and State governments lack the technical know-how of executing an e-Governance programme. Therefore, there is a need to build capacities both at central and State level for better planning and execution of the e-Gov programs. The process thus evolved should also focus specifically on Change Management and Business Process Re-engineering. BPR will necessitate the analysis and redesigning of the workflow within a department in order to achieve objectives of improved measures of performance, such as cost, quality, service and speed. Similarly, Change Management will ensure that the necessary procedural/administrative changes smoothly propagate throughout a department.
- **Ensure professionalism in project management throughout the project lifecycle:**
- **Improve availability of resources with skills to work in an IT enabled environment:** Because of lack of resources with sufficient skills for implementation and management of various e-Governance projects, a number of government departments/ministries remain dependent upon external consultants. Therefore there is a need for a program where the required skill sets are built within and outside Government so as to have sufficient amount of talent available for execution of e-Governance projects.
- **Build awareness in Government Ministries/Departments on e-Governance:** There is a need to build greater awareness about e-Governance across various government ministries/departments so that the benefits of e-Governance are properly understood and various e-Governance initiatives taken by the Government are effectively implemented across the departments.

- **Expediting e-delivery of services**
  - **Development of a Policy framework for ensuring e-Governance to be an inherent component in all Government projects/programmes:** e-Governance cannot be disjoint from the governance processes within the departments. For this reason and considering the federal character of the country, the e-Governance projects are being implemented by the concerned line ministries where DIT provides the requisite technical advice to ensure adherence to standards. As an immediate objective, DIT will facilitate the approval of the remaining MMPs under NeGP by coordinating with the concerned Line Ministries. As a long term objective and in order to ensure that e-Governance principles are applied in any project from the very beginning, DIT intends to work with the Planning Commission to ensure that projects are approved only when e-Governance is the underlying principle from inception in such projects. The guidelines for keeping apart a percentage of the plan budget for e-Governance programmes should also be reinforced and made mandatory.

- **Improve business environment for e-Governance projects:** While Government is building its competencies in ICT related areas, the private sector has already made significant progress in not just promotion but adoption of latest technologies and service delivery mechanisms. However, the current processes and practices for engaging the private sector are tedious and non-uniform. Therefore, there is a need to bring in standardization of such procedures and practices that will encourage private sector participation in government projects as well as make it easy for the Government to engage private players in a transparent and efficient manner. Secondly, there is a need to build a suitable business environment that will help in the sustainability of e-Governance projects beyond their implementation time frame. This can be achieved by building PPP models and creation of institutional mechanisms like SPV for operations and maintenance phase of e-governance projects.
- **Develop standards for interoperability and ensuring their compliance:** While different government departments are executing their own e-governance projects, quite often the core components of project implementation vary widely across different projects. This ultimately creates a problem at the time of collation of these projects when some strategic decisions have to be made based on information available in different departments/projects. Therefore, there is a need to build a model for interoperability of different government projects and departments so that the common standards used and adhered to by all government functionaries.
- **Create appropriate implementation model for use of ICT for financial inclusion, Health, Education etc.:** Government is currently running a number of benefit schemes like NREGA, RSBY etc. which provide direct financial benefits to the citizen. However, there is a need to reduce leakages and ensure that all government benefits reach their intended beneficiaries. This can be achieved only through an extensive financial inclusion program that utilizes technology and the common infrastructure to take the benefits of the traditional financial systems to the unreached population of the country. DIT has played an important role, as part of an Inter-Ministerial Group, in developing an enabling framework for the delivery of basic financial services using mobile phones. There is now a need to develop appropriate implementation models that will utilize the common infrastructure like CSCs and will help provide basic banking/health/education services to the citizen in villages and other such areas.

- **Improve service delivery outcomes:**
  - **Developing a framework for ensuring engagement of citizens in e-governance project lifecycle:** One of the biggest success factors for e-Government is the social and financial inclusion of the citizen. There is therefore a need to involve citizen while planning and prioritizing the government services. Citizen feedback needs to be taken both during the project conceptualization as well as during project execution. The services and service levels have to be defined based on citizen expectations and a very well defined grievance registration and redressal mechanism has to be evolved. DIT therefore intends to create the enabling environment in the form of standard procedures for project conceptualization and implementation that

will facilitate government citizen interaction and will ensure a higher social inclusion of the citizen.

- **Developing a framework for Electronic Repository of personal data of all residents:** In order to avail benefits of various government services, the citizen has to often provide his/her personal information multiple times to different government agencies. Therefore, DIT intends to develop a framework for electronic repository of the personal data of all residents so that all government agencies can access the citizen information from a single location and the citizen also does not have to provide his/her information again and again.

- **Developing a framework for comprehensive assessment of e-Gov initiatives:** The success of any e-Governance programme can be measured only through an assessment of its outcomes at the ground level. Therefore, DIT intends to formulate a policy for Assessment of all e-Governance initiatives which can provide a mechanism for all Central/State Governments to assess the impact of the initiatives on the citizen and other stakeholders in the country. This assessment should also identify the reasons for any delays in project implementation (for e.g.: long procurement processes, instability of nodal officers etc.) and recommend solutions that can be incorporated in all government projects.

SWOT Analysis

An analysis of the Strengths, Weaknesses, Opportunities and Threats with regard to the long term outcome goals and results, as defined in the previous section, is as follows:

Strengths	Weaknesses
• Experience of over 4 years of e-Governance project implementation and program management under NeGP	• Most of the Mission Mode Projects (MMPs) are still in the implementation stage
• Widespread willingness to take up e-Governance initiatives within and outside governments	• Slow change management within Government with little or no mechanism for feedback from the citizens • Low levels of computer/English literacy coupled with low availability of local language content are the major hindrances towards adoption of e-Governance service delivery mechanisms.
• Manifold increase in the outreach of mobile telephony has opened up the possibility of utilizing these technologies as alternate channels for public service delivery.	• Low levels of broadband penetration are impacting the outreach of e-Governance applications to only limited number of households
• DIT has established a National e-Governance Division (NeGD) at the central level and several State	• Still a majority of Central and State Ministries/Departments do not have the required manpower for executing

e-Mission Teams (SeMTs) across various States/UTs. This institutional structure is already assisting the State IT Departments in planning, execution and project management of their e-Gov programmes.	e-Governance projects and hence they are primarily dependent upon external consultants.
• A number of projects like CSCs, MCA21, Passport etc. have been showcased the efficacy of PPP model. The capabilities of the private sector are much better understood today than ever before.	• Tedious procurement processes have made it difficult to avail the services of private sector efficiently.
• An increasing amount of funds are becoming available at the disposal of central and State government for carrying out e-Governance initiatives.	• Majority of the funds placed at the disposal of Central/State Governments are either unutilized or being spent on departmental infrastructure. There is a need for proper planning and utilization of these project funds.

Opportunities	**Threats**
• The cost of hardware is continuously decreasing. This will promote the growth of ICT at the grass root level. This growth can then be leveraged by the Government in providing public services to the citizen.	• The manpower costs are continuously increasing.
• Low cost of mobile telephony is strengthening the outreach of mobile telephony at the rural level.	• The access cost for the broadband and other network access services need to come down. Without these the internet penetration levels may not increase and hence the real benefits of e-Governance will be difficult to realize.
• A model for financial inclusion of the rural poor using mobile technology has already been approved by the Government. This model can now be implemented in order to take the banking and other government services to the citizen's door step.	• In order to implement a uniform policy/framework, a consensus from a number of ministries / departments / external stakeholders is required. In the absence of such a consensus, the policy/framework may not get implemented.
• With the increased media coverage and multiple channels for awareness building, the expectations of citizens from the Government are very high.	• Low availability of local language content and delays in the project implementation may negate the expectations and affect acceptability.
• Establishment of institutions like CERT-In (Indian Computer Emergency Response Team) will assist DIT in formulating security policies to ensure the security of data and information across various e-gov projects.	• With the development of more and more e-Gov applications, a lot of government information will be residing on IT systems. Therefore there will be a strong threat of hacking and other such cyber-crimes over the confidential information.

• There is lot more willingness in the Government as well as Private sector to put money into e-Governance initiatives. Several of the State governments have started putting aside 2-3% of their annual budgets for IT related activities.	• Political will may vanish if the results are not evident and outcomes are not achieved in time.
• The overall sphere of e-Governance is expanding at a fast pace and an increasing number of private sector players are showing interest in partnering with the Government. This will propel competition and will bring the necessary competencies to the Government.	• Contracting difficulties may scare away the private sector.
• There is an increasing amount of talent available in the private sector that can be utilized by the Government for building necessary capacities at various levels.	• Computer and English Literacy has still not picked up as part of school education curriculum in India, more so at the village level. The job opportunities at the rural level may therefore remain limited.

Proposed Prioritized Solutions & Policy Options

Although a complete set of solutions to achieve the long term outcome goals can be formulated only through a comprehensive consultative process, a few solutions are proposed in the following areas:

- **Shared and secured e-Governance Infrastructure**
  - **Improve the capacity of SWAN and integrate available infrastructure, viz. SWAN, NICNET, NKN, data centres etc.: :** While the existing SWAN network is providing connectivity of 2 Mbps upto the block level, DIT intends to improve its capacity as well as its reach upto the village level. Simultaneously, DIT intends to integrate the other infrastructure like NICNET, NKN etc. so as to provide seamless connectivity across to all government departments/ministries for better and faster delivery of public services.
  - **Build on success and learning of the existing CSC Scheme and upscale to 250,000 CSCs at Panchayat level;** The Government has decided to build on the success and learnings of the existing CSC Scheme and has taken on to reposition the existing scheme as Bharat Nirman Common Services Centres for delivery of public services to citizens in rural areas. Accordingly DIT will scale up the existing 100,000 CSCs to 250,000 CSCs by 2012 so as to have one CSC in each of the Gram Panchayats in the country.
  - **Memorandum of Understanding (MoU) with various Ministries/Departments for ensuring utilization of core common infrastructure:** DIT intends to sign MoUs with various line ministries/departments to serve their infrastructural requirements through the usage of the core common infrastructure (SWAN, CSC, SDC etc.) in the

projects implemented by these ministries/departments. This MoU will ensure that all current and future projects will plan to utilize the core common infrastructure and will provide their additional requirements to DIT so that DIT can upscale the existing infrastructure to match the requirements of these line ministries/departments.

- **Identify Core Common processes for BPR and platforms:** There are multiplicity of government processes and platforms across various government departments and ministries which are common. However, because of lack of coordination, the common processes vary widely which result in disjoint project implementations. DIT therefore intends to identify the core common processes across departments/ministries so as to perform a comprehensive BPR exercise and bring standardization and efficiency across these processes and platforms.

- **Leveraging Emerging Technologies on continuous basis**
  - **Developing a framework for identification and incubation of emerging technologies like Cloud Computing, Green Technologies, Virtualization etc. in various e-Governance projects:** DIT intends to develop a framework and an enabling environment for utilization of various kinds of emerging technologies like Cloud Computing, Green Technologies, Virtualization etc. in government projects. DIT believes that such an initiative will provide the necessary impetus for continuous development of such technologies in future as well as will help government is saving costs and optimizing infrastructure.
- **Human Resource Infrastructure for e-Governance**
  - **Creating a Framework for positioning dedicated project teams in the Line Ministries / Departments:** DIT intends to upscale and utilize the services of National e-Governance Division (NeGD) to assist various central/State ministries/departments in setting up their e-Governance teams so as to better plan and execute their e-Governance initiatives. NeGD will assist in not only positioning of these dedicated teams but will also manage them on an ongoing basis.
  - **Develop a program, in association with other groups in DIT, for mandating computer literacy in schools and distribution of simple learning tools through access channels in rural areas:** DIT intends to partner with various groups like academic institutions to include computer education as a mandatory subject in the school education. Further, DIT will partner with some institutions who can provide free learning tools such as mathematical games, basic accounting softwares etc. which can be distributed through various channels like CSCs in the schools across various villages/towns to promote computer literacy as well as build the overall computer literate talent pool.
  - **Facilitating training programmes for computer awareness in government ministries/departments:** DIT will partner with appropriate institutions in order to facilitate various training programmes on computer awareness for the existing government staff. DIT will further hold discussions with Ministry of Personnel, Public Grievances and Pensions to develop a mechanism so as to make computer awareness a mandatory requirement in all new government recruitments.

- **Create a framework for joined up awareness and Communication campaigns with other departments/State governments:** While the Government progresses on its path of e-enablement of public services and developing newer ways of public service delivery, there is a need for spreading the awareness about the e-services as well as the service delivery mechanisms among the citizen. While DIT is already executing an awareness and communication programme under NeGP, however, there is a need to develop a more formal mechanism in association with other departments/State governments that can be adopted by Government in general in spreading awareness about the e-Gov related services among the citizen.

- **Expediting e-delivery of services**

  - **Policy intervention for ensuring that e-Governance is an integral part of large programmes including Health and Education Government projects:** DIT will work with Planning Commission to ensure IT enablement of all government projects by making it mandatory for projects to have e-Governance as their underlying principle right from the inception stage.

  - **Fast track procurement process by creation of a transparent and simple mechanism for engaging private partners for e-Governance projects:** DIT intends to develop standardized procurement templates and processes for engagement of private partners in various e-Governance projects. The templates thus evolved will assist government departments in engaging various kinds of vendors in a fast track manner and will eventually speed up the project implementations.

  - **Facilitate engagement of SMEs:** The Small and Medium Enterprises (SMEs) have constantly raised concerns that the existing procurement processes of the e-Gov projects are not SME friendly and restrict their entry into large scale projects. Therefore, DIT intends to take necessary steps in order to streamline the e-Governance related procurement processes so as to make them SME friendly and enable various kinds of small players to participate in e-Gov projects.

  - **Creating a framework for adoption of PPP and outsourcing models in implementation and operation of e-governance projects:** DIT will formulate a uniform policy for adoption of PPP for various categories of e-Governance projects. DIT will work with various private sector institutions to develop the various kinds of PPP models and define their applicability for the different e-Governance projects.

  - **Promoting development and delivery of content and services in local languages:** With the low levels of English and Computer literacy in the country, there is a great need to develop content in the local languages. DIT intends to focus in its initiatives in the next five years on language enablement of the content, development of application platforms that will support the local language content as also the development of a content policy to ensure uniform adoption of this concept across the whole government functionary.

  - **Mandating delivery of public services through electronic means only from a fixed date in a phased manner:** The Information Technology Act, 2000 and amendments thereof provide legal recognition to all electronic

transactions, documents, data messages and electronic signatures contained therein. Concurrently, with the development of e-infrastructure, a lot of e-Governance systems implemented by Government departments like Railways, Income Tax, MCA21 etc. have also proved to be hugely successful. However, a need to provide a legislative push to speed up the process of adoption of electronic means for delivery of public services has been felt. DIT therefore is of the view that the universal application of e-Governance principles can be brought about by mandating through a law the delivery of all public services through electronic means.

Implementation Roadmap

An indicative implementation roadmap to achieve various goals identified by DIT as part of its strategy plan is as follows:

<table>
<tr><th>Timeline</th><th>Action Items</th></tr>
<tr><td>Year 1</td><td>• Discussion with various stakeholders and constitution of different teams to conceptualize in detail the various solutions and policies identified
• Taking necessary approvals on various policy initiatives from the appropriate authorities</td></tr>
<tr><td>Year 2</td><td rowspan="3">• Program Management of policy initiatives to ensure their execution within the stipulated time
• Implementation of policy initiatives in phased manner
• Assessment
• Refinement of policy initiatives</td></tr>
<tr><td>Year 3</td></tr>
<tr><td>Year 4</td></tr>
<tr><td>Year 5</td><td>• Formulation of strategic plan for the next five years</td></tr>
</table>

e-Industry

Electronics Hardware Manufacturing Sector:

Background:

The Information, Communication Technology and Electronics (ICTE) is the world's largest and fastest growing industry. Given that ICTE is pervasive and permeates across sectors of the economy, it has been increasingly finding applications in all sectors of the economy. The e-Industry per se may be classified in two sectors namely Electronics Hardware Manufacturing Sector and Software & Services Sector.

Status of Electronics Hardware Manufacturing Sector:

- Global Electronics Hardware manufacturing, currently reported at US $ 1750 billion, is the largest and fastest growing manufacturing Industry in the world. It is expected to reach US $ 2000 billion by 2014 and US $ 2400 billion by 2020.

- Indian electronics hardware production increased from Rs. 50,500 crore in 2004-05 to Rs. 97,260 crore in 2008-09, with a cumulative annual growth rate of 17.3%. The production of electronics hardware in the country is estimated to grow from Rs. 97,260 crore in 2008-09 to Rs. 109,940 crore in 2009-10, registering a growth of 13%. The slower rate of growth of production during 2009-10 is attributed to the global economic slowdown.

- The current demand of electronics hardware in the Indian market is about US $ 45 billion, whereas the production was around US $ 20 billion. Electronics Hardware exports is estimated to be US $ 4 billion in 2008-09, up from US $ 3.3 billion in 2007-08, representing a growth of 21.2%. The production growth during 2009-10 further declined to 13.0%. Indian electronics hardware production constituted around 1.31% of global electronics production and around 1.86% of India's GDP.

- Direct employment in Electronics hardware manufacturing sector is estimated to be 1.4 million in 2009. The indirect employment is around 3.0 million, leading to a total employment of around 4.4 million. (Source: Task Force Report)

Challenges for the Industry:

Despite the various steps taken by the Government in the past, the growth of electronics hardware manufacturing industry has not risen to its potential due to several factors as detailed below:

a) The domestic IT hardware manufacturing sector was the first sector hit by the zero customs duty regime, as a result of implementation of the Information Technology Agreement (ITA-1) of the WTO. Accordingly, the customs duty on the specified 217 Tariff lines was reduced to zero% in a phased manner and w.e..f. 2005, the entire 217 Tariff lines are at zero% basic customs duty.

b) India has entered into Free Trade Agreement (FTA) / Preferential Trading Agreement (PTA) with a number of countries / trading blocks (Thailand, Singapore, ASEAN, Korea, SAFTA, etc.) and more Agreements are under negotiation, wherein import of electronics hardware from these countries shall be at a preferential rate of duty, which is lower than the normal tariff rate.

c) There are a number of disability factors such as high level of taxation; high cost of power, finance & freight; inadequate infrastructure; high transaction cost, etc. which render indigenous electronics hardware manufacturing uncompetitive and discourage capital intensive and large level of investments. According to the estimates by the Task Force, in the present scenario, the cost-penalty on account of the above disability factors is of the order of 19-22%. The above issues become critical in a zero duty regime and result in absence of a level playing field vis-à-vis competing countries.

Aspiration:

To harness the potential of the electronics hardware sector to contribute to the country's development and growth in the next few years, particularly in terms of investment for product development to move up the value chain, innovation, contribution to GDP, employment and inclusive growth; make India a trusted global hub for electronics product development and manufacturing and enhance India's brand equity image in electronics hardware sector.

Quantifying the aspirations:

- To increase the electronics hardware sector's contribution towards GDP to 4% from the current level of 1.86% over the next five years.
- To increase the electronics hardware sector's contribution towards World production to 3% from the current level of 1.31% over the next five years.
- To increase the electronics hardware sector's contribution towards direct employment to 4 million from the current level of 1.4 million over the next five years.

SWOT Analysis:

Strengths	Weaknesses
• Sustained growth of 15% even during economic slowdown • Domestic demand to grow exponentially • Huge Indian consumer market with rising middle class and youth population with disposable income in their hands. • Large pool of manpower • Significant presence of MNCs • Potential to become one of the factories of world • Conducive Government policies	• Zero duty due to ITA – 1 • PTAs and FTAs • Disability costs - Cost of power, finance, logistics, fragmented supply chain) • Weak components manufacturing base, especially semiconductors • Lack of targeted & proactive R&D in collaboration with industry

Opportunities	Threats
• Global opportunity projected at USD 1.75 Trillion by 2014 and 2.4 Trillion by 2020. Export of USD 80 Bn projected by 2020 • Domestic consumption of products – USD 240 Billion (Need USD 80 Billion components) • Growing Demand – Supply Gap (50% import) • Investors looking for alternative locations due to concerns of IP and search for talented and cost effective manpower etc.	• FE outgo liability – ICT all pervasive – growing usage inevitable • National/ Business/ Personal security risks • Loss of employment opportunity (Social angle) • Flux of sub-standard goods

Targets:

USD Billion

Electronics Segment	Current	2016	2020
Products - Domestic Consumption	13.5	76	240
Products - Export	04.0	24	080
Components	02.5	24	080
Total	20	124	400

The above targets are based on projections made by the industry. However these are extremely ambitious and all out efforts are needed by Government of India to evolve and implement planned schemes and policies in a time bound manner and through Single Window clearance mechanism. State Governments are required to work in collaboration with the Central Government to help achieving these goals.

Strategy:

- To set up an Empowered High Level Body within DIT as a Nodal Agency to pursue specific goals and the targets in Mission Mode by identifying the requisite policies and actions required to reach the goal, fine tuning them continuously and monitoring the results, maintaining close liaison with industry.
- To promote high value added manufacturing of electronics products by *inter-alia* promoting components industry including Semiconductor Wafer Fabs.

- To promote eco-system for development of supply chain for manufacture of electronics hardware in order to address the issues of disability costs being faced by the industry.

- To facilitate market-pull by leveraging the growing domestic market for electronics products so as to help industry achieve viable scale of operations.

- To promote ICT adoption in the manufacturing and services sector, especially the MSMEs /SMEs and ICT penetration, to support Research and Development (R&D) with a view to encourage development of Indian Intellectual Property (IP) and manufacturing for niche applications of electronics products and to promote Skill development in identified areas to address the needs of the entire value chain of manufacture of electronics hardware.

- To attract investments in high technology segments of the electronics value chain and to promote Brand India in respect of electronics hardware with focus on attracting foreign investments and exports.

- To promote Electronics Support Services like repair and maintenance to support the growing demands of electronics products, particularly with fast changing technologies/ features.

- To regulating manufacture and import of sub-standard electronics products.

- To carry out effective negotiations in World Trade Organisation (WTO) for market access to Indian industry in foreign countries and for removal of barriers to trade in its forums of Non-Agricultural Market Access (NAMA), GATT, TRIPS, TRIMS etc..

Implementation Mechanism:

To set up Empowered High Level Body as Nodal Agency: Electronics/telecom industry requires a dedicated set-up that understands the complicated technical nuances of this industry, as also the rapidly changing world trends and capital movements linked to it. Therefore, in order to give above focus, a National Electronics Mission (NEM) as a Nodal Agency with adequate powers shall be set up so as to give a fillip to the manufacturing of electronic hardware in India in a Mission mode.

(Time Frame: 6 months after Government approval)

Initiating Schemes:

(i) *To introduce Modified Special Incentive Package Scheme to promote high value added manufacturing of electronics products by inter-alia promoting components industry including Semiconductor Wafer Fabs:* In order to encourage high value added manufacturing of electronic products in India the Special Incentive Package Scheme which closed on 31.3.2010 shall be modified to have multi-product/ multi-threshold features. The capital grant under the scheme shall be calibrated to ensure setting up of Semiconductor Wafer Fab facilities, manufacturing of entire supply chain and facilitating market pull for industry to achieve viable scale of operations.

(Time Frame: 6 months after Government approval. Scheme to be operational for 10 years)

(ii) *To promote setting up of Electronics Manufacturing Clusters:* Electronics Manufacturing Cluster shall be promoted with an objective to address the issue of disability costs being faced by the industry. The clusters would focus on complete eco-system required to set up units for manufacture of electronic products/ components/ parts/ accessories including *inter-alia*, fully developed land, physical and social infrastructure like Housing/ Hostels, Educational and Healthcare facilities, Community Services, Power (Assured & Un-interrupted), Banking and nearness to Airport, Sea Port, Rail/Road link etc. The scheme of

setting up of Electronics Manufacturing Clusters would be integrated with the Modified Special Incentive Package Scheme.

(Time Frame: 6 months after Government approval. Scheme to be operational for 10 years)

(iii) *To promote Brand India and attract investments in high technology segments of the electronics value chain in collaboration with industry.*

(Time Frame: On-going activity)

(iv) *To promote electronics support services, especially for repair and maintenance to support the growing demand of electronics products, particularly with fast changing technologies/ features.*

(Time Frame: Scheme development 6 months. Notification 6 months after Government approval. Scheme to be operational for 5 years)

Initiating Policy Measures:

(i) To encourage adoption of ICT, R&D and skill development based on industry requirements.

(Time Frame: On-going activity)

(ii) To provide preference in Government Procurement for electronics products manufactured in India with graded value addition in terms of Indian IP and domestically manufactured components and parts.

(Time Frame: 6 months after Government approval. Scheme to be operational for 10- 15 years)

(iii) To regulate manufacture and import of sub-standard electronics products by evolving standards and enforcement mechanism.

(Time Frame: On-going activity)

(iv) To negotiate market access in foreign countries and removal of barriers to trade in WTO negotiations in its agreements like GATT, NAMA, TRIPS, TRIMS etc.

(Time Frame: On-going activity)

Review and Monitoring Mechanism:

A suitable framework shall be developed by the National Electronics Mission for review and monitoring of the implementation of the strategy.

Software & Services Sector :

Background

The Information, Communication Technology and Electronics (ICTE) is the world's largest and fastest growing industry. Given that ICTE is pervasive and permeates across sectors of the economy, it has been increasingly finding applications in all sectors of the economy. The e-Industry per se may be classified in two sectors namely Electronics Hardware Manufacturing Sector and Software & Services Sector.

Status of Software and Services Sector:

- The Indian IT-ITES sector has played a vital role in acquiring Brand Equity for the nation and has contributed immensely to the increase in our GDP, employment and exports. The exports of IT-ITES from India has grown from US $ 1.8 billion in 1997-98 to a staggering US $ 47.1 billion by 2008-09, a CAGR of

35 per cent and is estimated to generate export revenue of US $ 49.7 billion in year 2009-10.

- India is regarded as the premier destination for the global sourcing of IT-ITES, accounting for almost 51 per cent of the global off shoring market. It is expected that the IT software and services sector revenue will grow from US $ 59.9 billion in year 2008-09 to US $ 100 billion by 2016 and US $ 225 billion by 2020 with exports growing from US $ 47.1 billion to US $ 82 billion by 2014 and US $ 175 billion by 2020 respectively.

- The domestic revenue is projected to grow from US $ 12.8 billion in year 2008-09 to US $ 30 billion by 2016 and US $ 50 billion by 2020 with a CAGR of 13-14 per cent for both, exports and domestic.

- The Indian IT-ITES industry also has been a large generator of employment, with over 2.3 million professionals directly employed by the industry and indirect job creation of about 8.2 million. Further, it is projected that the employment generation (direct and indirect) may grow from 10.5 million in 2009-10 to 30.0 million by 2020.

- The phenomenal success of the IT-ITES industry has been facilitated by the pivotal role played by the Software Technology Park (STP) Scheme, providing fiscal benefits as well as the concerted efforts of the Indian IT-ITES industry. More than seven thousand IT-ITES units have been exporting under the STP Scheme since its inception with 95% exports contribution of the total exports of IT-ITES sector. This bears testimony to the popularity and relevance of the STP Scheme for IT-ITES sector.

- To achieve the desired growth rate of IT-ITES sector, there is a need to take appropriate measures and formulate strategy for creating enabling environment. Government needs to provide support to realize full growth potential, retain its advantage over other global destinations such as China, Philippines and Eastern Europe.

- Another important factor to be considered is that due to its nature of being less capital intensive and flexible in its operations, the IT-ITES industry can be relocated in a very short time. If India is not able to retain its competitiveness and the status of being most preferred destination for outsourcing, not only the foreign companies would move to other more attractive destinations but Indian companies may also prefer to set up operations in those countries due to the same reasons.

- It is also felt that large players within the IT Sector are in a position to avail the benefits conferred by the Special Economic Zones (SEZ) Scheme. However, Medium/Small players are unable to avail these benefits owing to the limitation of size and higher cost of infrastructure prevailing in SEZs. Such relocation (in case the tax benefit is withdrawn for STP units) would not only result in infructuous expenditure without meaningful economic gain, but is also unviable and impractical for the small and medium companies.

Challenges for the Industry:

The Indian IT-ITES sector is currently facing the following challenges and threats:

a) Growing competition from other emerging destinations/countries like Malaysia, Vietnam, China, Philippines, Latin America, Central & East European nations is going to be a great challenge for Indian IT-ITES sector. These countries provide significant tax concessions for IT - ITES companies and offer extremely attractive fiscal incentives for this segment. Consequently, India stands to lose heavily on both investments and employment opportunities in a sector where Indian and foreign companies evaluate alternative locations based on relative profitability. This may lead to decline in India's share in the Global IT outsourcing market.

b) China is intent on transforming its economy from a manufacturing engine into a services hub, and the Chinese Government has been pushing the growth of the country's service outsourcing market. Due to these measures by 2010, China's offshore work is likely to reach US$ 5.6 billion. Aided by strong investments, extensive infrastructure, a developing domestic market and a vast talent pool, China's outsourcing industry is set to become one of the largest in the world and challenge India's leadership position.

c) Another important factor to be considered is that due to its nature of being less capital intensive and flexibility in operations, IT-ITES industry can be relocated in a very short time. If India is not able to retain its competitiveness and the status of being most preferred destination for outsourcing, not only the foreign companies would move to other destinations that are more attractive but Indian companies may also prefer to set up operations in those countries due to the same reasons.

d) Large players within the IT sector have been in a position to avail the benefits conferred by the Special Economic Zones (SEZ) scheme. However, Medium / Small players are unable to avail the benefits under the SEZ scheme owing to the limitation of size and higher cost of infrastructure prevailing in SEZs. Such relocation (in case tax benefits is withdrawn for STP Units) not only results in infructuous expenditure without meaningful economic gain, but is also unviable and impractical for the small and medium companies.

e) Development of the IT industry in Tier-II and Tier-III cities, which is feasible under the STP scheme, is important for ensuring long term competitiveness as Tier I locations would gradually loose their competitive edge over the other emerging nations.

f) The sunset clause (withdrawal of income tax benefit under Section 10A/10B beyond 31st March, 2011) would hit over 5000 SME STP Units, exports, employment generation and the development of the IT/ITES sector especially in Tier-II and Tier-III locations.

Aspiration:

The main aim is to harness the potential of the software & services sector to contribute to the country's development and growth, particularly in terms of investment, exports, employment generation and contribution to GDP.

- To retain India's leadership position as a global IT-ITES destination
- To focus on development of IT-ITES industry in Tier-II & Tier III Cities.

It is therefore important that the IT – ITES sector is supported on continuous basis by the Government through various business related initiatives, policy and regulatory measures etc.

Quantifying the aspirations:

The goals identified to achieve the aspirations are as under:

- To achieve 13% annual growth rate to reach exports revenue of over USD 100 billion by the year 2015-16.
- To achieve 13% annual growth rate to reach domestic revenue of about USD 30 billion by the year 2015-16.
- To provide fiscal incentives and other benefits to the industry for retaining the competitive edge and attract investment in Tier II & Tier III cities.

SWOT Analysis:

Strengths	**Weaknesses**
• India is rated as a top location due to the strength of its English-speaking talent pool. • Lower cost of operation • Growing Indian market with rising middle class and youth population with disposable income in their hands • India hosts 35% of the entities registered with CMMI Level-5 • Enabling government policies to promote growth of this industry	• Low employability (15% of graduates in general and 25% of engineering graduates are employable) • Infra-structure constraints (Connectivity by rail, road, air; telecom, power, water, social infrastructure etc. in Tier II and Tier III locations) • Rising costs • Uncertainty of fiscal incentives • Lack of an innovation ecosystem (low R&D spend, lack of institutional capability for academic research, incubator centre, lack of enforcement of IP laws)
Opportunities	**Threats**
• Emerging global trends indicate that the addressable market (total revenue potential) for technology and business services is likely to expand three fold, from US $ 500 billion in 2008 to approximately US $ 1.5-1.6 trillion by 2020. • The global sourcing market size will increase to US $ 450 billion by 2020. Even though India has a 51% share of	• Decline in exports due to the global economic slowdown. • Protectionist measures against outsourcing by the developed economies. • Growing competition from other emerging destinations/ countries like Malaysia, Vietnam, China, Philippines, Latin America, Central & East European nations.

the off-shoring market, there is tremendous headroom for growth as current off shoring market is still a small part of the global outsourcing industry. •	• Sunset clause under Section 10A/10B of the Income Tax Act for STP units (31-03-2011). Parity with SEZ scheme being pursued as part of Task Force Recommendations. • SEZs not viable for Start up Units, who work on innovative ideas. • Limit of scale in SEZ, which are mostly near Tier-I locations.

Targets:

USD Billion

	Current	**2016**	**2020**
IT/ITES - Export	49.7	100	175
IT/ITES – Domestic	14	30	50
Total	**63.7**	**130**	**225**

The above targets are based on projections made by the industry. However these are extremely ambitious and all out efforts are needed by Government of India to evolve and implement planned schemes and policies in a time bound manner and through Single Window clearance mechanism. State Governments are required to work in collaboration with the Central Government to help achieving these goals.

Strategy:

- To support small and medium enterprises and provide competitive edge through fiscal benefits and other incentives to promote the sector and sustain India's leadership position in the global market space.
- To attract investment in tier II & tier III cities and encourage employment creation in these locations.
- To address the gap of skilled manpower through skill development initiatives.

Implementation Mechanism:

Initiating Policy Measures : Proposals for tax concessions and other benefits would be taken up with the concerned Ministries/Departments and procedural issues would be streamlined to provide the competitive edge to the IT/ITES companies and facilitate the business operations. The phenomenal success of the IT-ITES industry has been possible only through the pivotal role played by the Software Technology Parks (STP) Scheme and providing fiscal benefits under Section 10A/10B of the Income Tax Act. Over 7000 IT units are operating under the STP Scheme, which account for over 90% of the IT-ITES exports. The tax holiday under section 10A/10B of the Income Tax Act for STP units is available upto 31.3.2011. Appropriate mechanism need to be evolved in consultation with the stakeholders.

(Time Frame: On-going activity)

Promotion of IT/ITES industry in Tier – II & Tier – III cities : To formulate schemes to attract investment in Tier II & Tier III cities by leveraging STP Scheme. It has been observed that initial existence of a few IT players in Tier II and III locations is imperative for attracting further investments and transforming it into a IT hub. Due to poor infrastructure in Tier II & III cities, high cost of generation of captive power and other associated costs to start the operation, new STP/IT SEZ Units at these locations be offered benefits. Incubation centres also be set up in these locations through STPI. STPI will formulate appropriate action plan.

Employment Creation in Tier II & Tier III cities :

- There is an urgent need to develop human capital skilled in ICT for both supply and demand sides, both at entry level and existing workforce. Similarly, lack of local IT talent especially at the smaller towns is a key bottleneck in improving the capacity of local technology providers to provide high quality IT services to IT companies. Given the relatively poor educational institutions, the IT-ITES industry should offer skill building on IT or modern functional areas.

- To address the gap of trained manpower for the sector through the skill development initiative programme proposed to be launched by DIT.

- STPI facilities/incubation centres may also be used for arranging periodical training programmes for the fresh graduates by involving the industry and experts for creating the employable manpower.

(Time Frame: On-going activity)

Review and Monitoring Mechanism

Export performance and employment generation on periodical basis.

e-Innovation / R&D

Define the aspiration

Purpose and Vision of the Strategy

Global economic growth has been a result of growth of technology and innovation. Different countries have adopted different policies for advancement in R&D and Innovation. In India we have largely been a follower of technology in almost all the spheres of electronics/IT whether for civilian or strategic applications. In the post liberalisation era due to opening up of the economy, almost all new technology solutions are available in the country either through direct import or through manufacturing with large amount of imported components or modules. Though this has made available to the Indian customers the state-of-the-art solutions, the country is largely dependent on innovations done elsewhere. India does have some institutions and industries which are doing innovative work, however, this needs to be increased manifold. It is imperative that the research and innovation initiatives at various institutions are linked to societal and industry needs directly.

Where we aspire to be

To make India a hub of Research, Development and Innovation in the area of IT and Electronics contributing to overall socio-economic growth of the country.

The aspiration of the Department translates into the following goals:

a. **Promote R&D for Manufacturing / Development of products, packages and services:** India provides a huge market for electronics/IT products and this requirement is going to grow rapidly in times to come. According to the recent report of Task Force on IT/ITES and Electronics Hardware, the import bill of this sector, unless domestic manufacturing is enhanced, will surpass the import bill of the oil sector by 2020. According to this report, the demand for electronics in India is expected to be US $ 400 billion by 2020. Against this, the domestic production is projected to be only US $ 100 billion by that time. In order to achieve this huge shortfall, the country has to attract huge investments in electronics manufacturing and development of software products, package's and services. Manufacturing industry has always served as a pivotal factor in the economic development of a country since this also leads to larger employment possibilities. It is important that we build strong linkages between the manufacturing industry & the R&D institutions in order to enable manufacturing of domestically designed products.

b. **Widen the R&D base in the country:** To emerge as an economic force in today's knowledge era, it is imperative to have strong R&D base in the country. This requires development of highly skilled manpower on a much larger scale through an enabling environment. A very large portion of DIT's R&D funding currently goes to only a select group of DIT's own R&D institutions and the Tier-I educational institutions. It is imperative that the outreach of R&D funding is extended to cover more number of educational institutions, small and medium level industries

including their in-house R&D set-ups. We also need to enhance the capacities to undertake research at smaller institutions by linking them to the larger R&D institutions.

c. **Creation/Utilisation of R&D infrastructure:** To create an ecosystem for Research and Development in IT and Electronics, there is a need to create appropriate R&D infrastructre in many more institutions which could also be used by industry. In addition to this, Design Studios / innovation centers could be set up where individuals and SMEs can develop and test their products.

Assess the situation

What external factors will impact us:

a. Fast pace of development of new and innovative technological breakthroughs
b. Availability of technology / products from outside at low costs
c. Fast changing Market Demand
d. Drain of highly skilled technical manpower

Who are the stakeholders

1. Industry / Industry Associations
2. R&D Organizations / Academic Institutions / Societies of DIT
3. Society as users of technology

What are our Strengths, Weaknesses, Opportunities & Threats –

Strengths

1. Demonstrated capability of IT/ ITES services industry
2. Capabilities in end-to-end solution development, consulting engagements, innovations etc. especially in IT
3. Strong educational system up to post-graduation level
4. Capability to undertake Research at leading academic institutes

Weaknesses

1. No long-term strategy and low risk-taking attitude of the industry
2. Low R&D expenditure by the industry
3. Little collaboration between Industry, R&D labs and academic institutions
4. Low availability of skilled manpower for R&D
5. Low capabilities in Product development / Conversion of prototype to product
6. Lack of R&D for products tailored for Indian masses

7. Lack of mandatory standards for import of electronics items - product, processes, environment etc.
8. IPR issues
9. Severely depleted S&T manpower in DIT (both in number and domain expertise)

Opportunities

1. Increased demand for innovative IT and IT enabled products and services in emerging markets. India can potentially be an "innovation hub" for such markets.
2. Expected increase in investment in infrastructure and energy by both the government and private sector is likely to increase the need for innovation in IT / Electronics products and services as appropriate for domestic market.
3. Enhanced requirement of Embedded hardware and software development, and Integrated Circuit designs for telecom, automotive, medical systems, aerospace, and energy systems are possible opportunities ($30 Billion by 2020 as per NASSCOM, 2010).
4. Large number of consumers and SMEs in the country offer immense potential as a test market for innovative products and services.
5. Moving up the value chain

Threats

1. Cost advantage of India in services sector, products and R&D is decreasing due to wage inflation and competition from other developing countries
2. Sub-standard imported products threaten genuine Indian products

What do we need to learn

1. How to increase collaboration between industry, R&D labs, Societies of DIT and Academic Institutions
2. Develop attitude for risk taking R&D initiatives by the industry
3. Protection of IPR of R&D / Innovations
4. How to enhance participation of local industry in major Government of India programmes (UID, e-Gov etc.)

Develop the Strategy

Promote R&D for Manufacturing, Development of products, packages and services:

i. Strengthen and Create Schemes

- For providing R&D grants to companies for collaborative research, innovation and product design, development of value added products for creating and incubating Indian Start-ups
- Supporting technology start-up companies and SMEs

ii. Strengthen linkages between Academic Institutes and Industry

- Initiate follow-up action on recommendations of Task Force to stimulate the growth of IT and Electronics Hardware manufacturing industry

Setting up of Centres of Excellence in identified areas:

a. Enhance commercialization of technologies developed in government supported laboratories

b. Provide government support for pre-competitive research in identified areas

c. Liberalizing the IPR policy for Government supported Research

- Link DIT R&D societies with academic institutions for specific programmes. Enable linkages of industry with academic institutions

Widen the R&D base in the country

- Identify thrust areas and existing technological gaps along with institutions to carryout R&D in these areas
- Take-up capacity building programme in identified thrust areas
- Create enabling environment for carrying out R&D in Tier-II and Tier-III institutions
- Strengthen linkages between R&D / academic institutions and Industry

Creation/Utilisation of R&D infrastructure

- Provide state-of-art infrastructure and technology development in emerging areas at identified Tier-I and Tier-II institutions
- Provide appropriate technical infrastructure to identified Tier-II and Tier-III level institutions to initiate R&D / innovation in identified areas of IT and electronics
- Setup design studios at academic and research institutions for individuals and SMEs to develop and test products
- Facilitate usage of infrastructure created under government support in the identified institutions and identified areas to be used by other organizations

Implementation Plan

Widen the R&D base in the country & Creation/Utilisation of R&D infrastructure: IT and Electronics are fast growing areas. Also, the technological advancements in these sectors are very dynamic. Therefore, there is a need to regularly identify the thrust areas, which need to be developed in the country along with the potential institutions. The following three Working Groups will be constituted who will look into the needs for areas, which need to be harnessed in the country:

i. Working Group on R&D in IT - Free and Open Source Software (FOSS), Bio-informatics etc.

ii. Working Group on R&D in Electronics – Nanotechnology, Microelectronics, Industrial and Electronics Application, Electronic Components & Materials,

Medical Electronics & Telemedicine, Photonics Development, Strategic Electronics etc.

iii. Working Group on R&D in Convergence Communication and Broadband Technologies

These Working Groups will have members from

i. Industry

ii. Academic / Research Institutions

iii. Government Organizations / Societies

iv. Industry Associations

v. Consultancy Organisations etc.

The Working Groups in particular will

- Identify thrust areas and existing technological gaps along with institutions to carryout R&D in these areas
- Workout in details the capacity building programme in identified thrust areas
- Identify the state-of-the-art infrastructure required for technology development in emerging areas at Tier-I (IIT's, IISc etc.) and Tier-II institutions (NIT's etc.)
- Identify the Tier –II & Tier-III institutions and the technical infrastructure required for these institutions to initiate / take-up R&D / innovation in identified areas of IT and electronics
- Identify the academic institutions with appropriate expertise where design studios for individuals and SMEs to develop and test products
- Identify the areas for setting up the Centres of excellence
- Work out details to strengthen linkages between R&D / academic institutions and Industry
- Identify the DIT R&D societies and academic institutions with similar expertise in the identify areas and link the two to carry out joint R&D initiatives.
- Identify steps needed for linking IT & Electronics industry with academic institutions

Activities like - identification of thrust areas, institutions and working out of other details of infrastructure etc. would be carried out by end of December 2011. This would be followed with initiation of appropriate activities / projects in the identified areas in the remaining 4 years.

The working Group will meet at least twice in a year. The Working Group will also review the on-going activities in the identified thrust areas and suggest mid-course correction wherever required.

Sub-Groups may also support these Working Groups, wherever needed, to work out in-depth details of the activities mentioned above.

To facilitate usage of infrastructure created in under government support in the identified institutions and identified areas, wider publicity would be given

i. Proving details of the infrastructure & institution on DIT web site

ii. Publishing in the leading News Papers

iii. Publicizing in seminars etc.

Promote R&D for Manufacturing, Development of products, packages and services:

Strengthen and Create Schemes: Regular interaction – through seminars, discussions etc. would be held with Industry to access their actual requirement and needs. The existing DIT's R&D promotion schemes Technology Development Council, Multiplier Grant Scheme etc. would be appropriately modified to support R&D for manufacturing, Development of products, packages and services. Also, similar schemes existing and new schemes of other Departments i.e. Department of Science and Technology, Department of Scientific & Industrial Research, Defence Research and Development Organisation etc. would be examined and modified mutatis mutandis for R&D for manufacturing, Development of products, packages and services industry. **This activity would be completed by end December 2011.**

The institutions would thereafter be supported under the new schemes. Till then this promotional activity would be covered, to the extent possible, under the existing schemes of DIT.

Strengthen linkages between Academic Institutes and Industry: Based on the recommendations of the Working Group

a. Centres of excellence in the identified areas would be set up in the country

b. DIT R&D societies and academic institutions with similar expertise in the identify areas would be linked for joint R&D initiatives

c. Steps would be taken to develop linkages between IT & Electronics industry and academic institutions

These activities will be initiated from April 2012.

What resources will be required: The working Groups mentioned above will identify the resources required for developing identified thrust areas in their respective domains in the country.

The Working Groups may also project the additional requirements during the mid-course review of the activities.

The resources required will be appropriately reflected in the next five-year Plan starting from April 2012.

How will we track and measure success: The following will be the parameters for tracking and measuring success of the programmes / projects supported in Research / Academic Institutions / DIT Societies / Industry etc. under R&D / technology Development / e-Innovation initiatives of DIT:

i. **Projects initiated:** The number of projects initiated in the identified thrust areas to carryout Research / Technology Development / e-Innovation in will be one of the key parameters for tracking and measuring success.

ii. **Infrastructure developed**: Technical Infrastructure developed at Research / Academic Institutions in the emerging areas of IT & Electronics to carryout basic & Applied Research / Technology Development / e-Innovation will be the other important parameter for tracking and measuring success.

iii. **IPR Generated / Transfer of Technology (TOT)**: IPRs generated / Transfer of Technologies carried out under Research / Technology Development / e-Innovation projects supported in Research / Academic Institutions / DIT Societies etc. will be another indicator for tracking and measuring success.

iv. **Extra-Budgetary Resources** (**EBR's) generated**: EBR's generated particularly by the Societies of DIT will be another indicator for tracking and measuring success.

E-Learning

Background, Purpose and Vision

The E-Infra, Internet Governance, HRD Group of Department of IT consists of 4 Divisions namely: E-infrastructure, Internet Governance, Human Resources Development in IT, E-learning and Human Centric Computing.

The world is in the midst of a technological revolution nucleated around Information and Communication Technology (ICT). Advances in Human Language Technology will offer nearly universal access to information and services for more and more people in their own languages. India is a multilingual country with 22 official languages and 10 scripts. It is therefore essential that tools for information processing in local languages are developed and made available for wider proliferation of ICT to benefit the people at large and thus paving the way towards 'Digital Unite and Knowledge for all' and arrest the sprawling Digital Divide.

The E-infrastructure division aims to bring out schemes/projects for countrywide e-infrastructure development and to integrate various e-infrastructure development elements such as Broadband, Telemedicine, telecommuting, tele-cottages, Overlay networks for education health, Rural communications, community business centres etc. under a common program /scheme in DIT

The Internet Governance Division has a mandate for proliferation of Internet in India and interventions at international and domestic forums towards formulation of regulatory and governing policies, principle, norms, rules, decision making procedure and programs such as to shape the evolution of and user of Internet by each Indian populace. This is to be undertaken in partnership with all stakeholders namely private sector, civil society and user communities of Internet.
DIT's HRD activities are aimed at generation of trained human resources for the manufacturing & service sectors of electronics and IT industry. Initiatives include identifying gaps emerging from the formal sector, planning programmes in non-formal and formal sectors for meeting these gaps.
The E-learning facilitates the acceleration of the HR activities. The web based learning enables the learners to access the learning any where any place. The activities include development of tools technologies for e-learning.

This document highlights the key technology areas, implementation methodologies, high impact application areas and guidelines to research on futuristic technologies in the above mentioned areas.

The vision of this e-learning group of DIT is to generate human resources for the electronics and ICT industry using ubiquitous learning models in an inclusive manner.
Thus e-infrastructure, Internet Governance, Human Centric Computing, e-learning and HRD divisions of DIT provide a holistic eco system need for the generation of skilled population which can leverage the use of knowledge effectively for the economic growth.

Aspiration

The main aim is Communicating and moving up the knowledge chain overcoming language barrier with the following Objectives:

- Research and Development of Technology, Software Tools and Applications for Indian Languages.
- Proliferation of Language Technology products and solutions.
- Development of Standards for linguistic resources, tools and applications for interoperability.

The main goals are a) to make available the Basic Information Processing Kit (BIPK) and other tools for free use of all Indian languages; and b) Work towards development of those technologies that are required to achieve the above vision.

To project India as knowledge based economy with a ubiquitous and robust broadband network (Optical Fiber Cable) across the country with 100% bandwidth utilization through contextual content and services; Country readiness for futuristic network and computing through R&D and development in a Public-Private-Partnership. To achieve this vision, the goals identified are:

- Identify organizations in industry, R & D, Academia, Government and other key departments to setup a working group for Identification of thrust areas/gap areas/ edge areas for initiating projects for countrywide e-infrastructure development .
- To integrate various e-infrastructure development elements such as Broadband, Telemedicine, telecommuting, tele-cottages, Overlay networks for education health, Rural communications, community business centers etc. under a common program /scheme in DIT.
- To create an appropriate management and monitoring mechanism for the projects

The worldwide Internet user statistics places India in 3rd position in Asia with Internet user base of 81 million and low Internet proliferation rate of 7%. The aspiration is to achieve a target of 100 PCs per 1000 and Internet users base of 300 million by 2015. As also Internationalization of Internet in Indian Languages (Scripts) and computing in Indian language. To achieve this vision, the goals identified are:

- Establish a Multi stakeholder public dialogue forum for identification of schemes and policies for countrywide proliferation of Internet.
- Establish more NIXI hubs in the country and interconnect them for open peering among service providers thereby improved connectivity at lower costs to the end user.
- Incentivize Web hosting services, Data Centre establishments and Content Creation and Content Distribution & Management in India to keep domestic traffic within India and thereby reduced latency and service deliveries for the end user.

- Research and Development of Search Engine for Indian Languages for Indian language content and web search.
- Creation of a Semantic Web for increased exchange and flow of information beyond
- Creation of Voice Based Web surfing technology
- Improving Web Accessibility in terms of provisioning for accessibility for the differently-abled, Indian Language dependent web users etc.
- Research & Development funding for futuristic web technologies and access devices, etc for industry adoption.
- Widespread National Internet Awareness Campaign
- Initiate action for National Digital Content Commission.
- Position India as a major stakeholder in the Global Internet Resource Allocation and Management Policy and implementation decisions.
- Liaise with International bodies ICANN, IGF, APNIC on Internet Resource allocation and its management and governance policy development processes.

Government of India had announced the National Skill Development Policy which has set a target of skilling 500 million by 2022. The policy also aims at taking the advantage of demographic dividends. India would have major sections of its population in the productive age group (especially youth) while the developed world would have major segment of ageing population. It is also seen that population at the working age group i.e. 15 to 59 is expected to be increasing in India. Department of Information Technology has been listed as a part of the skill development initiative and has been given a target to train 10 million persons by the year 2022.

The blended and supportive learning are found to be more useful in higher education. Immersive Interactive learning techniques, systematic approach in e-Learning delivery, mentoring and an adaptive assessment mechanism have to be given serious consideration while evolving the e-Learning solutions: (i) Introduce low cost broadband on all India basis (ii) Introduce low cost PC's Laptops (iii) Convert max. number of courses into e-Learning courses/regional languages (iv) Teacher training.

It is suggested that there is a need to have Public-Private partnership in e-Learning initiatives. For effective private participation, Government could help by establishing quality standards, establishing accreditation arrangements and wide dissemination of information so that good effort can flourish and inappropriate finds it difficult to survive.

Social networking can be exploited in making education more interesting. Media's help can also be explored to enhance the new ways of improving this area. While designing content and e-Learning tools, we have to consider "Engaging the Learner" as the key aspect. This would be possible by enhancing the content presentation and also by creating virtual labs.

SWOT ANALYSIS

Strength

- Increased adoption of Web Based Communication and Services by the Governments., industry and the civil society.
- Increased awareness and usage of Internet and IT based services for their socio-economic needs.
- Increased computerization and mechanization of manufacturing and development processes by the small and medium enterprises. As also of their business process.
- IT industry's adoption and deployment of Internet technology and services simultaneously with their global counterparts.
- Approx. 500,000 route kms. of Optical Fiber network coverage across the country and 25,000 VSATs for connectivity.
- Increased usage of Internet through mobile.
- Expected roll out of 3G services to further increase mobile Internet and other ICT services.
- Establishment of National Knowledge Network.
- The initiatives have further positioned India as a strong ally for both the developed and the developing countries and has an able technology support for the under developed countries.

Weaknesses

- IT industry investment in R&D initiatives in futuristic Internet and computing technologies is negligible.
- Industry in a wait and watch state reluctant to adopt IPv6
- IT industry investment in designing and developing products, applications and services for the domestic market is negligible as compared to their spending for exports.
- Very little or no linkage between academia, R&D institutions and industry each working on similar R&D activities in silos leading to gaps or overlaps in efforts.
- Vastly multilingual, multi cultural diasporas and geographical terrain makes it complicated task to envision and encompass the community specific requirements in terms of infrastructure, technology, capability and context for roll out of schemes and initiatives at national level. Most of the initiatives are therefore taken up at small scale with localized implementation as objectives.
- The ubiquity of Internet and its open architecture allows for entrepreneur escapades of unwarranted cyber activities leading to cyber crime. Technology developed for a socio economic upliftment also is misused for malpractices.
- A largely English-speaking base of Internet user has resulted in Indian IT industry not investing in development of tools and technologies for Indian languages.

- Most of the resources required for India in computing have been developed by the Department of Information Technology, Government of India through its societies.
- Further there has been little interest in development of application and services on the IPv6 protocol. With IPv4 address space getting consumed by 2011, the country may suddenly face disruption in its Internet space due to last mandate adoption/adaptation of IPv6 protocol by the Internet service providers.
- The efficacy of e-Learning, virtual class, & virtualization of Learning has not yet been fully understood and the potential of these has not been fully emphasized and exploited. There is a need to setup virtual university for IT/Computer Science by effectively leveraging the potential of e-Learning methodology.
- There is a need to provide adequate opportunities for technical upgradation of scientific manpower to keep them abreast with the emerging new technologies/fields, etc.

Opportunity

- India is keenly watched for its schemes and plans for universal Internet access to its vastly multi-lingual and multi-cultural population.
- Inputs and Best Practices are expected from India for its implementation of schemes in the areas of Access, e-Governance, Multi-lingualisation of Internet, Internet Security, etc.
- Worldwide development in the area of Internet and information technology has been focused on use of English (Latin script). India with its multiple languages with some of them such as Hindi, Bengali, Tamil, Malayalam, Urdu, etc. also used in other countries is looked upon as a testbed for implementation of localized Internet access and services base.
- A young population has a vast arena for development of tools and technologies, services, applications which could be in demand by other countries.
- India is also expected to take a leadership position in developing and articulating the interests and perspectives of developing countries at international IG related policy forums.
- Government of India's announcement of National Skill Development Initiative which envisages empowering all individuals through improved skills, knowledge, and nationally and internationally recognized qualifications to enable access to decent employment in promoting inclusive growth and to ensure India's competitiveness in the global market.
- The tools/technology build/developed now will find immediate use when looked at along with the National Mission on Education through ICT and the ICT@school programmes of MHRD

Threat

- Industry disinterest in R&D for domestic market would lead to diminishing the scope of Indian populace benefiting from Web Based technologies and services.

- Substandard content and services availability in Indian Languages provisioning by international companies not adept in Indian Languages resulting in developing disinterest in adopting Internet or participating in its development and further evolution.
- Slow adoption of IPv6 may cause disruption of services in the absence of IPv4 addresses, NATing may not resolve the demand for addresses at large scale.
- India may lose out on IP address space allocation and management due to industry disinterest in adopting and procuring IPv6 addresses.
- Various developing nations are taking steps to take advantage of the opportunities that are coming up. This would mean more competition.
- Emerging market opportunity itself may shrink due to the geriatric problem which the developed nations are likely to face as the old age population in these nations may not be in a position to participate in the economic activity thereby shrinking the market itself.
- The Quality of faculty / Trainers are not upto the mark which leads to generation of poor quality of trained manpower which is not employable. This would severely affect the sustainability of market share.
- Psycho-social ill-effects and the resultant health problems / Behavioral aberrations in the manpower pool working in the BPO industry is likely to emerge as a major threat to this industry as it would discourage the parents to allow their wards to join this industry
- The English language advantage would not continue for a long time as the other Non-English speaking countries have entered in the fray by training their population in English.

Proposed Strategy and Road Map

Internet Governance

Strategy

- The strategy is to establish a National Internet Registry of India (NIRI) to facilitate IP address allocation to Indian entities in Indian Rupees
- Establish a National Digital Content Mission.
- Fund projects for development of tools and technologies for localization of Internet, fund research projects for identifying evolution of next generation networks.
- Increase education, training and awareness in Indian language Web technologies and computing technologies for Internet proliferation.
- Incentivize Technology, tool, content and other resource development in Indian Languages.
- Implementation of Web access Standards and Internationalized Domain Name implementation Policies.
- Strengthen the IT Act provisions to deter misuse of Internet and Internet based applications and services.

Implementation method

- Sponsoring R&D projects to academia & R&D institutions with Industry partnership.
- Establishment of a Working Group for thrust area identification and monitoring of national programmes and schemes.
- Establishment of a Multi-stakeholder national forum for policy dialogue on Internet proliferation and governance in the country.

e-Infrastructure

Strategy

- Fund projects for development of tools and technologies for proliferation of ICT infrastructure in unreached areas localization of Internet, fund research projects for identifying evolution of next generation networks.
- Increase awareness about the use and benefits of ICT infrastructure for social development, quality of life, and economic growth and over all national development.
- Incentivize Technology, tool, content and other resource development in Indian Languages.

Implementation method

- Identification of thrust areas , gap areas, edge areas, for initiating e-infrastructure development projects
- Establishment of a working Group for proposing, assessing, initiating and monitoring of national programmes and schemes.

Human Centric Computing

Strategy

The focus will be on development of the core technology engines. Following principles are being followed for implementation of the projects for language technology development.

i. Separating Language Specificity from Technology
ii. Setup Language Technology Groups as Consortia
iii. Evaluation of Technology Engines, their Components and End-User Systems

In the next five years, advanced version of Language CDs and technology enhancement for Machine Translation, Cross Lingual Information Access, Optical Character Recognition, Online Handwriting Recognition and Text to Speech Conversion systems, in terms of efficacy of the systems, more language pairs and domain coverage would be undertaken. During the next five-years, technology development in the new areas such as

Indian Languages to English Machine Translation Systems, Voice Browser, Semantic Web and Speech Recognition would also be initiated. The programme also aims to access Indian Language technologies through mobile devices.

Implementation Method

In the area of Language Technology development, projects are being implemented in the consortium mode. This has helped in smooth implementation of the projects. Multiple institutions are involved in the development as the technologies involved are very complex and the development is to be done for many languages. Plan has been divided into two categories as long and short range R&D. Mechanism will be evolved to seed new research groups. Human Resource Development in the natural language processing area would be encouraged.

Human Resources Development

Strategy

There are several cutting-edge technology areas which are emerging. The market requirement and characteristics are continuously modified based on both emerging technology and change in customer needs. The NASSCOM Report entitled *'NASSCOM PERSPECTIVE 2020: Transform Business, Transform India'* has identified a set of emerging technology areas which would transform the business. These *inter-alia* include artificial intelligence, cloud computing, biometric identification, ubiquitous computing, collaborative online interaction, pervasive IT security, intelligent information gathering and processing, flexible IT and Green IT. This list could be taken as a starting point for identifying potential emerging areas and launching HR initiatives associating all the stakeholders viz. academia, industry/industry associations.

Implementation method:

The Government of India is laying emphasis on promotion of IT Hardware and Electronics Manufacturing Industry. A study on the manpower requirement on this segment has made several recommendations regarding the manpower initiatives that are to be taken up. In line with these, it is proposed to launch various short term and long term courses in the emerging areas, setting up of Centres of Excellence in electronics product design and development and also in manufacturing technology associating IISc, IITs, erstwhile CEDTs (presently DOEACC Centres), launching HR Development programmes associating various stakeholders like academia, industry/industry associates, etc. in the areas of Electronics Products Design & Production Technology covering various branches of Electronics viz. consumer electronics, medical electronics, communications, etc.

National Skill Development Initiative

Government of India has approved the 'Coordinated Action of Skill Development' alongwith the setting up of National Council on Skill Development', National Skill Development Coordination Board' and establishment of National Skill Development Corporation (NSDC), which envisages empowering all individuals through improved skills, knowledge, and nationally and internationally recognized qualifications to enable

access to decent employment in promoting inclusive growth and to ensure India's competitiveness in the global market.

The autonomous societies DOEACC and C-DAC under DIT are engaged in the human resource development and training. Strategy to scale up their existing training activities to create a pool of 10 million trained persons by the year 2022 alongwith fund requirement in the form of a concept note entitled 'DIT's road map for Skill Development in IT' was submitted to Planning Commission; and the Planning Commission has accorded 'in-principle' approval for the same. The Detailed Project Reports/EFC documents are under formulation for obtaining the approval of the Competent Authority. The proposal involves the following components:

a) As a part of skill development initiatives, the capacities of DOEACC and C-DAC would be enhanced to generate 10 million skilled manpower by the year 2022 starting from diploma level right up to doctoral level and in line with the emerging industry/market/society needs.

b) The Central Government scheme for providing financial assistance for setting up of ICT Academy in each State/UT under PPP mode by respective State Governments/UTs alongwith industry/industry associations is being proposed. This scheme would address the issues related to faculty development in various academic institutions cutting across Engineering Science & other Graduate colleges across the country. This is aimed to ensure wider spreading of quality faculty development and continuous updation of faculty in an inclusive manner leading to an improved employability of the graduates at various levels in the academic institutions.

E-learning

Strategy

a. To bridge the gap between the academia and industry and provide learning to the students at their own pace and available time
b. Developing meaningful partnership with the private sector in all stages of e-Learning efforts
c. The focus is on :
    - Availability of large scale, high quality learning resources localized to Indian needs in terms of language and culture
    - Mechanism to reach technology enhanced learning to remote and rural areas (affordability and accessibility)
    - Ensuring access to learning opportunities for all sections of society (including illiterate and disabled)

Implementation method:

- To develop tools and Technologies for Immersive Interactive learning techniques, systematic approach in e-Learning delivery, mentoring and an adaptive assessment mechanism while evolving the e-Learning solutions.
- (i) Introduce low cost broadband on all India basis (ii) Introduce low cost PC's Laptops (iii) Convert max. number of courses into e-Learning courses/regional languages (iv) Teacher training

- Keeping in view, the diversity of language and culture in our country, it is important to make efforts in creating a wrapper around the established worldwide standards to meet the needs of our country.
- Evolving policy/guidelines for **quality, standards, accreditation of e-Learning courses** and **industry acceptance** to enable the learner to gain **employment opportunities**
- Extensive Groups working in the area of **open source and open content** would play a crucial role in e-Learning in future

Framework for the Implementation, Monitoring and Measurement of Success

The technological advancements in these Electronics and ICT sectors are very dynamic. Therefore, there is a need to regularly monitor and identify the niche areas, estimate the manpower demand and supply gaps which need to be developed in the country along with the potential institutions. In order to identify, evolve and implement specific projects as per the above strategy Working Groups (WGs) would be constituted/re-constituted.

i. Working Group on HRD in IT – To Identify the gaps from the demand and supply of human resources emerging from the formal sector. Planning programmes in the non-formal and formal sector for meeting the demand

ii. Working Groups on E-infrastructure and Internet Governance – To study the e-infrastructure needs for ubiquitous & blended learning in an inclusive manner. Evolve programmes to increase education and awareness for Internet proliferation.

iii. Working Group on E-learning: To evolve projects for e-learning tools and technologies

iv. Working Group on Human Centered Computing

These Working Groups would have members from

i. Industry

ii. Academic / Research Institutions

iii. Government Organizations / Societies

iv. Industry Associations

The Working Groups in particular would

- Identify thrust areas and assessing the skilled human resource requirements along with institutions to carry out training and education programmes in these nicheareas
- Workout details of the capacity building programme in identified thrust areas
- Identify the state-of-the-art infrastructure required for setting up labs for training in emerging areas
- Identify the academic institutions with appropriate expertise where the training of the trainers programmes could be launched
- Identify the areas for setting up the Centres of excellence

- Work out details to strengthen linkages between R&D / academic institutions and Industry
- Identify the DIT R&D societies and academic institutions with similar expertise in the identify areas and link the two to carry out joint R&D initiatives.
- Identify steps needed for linking IT & Electronics industry with academic institutions

Activities like - identification of thrust areas, institutions and working out of other details of infrastructure etc. would be carried out by end of December 2011. This would be followed with initiation of appropriate activities / projects in the identified areas in the remaining 4 years.

The working Group would meet about twice in a year. The Working Group will also review the on-going activities in the identified thrust areas and suggest mid-course correction wherever required.

Sub-Groups may also support these Working Groups, wherever needed, to work out in-depth details of the activities mentioned above.
To facilitate usage of infrastructure created under the government support in the identified institutions and identified areas, wider publicity would be given by,

i. Proving details of the infrastructure & institution on DIT web site
ii. Publishing in the leading News Papers
iii. Publicizing in seminars etc.

E-Security

Background and need

Today the physical world is seamlessly merging with the cyber space. Millions of people in the country rely on the services and information available in cyber space, which comprises of IT networks, computer resources and all the fixed and mobile devices. The work of government, business and national infrastructure is highly dependent on cyber space. The electronic world is here to stay and is growing exponentially. The Cyber space is borderless and anonymous. These features are being exploited by adversaries for perpetration of crime in the cyber space. The scale and sophistication of the crimes committed in the cyber space is continually increasing thereby affecting the citizens, Business and Government. As the quantity and value of electronic information has increased so too have the business models and efforts of criminals and other adversaries who have embraced the cyber space as a more convenient and profitable way of carrying out their activities anonymously. The need is to create an ecosystem for cyber security. The components of that should be: Govt., Govt. bodies and E-Governance project, Cyber Security function, Security Research & Development, Operational facilities (CERT-In), Security Guidance & Practices, Security Testing Drills, Industry Participation, Legal Authority, Legal Enforcement, Forensic Capabilities, Security Training, End User Awareness and Security Education. This will facilitate to provide a secure environment in the presence of untrusted elements and equipment. There is, thus, a necessity for the Government to ensure the safety, security and resilience of the cyber space and harness the vast opportunities it presents with an appropriate long-term strategy.

Vision

The creation of a secure, resilient and trusted electronic operating environment that supports national security and maximizes the benefits of the digital economy.

Objective

The objectives of the cyber security Strategy are:

- Awareness of Cyber risks to all citizens and take steps to secure IT infrastructure and online transactions.
- Businesses operate secure and resilient information and communications technologies to protect the integrity of their own operations.
- The Government ensures its information and communications technologies are secure and resilient.

Assess the situation

What external factors will impact us

- Growing nature of distributed and coordinated attacks and increasing sophistication of attack tools and techniques used by adversaries
- Slow pace of implementation of appropriate technologies by critical sector and other organizations to face new challenges of emerging threat scenario

- Low level of interaction between R&D institutions and user organizations to develop and implement suitable solutions
- Low public awareness about various cyber security threats and security measures to be taken
- Lack of suitable mechanisms to resolve cyber crime jurisdiction issues

Who are the stakeholders

- Academic, R&D organizations and industry
- Critical sector and other user organizations
- Low enforcement agencies
- Public
- Standardization bodies

Strengths

The multi-pronged initiative already taken by the Government include:

- Designated CERT-In as Nodal agency for coordinating all matters related to cyber security and emergency response. It is now assigned with the task of oversight of the Indian cyber space for enhancing cyber protection, enabling security compliance and assurance in Government and critical sectors and facilitating early warning & response as well as information sharing and cooperation.
- Enacted the Information Technology (Amendment) Act 2008 to address the needs of National Cyber Security by providing a legislative framework for electronic operating environment
- The Department has taken various initiatives towards promotion of indigenous technology innovation in the field of Information Security
- Embarked on an Information Security Education and Awareness Project to develop human resources in the area of Information Security at various levels.

In addition:

- CERT-In is also conducting cyber security mock drills to assess the preparedness of organizations in the critical sector to withstand cyber attacks.
- CERT-In in collaboration with CII, NASSCOM and Microsoft have created a portal “secureyourpc.in” to educate consumers on cyber security issues.
- CERT-In has empanelled 80 information security auditing organizations to carry out information security audit, including the vulnerability assessment and penetration test of the networked infrastructure.
- CERT-In is a member of Forum of Incident Response and Security Teams (FIRST), Asia Pacific CERT (APCERT) and Anti-Phishing Working Group (APWG).
- CERT-In has successfully participated in ASEAN CERTs Incident Handling Drill (ACID 2009) held in July 2009 involving CERTs from Asia Pacific region and Europe.

- Now CERT-In will be participating as an observer in Cyber Storm (critical in maintaining and strengthening cross-sector, inter-governmental and international relationships, enhancing processes and communications linkages, as well as ensuring continued improvement to cyber security procedures and processes).
- Trusted Computing Group (TCG) Board has approved the Indian Government's participation in the TCG Government Liaison Program (India has now joined US, UK, Germany, France and China with respect to this program now).

Weaknesses

- No existing long term cyber security strategy
- Low R&D expenditure by the industry in the information security space
- Weak trusted collaboration between industry, R&D and academia
- Low expertise and trained human resources in all domains of cyber security
- Low appreciation of IPR, increased piracy and weak enforcement mechanisms
- Low level of public awareness in safe and secure use of technology
- Slow Adoption of new technologies to mitigate emergent threats

Opportunities

Aligning to the 10 Broad Priority Areas for the Government as outlined by the President of India, the opportunities exist in:

- Internal security
- Economic growth in services
- Education and skill development
- Strengthened social protection
- Governance reform
- Creation and modernization of secure infrastructure and capacity addition in key sectors
- Energy security and environment protection
- Constructive and creative engagement with the world
- Promotion of innovation

Threats

- Today Adversaries are producing, selling and distributing malicious code with ease, maximizing their gains and exploiting the fact that attribution is a challenge.
- Malware is getting stealthier, more targeted, multi-faceted and extremely difficult to analyse and defeat even by the experts in the security field.

- Organized crime is fast growing and targeting the exponential growth of on line identities and financial transactions.

- There is increasing evidence of espionage, targeted attacks and lack of traceability in the cyber world as state and non-state actors are compromising, stealing, changing or destroying information and therefore potentially causing risk to National Security, economic growth, public safety and competitiveness**.**

What we need to learn

- Enabling close interaction between R&D organizations and user agencies for development and implementation of usable solutions
- Creation of public awareness about cyber security threats and appropriate measures to be taken
- Motivate critical sector and other user organizations to hasten the implementation of suitable security measures
- Strengthen the collaboration among concerned organizations in India and abroad to identify emerging threats and related security measures

Develop the Strategy

The Department of IT has identified the following as the key elements of Cyber Security Strategy to address cyber security challenges effectively:

- Security R&D
- Legal Framework
- Security Incident - Early Warning & Response
    - National Cyber Alert System
    - CERT-In and Sectoral CERTs
    - Information Exchange with international CERTs
- Security Policy, Compliance and Assurance
    - Security Assurance Framework
    - Trusted Company Certification IT/ITES/BPO Companies
- Security training
    - Skill & Competence development
    - Domain Specific training – Cyber Forensics, Network & System Security Administration
    - Lab for training in Collection and analysis of Digital Evidence Law Enforcement & Judiciary

Implementation Plan

Implementation Plan details

Research & Development:

Tasks: Facilitating Basic research, Technology demonstration and Proof-of concept and R&D test bed projects

Indigenous R&D is an essential component of national information security measure due to various reasons- a major one being export restrictions on sophisticated products by

advanced countries. Second major reason for undertaking R&D is to build confidence that an imported IT security product itself does not turn out to be a veiled security threat. Other benefits include creation of knowledge and expertise to face new and emerging security challenges, to produce cost-effective, tailor-made indigenous security solutions and even compete for export market in information security products and services.

Public Private partnership: Joint R&D programme in specific identified projects in Public Private partnership mode will be initiated. These joint projects would speed up the development efforts and make available outcome from such joint projects for commercial exploitation and deployment in relatively short period of time. This joint R&D programme also will help in harnessing the technical skills and capabilities of institutions and organisations in public and private sector.

Strategy for Development: Three pronged strategy will be followed with short term, medium term and long term goals.

Better understanding of the security properties of existing major systems & components, development of prototypes in selected application and infrastructure domains and simulation environments will be taken up in short term.

In medium term, total deployable system development with integration of all building blocks will be completed. Also the tools for verifying trustworthiness of systems will be developed.

In long term systems developed will be tested with tools and techniques development and maintaining trustworthy systems throughout the life cycle.

The Thrust areas of R&D are:

- Cryptography and cryptanalysis research, Steganography, Digital Water marking of electronic documents
- Network & Systems Security
- Security architecture
- Vulnerability Remediation & Assurance
- Monitoring, Surveillance & Forensics

An indicative list of important areas of R&D is as follows:

- **Cyber Security Functional Requirements**

    - Attack protection and prevention
    - Attack detection, response, and recovery
    - Situational awareness, incident & warning
    - Secure software engineering & development
    - Software assurance, code testing & analysis
    - Lightweight, low-latency authentication
    - Forensics, traceback, attribution
    - Hardware/firmware security
    - Secure operating systems
    - Survivable systems/ self healing systems

- Malware research
- Identity management
- Trustworthy systems
- Role based access control
- Virtualised honeynets

- **Securing the Infrastructure**

  - Secure domain name system
  - Secure routing protocols
  - Secure process control systems(retrofit and future Infrastructure)
  - Adapting legacy systems
  - Usable security for mobile systems

- **Domain-Specific Security Needs**

  - Wireless/Mobile Security
  - Internet priority service
  - Distributed & embedded computing platforms

- **EnablingTechnologies for R&D**

  - Testbeds
  - Modelling and simulation
  - Network mapping
  - Security technology and policy management

Activities

Promotion of R&D in:

- Next generation secure networks, visual analytics, security architectures, trace back attribution etc.

- Setting up centres of excellence in identified areas of advanced security;

- Participate in global trusted identity approach and solution;

- Public Private Partnership model for development and implementation.

- Build national capability in encryption technologies and cryptanalysis.

- Focus on practical aspects of technology and use of technology in various areas of economy and governance and intelligence, study of technology trends, testing of products

- Building of capabilities by intelligence to handle encrypted communications by terrorists.

- Establish a state-of-the-art national cyber security monitoring centre that conducts rigorous testing of critical assets, monitors and analyses attack trends and vectors, and system behaviours; monitors national gateways.

- Continuous research on evolving threats and vulnerabilities for creating a Robust Threat Landscape; which can help the Indian industry and the Law enforcement agencies to become aware of the latest threats, enabling them to take proactive security measures.

A Working Group (WG) will be constituted with members from academic/research organizations, industry, Govt. and user organizations.

The WG will identify existing technological gaps and thrust areas, work out R&D plan, implementation methodology along with institutions to carry out R&D. Inputs from concerned user organizations will be solicited while evolving the R&D plan. These activities would be carried out by March 2012. In the subsequent four years, appropriate activities/projects would be taken up as per the R&D plan finalized in the first year. R&D plan will be updated based on the need.

Legal Framework

Tasks - Dynamic policy and legal framework development

Activities

- Understand the impact of new technology, crime trends and current policies on the business environment, public safety, National Security and global competitiveness by framing and recommending progressive policies and amendments based on appropriate public inputs and debates where necessary

- Setting up of think tanks in Public Private mode to identify gaps in the existing policy and frameworks (both domestic and international) and, where necessary, take action to address them working with the relevant stakeholders

- Devise means to strengthen the enforcement mechanisms with different stakeholders

Identifying the gaps in the existing policy and frameworks will be carried out in the first year. In the second year, amendments required in the existing legal framework will be worked out. In the subsequent three years, appropriate means will be devised to strengthen the enforcement mechanism for implementation. Completion of these activities in the identified time frames will be taken for tracking the performance.

Security Incident - Early Warning & Response

Tasks - Threat Discovery and Mitigation, technical baseline hardening, develop and support open industry specifications for trusted computing across multiple platform types, Participation in security drills to maintain and strengthen international relationships, embark on community based defence.

Activities

- Setup real time monitoring and data collection mechanism for research.

- Conduct mock drills and advance audits for information networks and systems sector-wise to strengthen defence posture, prepare technical hardening prescriptive guidelines for popular platforms, Participate to understand, review and contribute to specifications for the Trusted Platform Module (TPM) used in Personal Computers and other systems

- Improve safety, security and resiliency of systems;

- Evolve and promote software interface specification to enable application development for systems using the TPM, the Trusted Network Connect architecture to enable protection of the network and the Trusted Storage specification and a specification for the Mobile Trusted Module for mobile phone security.

- Participate in exercises such as Cyber Storm and ASEAN Cert drills

Security incident early warning and response activities including (1) security incident prediction, issue of cyber security alerts, advisories and vulnerability notes (2) handling of security incidents are regular activities and they will be carried out in all the five years.

Security Policy, Compliance and Assurance

Tasks: Creation, Establishment and operation of Cyber Security Assurance Framework aimed at enabling Government, Critical Infrastructure Organisations and other key IT users of nation's economy, Development of National Cyber Security Policy, establish labs for security testing of products, trusted company certifications by nominated agencies

Cyber Security Assurance Framework

Cyber Security Assurance Framework is a National framework for "Cyber Security Assurance" to assist National level efforts in protecting critical information infrastructure. It aims to cater to the security assurance needs of Government and critical infrastructure organisations through "Enabling and Endorsing" actions.

Enabling actions are essentially Promotional/Advisory/Regulatory in nature and are best done by Govt. or its authorized entity that can be seen and perceived as independent of bias and/or commercial interests. They involve publication of "National Security Policy Compliance requirements" and IT security guidelines and supporting documents to facilitate IT security implementation and compliance

Endorsing actions are essentially commercial in nature and may involve more than one service provider offering commercial services after having fulfilled requisite qualification criteria and demonstrated ability prior to empanelment. These include

- Assessment and certification of compliance to IT security best practices, standards and guidelines (Ex. ISO 27001/BS 7799 ISMS certification, IS system audits etc)

- IT Security product evaluation and certification as per 'Common Criteria' standard ISO 15408 and Crypto module verification standards
- IT security manpower training and other services to assist user in IT security implementation and compliance

Activities

- Development and implementation of policy in collaboration with key stakeholders

- Develop procedures and establish common criteria labs and crypto module validation labs,

- Develop the framework for certification with nominated agencies,

- Develop and release framework (including for secure architecture, migration from legacy systems / storage to modern electronic systems, security operation procedures) for ensuring security and privacy covering ICT.

- Promotion of security best practices in critical industry segments that make their security vibrant, relate their initiatives to recent trends and approaches and align their efforts to address the real threats they are facing.

The activities are aimed at improving the security posture of organizations and enhancement in the ability of IT systems and networks to resist cyber attacks. These activities are of continuous in nature and they will be carried out in all five years.

Security training

Tasks - Capacity building and Certification, Security awareness, and education in specialized areas of cyber security

Activities

- Build capacity through various training delivery modes and certifications in network security, forensics, audit, security management, and application security.

- Security training and courses in Public Private Partnership mode.

- Mandate certification for security roles including for CISO / CSO and those involved with critical information infrastructure.

- Specific courses to be retrofitted in all engineering & management colleges.

- Promote secure coding practices.

- Certification of staff in IT / ITeS and in-house s/w departments.

- Capacity building and certifications for Law Enforcement Agencies and Judiciary.

- Promote and mandate secure your Personal Computer portal among students and all government employment and for people with limited and color challenged visibility.

- Development of security education content in Indian languages.

- Security awareness at schools level with suitable cyber security curriculum

- Raise awareness of cyber security at all levels of government so as to identify and instill the changes in behavior and working culture by bringing in a risk based decision making that the cyber environment demands, as well as embedding cyber security in wider aspects of policy formulation.

- Contribute towards improving current rank of India in the secure nations.

Activities related to development of trained manpower to train in various areas of cyber security are regular activities and they will be carried out in all five years.

What resources will be required

The strategy will be implemented under Cyber Security programme of DIT with CERT-In, Cyber Appellate Tribunal (CAT) and R&D wing of Cyber Security Group. A Budgetary support of Rs. 250 crores (approx) is envisaged for 5 years. However, the WG will identify the resources required for carrying out R&D in identified thrust areas. CERT-In and CAT will work out year-wise requirements during the implementation of strategy.

How will we track and measure success

- Security R&D

  The Working Group constituted will examine the proposals in the identified thrust areas and specify milestones along with timelines. A PRSG will be constituted to regularly track performance of the projects against milestones and corresponding time frames. The number of projects initiated in the identified thrust areas and number of projects reviewed will be taken for tracking the performance.

- Legal Framework

  Completion of activities (a) identifying the gaps in the existing policy and frameworks, (b) working out amendments required in the existing legal framework and (c) devising appropriate means to strengthen the enforcement mechanism for implementation, in identified timeframes wiill be taken for tracking the performance.

- Security Incident - Early Warning & Response

  The parameters for measuring the performance will be (a) No. of security incidents handled, (b) percentage of incidents handled in reasonable time, (c) No. of cyber security alerts, advisories and vulnerability notes issued.

- Security Policy, Compliance and Assurance

  The parameters for tracking the performance will be (a) No. of cyber security drills conducted, (b) up-dation of Crisis Management Plan and (c) level of establishment of Common Criteria product testing facility.

- Security training

  Number of topics covered for awareness training will be taken for performance measurement.

E-Inclusion

Background

Eleventh Five Year Plan of India

The Eleventh Plan (2007-08 to 2011-12) sought to build on the gains achieved in the Tenth Plan and shift the economy to a path of faster and more inclusive growth. Inclusiveness a critical element in the strategy was to be achieved by ensuring that growth is broad-based and is combined with programmes aimed at overcoming deficiencies in critical areas which affect large numbers of the vulnerable sections of our population, particularly the Scheduled Castes (SCs) and Scheduled Tribes (STs), the Other Backward Classes (OBCs), women and the minorities. The Plan sought to deal with these deficiencies through programmes aimed at providing access to health, education and other essential services and programmes of livelihood support.

The Eleventh Plan viewed inclusiveness as multi-dimensional objectives and listed 27 monitorable targets. These parameters relates to Growth of GDP, Growth of agricultural GDP, poverty reduction, employment, education, health services, child nutrition, gender balance, access to basic infrastructural services and environmental sustainability.

The Allocation of Business Rules of DIT

- As per allocation of Business Rules 1961 relating to DIT, DIT is mandated to take initiative on bridging the Digital Divide (Digital inclusion).

Inclusive Development in the Budget Speech

In the Union Budget for the fiscal year 2010-11, Finance Minister indicated that:-

- For the UPA Government, “inclusive development is an act of faith.”

Inclusive Growth as per the Approach to Twelfth Five Year Plan

The main goal of the Twelfth Five Year Plan should be faster, sustainable and more inclusive growth with focus on people to improve their capabilities, access to opportunities, empowerment of weaker sections by including the excluded i.e. Scheduled Castes, Tribals, other Backward Classes, Minorities, Differently-abled persons, Women and Children.

An ‘interventionist’ strategy along with an ‘enabling’ strategy for inclusion and development is to be followed.

From Inclusion to e-Inclusion: Global Perspectives on e-Inclusion

e-Inclusion

e-Inclusion *('e' standing for electronic, e-Inclusion is also referred to as 'digital integration')* is a concept centered around involving people in the Information Society

through facilitating access to and use of ICT. The objective of e-Inclusion is to achieve a truly inclusive Information Society by reducing the digital divide at home, at work, in education and in public provision through e-Government and e-Health services, e-Education, e-Agriculture, e-Business, etc.

e-Inclusion policies are aimed at:

- Removing barriers that prevent access to tools and services of the Information Society for people who cannot afford ICT, people with functional restrictions and people who lack required skills,
- Avoiding exclusion, forms of which can be directly linked to ICT, including risks of social and economic deprivation among people who do not use ICT as more e-Services are established,
- Harnessing opportunities offered through ICT in order to support exclusion-prone communities in terms of better access to education and employment, and
- Exploiting ICT for the purposes of empowerment, motivation and networking among individuals and utilizing technologies that contribute towards the development of social capital.

e-Inclusion policies consist of a range of measures. Measures include legislation and regulation, institutional development, support and subsidy, and fiscal policy.

At EU level, e-Inclusion is one of the dimensions of social inclusion and community cohesion. The European Commission refers to a two-fold approach in relation to e-Inclusion concerned with:

- Preventing digital exclusion in instances where exclusion-prone communities do not benefit from the Information Society, and
- Exploiting digital opportunities to facilitate participation among exclusion-prone communities in the Information Society.

The Lisbon Strategy

In March 2000 and in response to new challenges of globalization and technology, the EU set out a strategy based on a consensus among Member States to become, by 2010 the most competitive and dynamic knowledge-based economy in the world, capable of sustainable growth with more and better jobs and greater social cohesion.

The Lisbon Strategy covered a range of policies that promote direct action through scientific research, education, vocational training, ICT accessibility, jobs improvement and environmental sustainability.

i2010: A European Information Society for Growth and Employment

The i2010 policy framework was launched by the European Commission in June 2005 to address the progression and development of the Information Society and the media. Adopted under the renewed Lisbon Strategy, the i2010 initiative promotes an open and

competitive digital economy which emphasizes ICT as a driver of inclusion and better quality of life.

Riga Declaration

At the 2006 Riga Ministerial Conference the Riga Declaration was issued, proposing to halve the digital divide by 2010. EU Ministers adopted a Declaration on e-Inclusion in response to the challenges experienced as ICT services are increasingly accessed by electronic means.

The Riga Declaration places a strong emphasis on the following 'cross-cutting' issues such as current enforcement, standard development and implementation of the Web Accessibility Initiative guidelines.

For e-Inclusion development, the Riga Declaration identifies disabled people, less developed regions, lower education groups, older people, unemployed people and women.

In November 2007, the European Commission adopted the European i2010 Initiative on e-Inclusion Communication to raise awareness, demonstrate progress and reinforce commitment to the Riga Declaration through a strategic framework for action.

Case Studies/Worldwide Practices

A.) Kenya

- The Government of Kenya is dedicated to build the crucial Internet infrastructure to enable access to faster, efficient, affordable connections by Kenyans and others in the East and South African region
- The government has automated services through various digital village projects, facilitating access to services such as e-procurement, e-registry, integrated land management system and e-Health.
- The government has deployed digital arteries countrywide to link rural, under-served and un-served areas to enable people access full benefits of the submarine cables. The implementation to the arteries also aims at stimulating private sector participation in the provision of rural telecommunication services.

B.) Sweden

- The Swedish government is following in the footsteps of the Finns, as their IT-ministry is now promising that 90 percent of all Swedish homes will have access to a 100 mbit/s broadband connection before 2020.

Today that minimum level is 20 Kbit/s, which clearly is not anywhere near enough. Sweden is one of the better-connected countries in Europe and about 89 percent of the population has Internet in their homes.

Defining the aspiration

Vision

"Towards an e-inclusive society – Charting inclusive progress, breaking barriers"
The Approach to Twelfth Five Year Plan has set the goal ***"Faster, Sustainable and More Inclusive Growth"*** Going by this broad objective of the Twelfth Five Year Plan the strategic plan on e-Inclusion aims at more Inclusive Growth enabled by e-Inclusion to ensure – social justice and alleviation of poverty to the extent possible with the help of ICT during the Twelfth Five Year Plan.

Objective

The objective of e-Inclusion is to close the gap of digital divide i.e to create access and capability to use information technology. e-Inclusion involves bringing the benefits of information Technology to all cross sections of the population including women, children, senior citizens, tribals, illiterates, labourers, differently-abled, farmers, artisans and craftsmen. e-Inclusion has the power to close the gap between developed and less developed regions within the country; promote democracy and mutual understanding; and empower disadvantaged individuals, such as the poor, the disabled, the unemployed, women and tribals.

Benefits

There are many economic benefits of e-Inclusion. Digital inclusion is capable of enhancing opportunity for both individuals and organizations. ICT-assisted learning stimulates learning and leads to higher academic achievements. Customer choice is also greatly enhanced through digital inclusion, which secures better deals for users while stimulating competition in the market. Commercial organizations also benefit hugely from digital inclusion in reaching out to more customers and attracting higher spend, in addition to the obvious internal benefits related to higher efficiencies.
e-Inclusion has immense potential in cutting the cost of public service delivery. Examples of such savings include efficiencies stemming from new electronic processes replacing traditional services like issue of birth and death certificates, advisory services e.g. agriculture, healthcare and education which make customer interactions a lot cheaper.

e-Inclusion has the ability to improve the society as a whole by social inclusion. Expanding access to ICT for marginalised groups is likely to reduce their social exclusion simply through facilitating access and participation, while the potential of the internet as a vehicle for expression and easier communication often translates to individuals who are more involved and communities that are more integrated.

Long term Goals

- Promotion of equal access to ICT, digital content and services, and the use of these by all;
- Promoting technical and content-related skills for using ICT;
- Promoting pluralism, cultural identity and linguistic diversity in the digital environment in order to integrate everyone;

- Promoting quality of life through ICT.

Assess the situation

Concept of Digital Divide

According to OECD (2001) the term 'digital divide' refers to "the gap between individuals, households, businesses and geographic areas at the different socio-economic levels with regard to their opportunities to access Information and Communication Technologies (ICTs) and their use of Internet. It reflects differences among and within countries". Digital divide exists in variety of other levels; sector, community, and individual level. For example many communities within nation-states are far removed from the rest of the country with regard to information and communication technologies access and use. Such communities reshape ICT to their culture and norms. Further, digital divide is also referred to as "the spiral of uneven access to and usage of information and communication technologies and the socio-economic rebound causes that have caused the emergence of information inequality throughout the world. The term 'digital divide' essentially describes three distinctive divides: a geographical digital divide a social digital divide (between social classes), and an upgraded digital divide (between technology and humans).

Thus digital divide can be defined as economic, social or cultural deprivation generated by missing ICT access and skills. In the modern knowledge and information-based world, economic opportunities, such as employability, depend on ICT access and skills.

Measurement of 'Digital Divide'

Element 1: A gap in access to use ICT: Measured by the number and spread of ICTs (first order digital divide)

Element 2: A gap in the ability to use ICTs: measured by skills base and presence of numerous complementary assets (second order digital divide).

Element 3: A gap in actual use: measured by the telecommunications for various purpose, the number and time of online users, the number of internet hosts and the level of e-commerce, e-business and e-governance

Element 4: A gap in the impact of use: measured by financial and economic returns.

Based on these four elements, many international organizations have defined development policies aimed to reduce the digital divide. However, in spite of the evolution in the concept, these principally emphasize development of a technological infrastructure. National investments and policies for the reduction of the digital divide continue to principally target connectivity development.

Digital Divide: Global- The State of Divide

As per ITU Report "Measuring the Information society 2010", Overall, the digital divide still exists in 2008, its magnitude being most important between the high and low groups, followed by the high and medium groups, and the high and upper groups. However, the digital divide is shrinking marginally, most notably between the high and upper groups,

followed by the divide between the high and medium groups, and finally the high and low groups. Thus, the digital divide between the high and each of the other three groups has decreased. Nonetheless, the divides between the upper and low, the upper and medium, and the medium and low groups have increased.

The analysis shows that the digital divide is still prevalent, although it is slightly shrinking between those countries with very high ICT levels and those with lower levels. This is partly explained by the flattening of ICT growth in the group of countries that are most advanced. At the same time, countries with upper levels of ICT have made strong improvements thus increasing the gap with those towards the lower end of the scale. Given the relatively short time lag of ICT indicators compared to other development indicators, low-performing countries could catch up relatively soon provided their ICT sectors receive adequate policy attention.

Digital Divide in India: The State of Divide

ICT infrastructure is the backbone of modern society. It is the biggest enabler of change and process reforms with minimum resistance. India is one of the countries where telecommunication development activities have gained momentum in the past decade or so. Yet the gap of digital divide is significant between the rural and urban India.

Teledensity Divide

The total telephone subscribers in India as on January 2010 is 581.81 million, which conveys the teledensity of India to 49.50%. Out of the total telephone subscribers, wire line subscribers are 36.76 million (teledensity of 3.13%) and wireless subscribers are 545.05 million (teledensity of 46.37%). These huge numbers, however, disguise a disturbing reality, which is the enormous variation within India. The rural telephone subscribers are 182.88 million which reflects teledensity of 22.18%. However, the urban telephone subscribers are 399.16 million which shows a teledensity of 113.78%. Many of the less developed states have state-wise average penetration rates of below 20 per cent.

Internet Divide

As per the Internet World Stats data source, the Internet Penetration in Asia at the end of the year 2009 is 20.1%. The world average is 26.6% and the rest of world is 35.1%. The worldwide Internet user statistics places India in 3rd position in Asia with Internet user base of 81 million and low Internet proliferation rate of 7%. The Internet users in China are 384 million. The broadband subscribers as on April 2010 are 9 million.

Mobile Divide

Far from being a lifestyle product, Mobiles have now become a necessity. It has penetrated even to the rural areas of India to a good extent. Over and above with the STD rates and the call rates reducing day-by-day and new competitors entering, the mobile market has flung open high growth prospects.

Globally in terms of mobile subscriptions, India is the world's second largest wireless market after China. As on April 2010, the total numbers of wireless subscribers are 601.22 million and the wireless teledensity is 50.98%.

This growth of the sector can be clearly attributed to the favorable and improved regulatory structure, declining handset prices and innovative pre paid tariff structure.

But, there is huge divide between mobile phone users in urban and rural areas. Still, rural mobile penetration is pretty low, though it has touched double digits in some prosperous States like Punjab, Kerala and even Himachal Pradesh. However, overall rural penetration remains far away below the mobile density in urban areas.

e-Readiness Assessment of the States/UTs

e-Readiness is a multidimensional concept that measures a State's ability to participate in an increasingly networked world. It can be viewed as the ability of the States/UTs to pursue value creation opportunities facilitated by ICT and their readiness to use technology skillfully at the level of the individual, business and Government.

In the ranking of States/UTs by their e-Readiness, the Report "India: e-Readiness Assessment Report 2008 for States/Union Territories" differentiates between different levels:

- Leaders-Karnataka, Chandigarh, Maharashtra, Tamil Nadu, Delhi, Andhra Pradesh
- Aspiring Leaders –West Bengal, Kerala, Haryana, Gujarat, Punjab.
- Expectants – Andaman and Nicobar, Madhya Pradesh, Goa, Orissa, Assam, Himachal Pradesh, Uttar Pradesh, Bihar.
- Average Achievers – Chhattisgarh, Uttarakhand, Jharkhand, Sikkim, Rajasthan.
- Below Average Achievers – Tripura, Nagaland, Puducherry, Meghalaya.
- Least Achievers – Manipur, Mizoram, Jammu and Kashmir, Arunachal Pradesh, Lakshadweep, Dadra and Nagar Haveli, Daman and Diu.

e-Inclusion: Current Strategy

Digital Divide exists with respect to access, content and capability. In order to address this issue both the private sector and the Government have been implementing various policies and programmes, which impact e-Inclusion. The private sectors initiatives in this regard are as follows:

Private Sector Initiatives

Microsoft Corp, the world's largest software maker, has signed MoUs with nine State governments around the country, and has committed $20 million to promote computer literacy among disadvantaged kids in rural areas. The Confederation of Indian Industry (CII), and the Global Leaders Of Tomorrow (GLT) of the World Economic Forum (WEF), have launched an initiative called 'Shiksha India' in December 2001 during the India Economic Summit primarily to bridge the digital divide and promote better quality education in Indian Schools.

Ecosystem partnerships

- NIIT: As part of the initiative, a "Swift net-connect" programme was launched in association with NIIT, with the objective of spreading awareness on the benefits to (internet) through an affordable education course designed to help people explore the world of PCs and the Internet. In the last 3 months of running of this programme, over 13000 people across 183 NIIT centres have benefited from it learning the various usages of the internet.
- IL&FS: IL&FS Education and Technology services has launched an Internet and PC basics course called 'Connected Indians' which will educate youth in small towns on the benefits of Internet and role of technology in improving lives. This course is available in Bihar and Dehradun at present.
- Intel, in partnership with BSNL and Itz Cash, has launched the very innovative ePCO initiative aimed at transforming PCOs in India through broadband and PCs to deliver the benefits of Internet. Till date, ePCO has reached 5 States - Punjab, Rajasthan, UP, Maharashtra and Karnataka.

Digital empowerment through NGOs

- *DEF:* To spread awareness at grass root level, Intel has tied up with a Delhi-based NGO Digital Empowerment Foundation. ICT is a great tool for development and empowerment is being realized world over. DEF offer and facilitates seamless ICT and digital solution based on the diverse needs amongst rural population. It also provides knowledge inroads to Government and corporate to offer ICT solution for masses. Intel with its mission of empowering a technology driven India is one of the partners in this initiative.
- *Digital Panchayats:* In an initiative aimed at bridging the digital divide in rural India and e-empowering the local governing bodies. It has been set up in Madhya Pradesh and Maharashtra. The Digital Panchayat will primarily focus on areas of governance, health, enterprise, agriculture, tourism, employment, education, culture, tribals, gender and microfinance.
- *e-NGO:* The programme has been initiated by DEF to create websites for NGOs working in rural India to help them showcase their projects effectively, communicate with the organizations and international agencies, thereby attract more volunteers and resources.

Consumer outreach and awareness

- *Net Yatras:* To this end, the 'Connected Indians' movement recently completed a Net Yatra, where a specially designed bus powered with laptops and Netbooks and Internet connectivity toured various cities in the country. The bus reached out to 53 cities, 60 schools and 81 colleges, educating over 90,000 Indians on the power of Internet showcasing demos to the audience and telling them about Internet and its various usages and benefits.
- *Virtual Yatra:* To reach out to many more Indians the movement has launched a Facebook application named the Virtual Yatra, wherein Facebook users are asked to push the virtual bus from one end of the country to the other by inviting their

friends to register. Every registered friend earns internet points and the user to gather the maximum internet miles is awarded a Netbook.

- *www.connectedIndians.com:* The website contains a mine of information on the benefits of internet and how it has improved both lives and lifestyles in rural and urban India alike. Users post stories on how the Internet has transformed their lives giving hope and confidence to many more. Stalwarts from various industries speak of the movement and their reasons to support it.

Role of DIT

The Department of Information Technology is implementing various Plan Schemes for creation of e-infrastructure, Innovation, R&D and Human Resource Development in the electronics and IT sector. These plan schemes directly and indirectly impact e-Inclusion. The schemes which directly impact e-Inclusion are as under:

e-Governance: National e-Governance Plan

A major initiative of the Government for ushering in e-Governance on national scale, called National e-Governance Plan (NeGP) was approved on 16th May 2006. NeGP consists of 27 Mission Mode Projects (MMPs) encompassing 9 central MMPs, 11 State MMPs and 7 integrated MMPs that span multiple backend Ministries/ Departments. It also includes 8 program support components aimed at creating the right governance and institutional mechanisms, core infrastructure, policies & standards and the necessary legal framework for adoption of e-Governance in the country. It is implemented at the Central, State and Local Government levels.

The major activities under the National e-Governance Programme relates to setting up of State Wide Area Network, Common Service Centres, Horizontal Transfer of e-Governance Projects and other initiatives in the form of Pilot Projects. The basic aim of these activities in broader terms is to make all Govt. Services accessible to the common man in his locality. Such schemes are aimed at Scheduled Castes and Scheduled Tribes along with others and hence such programs would indeed be helpful in passing on the benefits to the needy and desirable target population.

Human Resource Development: National Knowledge Network

Government had decided to establish a National Knowledge Network with scalable multi-gigabit capabilities which will connect 1000 nodes covering all universities, research institutions, libraries, laboratories, hospitals and agricultural institutions across the country. The initial phase of the National Knowledge Network was inaugurated by the Hon'ble President of India on 9th April 2009.

In the initial phase, a core Backbone consisting of 15 Points of Presence (PoPs) has been established with 2.5 Gbps capacity. Around 76 institutions of higher learning and advanced research have already been connected to the network and 6 virtual classrooms have been set up.

R & D: Indian Languages Technologies

To enable wide proliferation of ICT in Indian languages, the Department has taken a major initiative to make available Software tools & fonts in various Indian languages freely to the general public. Software tools & fonts for 22 constitutionally recognized Indian Languages have been released in public domain for free mass usage.

e-Industry: Incubation services

Department of Information Technology has been promoting growth of small and medium entrepreneurs by creating a conducive environment for software exports. Towards this end STPI has been promoting SMEs and their cause by offering Incubation services, Organizing events, Sponsoring/Co-sponsoring events, Participation in events, human resource development and exports promotion efforts. STPI has been providing incubation facilities to start-up units at its various centres. This has been of immense help to start up companies and entrepreneurs.

Targeted Schemes

In addition to the above, DIT is implementing 14 schemes which have earmarked allocation for development of Women and SCs/STs. The schemes are as under:

IT for Masses

- The Department of Information Technology under the plan scheme 'IT for Masses' has initiated several projects for SC/ST empowerment in the area of ICT. DIT has funded various projects in different States for Training, Capacity Building and Entrepreneurship Creation.

- The total numbers of SC beneficiaries are 14771 under various projects implemented / being implemented. The total numbers of ST beneficiaries are 8111 under various projects implemented / being implemented.

DOEACC

- DOEACC offers all its courses ranging from M. Tech to short-term courses to all the candidates including SC/ST and no tuition fees is charged from SC/ST candidates. The DOEACC Society and Kohima trained 902 candidates in 2007-08 and in 2008-09 2618 candidates.

- The DOEACC Society operating at Aurangabad, Calicut, Chandigarh, Gorakhpur, Kolkata and Srinagar/Jammu trained 369 candidates. Similarly in 2008-09, 1909 candidates have been trained.

- Setting up of RIELITs at Kohima (Nagaland) and Agartala (Tripura); (ii) Setting up of DOEACC Centres at Shillong (Meghalaya) and Gangtok (Sikkim) and towards the Project on "Training of Teachers in E-Learning" being implemented by DOEACC Imphal Centre.

STQC

- The Standardization, Testing and Quality Certification Directorate (STQC) of the Department, in the past, have done some training programmes for the benefit of SC/ST candidates. These included courses like: a) Post diploma in quality test engineering (1 year duration); b) Electronics manufacturing technology (3 months duration); c) Process automation (3 months duration).

- These programmes were supported by National SC/ST Commission. STQC has already trained more than 200 SC/ST candidates through these trainings. Most of these candidates have already been employed by the industry.

- In 2007-08, 208 beneficiaries have been trained. In 2008-09, 200 beneficiaries have been trained.

Research & Development

C-DAC

- C-DAC is working in the technology areas, which are useful to all the classes and for the nation. In particular, these technologies are used by all the categories of people.

Media Lab Asia

- In 2007-08, through the project on Implementation of Digital classroom teaching in 50 Secondary and Senior Secondary Schools in the remote areas of Mizoram, 16458 STs have benefited. On the scheme IT Education in Rural District utilizing district computer education centers, 810 STs and 12 SCs have been benefited.
- By the project on ICT in 100 schools in Mizoram the anticipated beneficiaries would be 13,000 STs in 2009-10.
- The project on 'Health Management Information System' is being implemented in three Blocks of Kerala with 7.8 lakh population including SC/ST. The Implementation started in July 2009 initially in Vettom Block (35 sub centres) and has already covered 1.75 lakh persons including SC/ST.

Constraints and impacting external factors

e-Access

- Poor Connectivity in rural areas:
  - Limited number of rural Subscribers: The total telephone subscribers as on December 2009 is 562.2 million out of which rural subscribers are 174.5 million only.
  - Low market share of rural subscribers: The share of rural subscribers to total telephone subscriber is just 31 per cent.
- Limited Internet accessibility: In rural India only 1.2 per cent people have Internet access whereas it is 12 per cent in the urban India.

- Limited Bandwidth: There is a growing need for more bandwidth to support the spectacular growth in cellular telephony. Besides, catering the sheer increase in the number of subscribers, greater bandwidth is also needed for value added and better quality service.

Infrastructure

- Infrastructure barriers: Electricity is the most basic condition for using ICTs and many studies established that relationship between the level of electrification and digital divide. Rural India has low electricity coverage. Almost 10 per cent villages of India have no electricity.

Skill

- Literacy & skill barriers: Improved training and skill development has to be a critical part of an employment strategy. Both Tenth and Eleventh Plan noted the large gap between the number of new entrants to the labour force and inadequate availability of seats in vocational and professional training institutes. The Eleventh Plan also identified various sectors with prospects for high growth in output, and for generation of new employment opportunities.

Price Barriers

- Economic barriers: As per ITU Report "Measuring the Information society 2010", India ranks 81 in ICT Price Basket in the year 2009.
- Content barriers: As per the MTA Document of The Eleventh Five Year Plan by Planning Commission, the scheme which have not picked up after initiation during Eleventh Five Year Plan is e-health (including tele-medicine)
- External Factors: Technological Developments such as Cloud Computing and Open Source Software, Indian language software tools and contents.

Important Stakeholders

- State Governments/ UTs.
- SC, ST, women and other weaker sections.
- Specially-enabled persons.
- People who are deprived from ICT opportunities.
- State Governments/ UTs in the North East.
- Projects Implementing Agencies.
- Ministries/ Departments in Infrastructure and Social Sector including – Department of Telecommunication, Woman and Child, Tribal Affairs, Rural Development, Panchayati Raj, Minority Affairs, DONER etc.
- CBOs

SWOT Analysis

Strength

- e-Infrastructure and e-Services under NeGP and by NIC.
- Indian IT-ITES Industry.
- Availability of IT Skilled human Resource.
- High wireless teledensity
    - World's lowest call rates (1-2 US Cents)
    - Fastest growth in wireless phone subscribers (about 14mn per month)
    - Total wireless subscribers as on March 2010 is 584.32 million which means 49.60% wireless teledensity.
- Growing number of e-Services such as Banking, Travel, job portals etc.
- Plan Schemes such as Electronics, Electronics in Health and Telemedicine, Technology development for Indian Languages, IT for masses, E-Governance, DOEACC, Manpower Development, STPI, CDAC and other R&D organizations.

Weaknesses

- Lack of focus on e-Inclusion in IT policies of State Governments/ UTs
- Lack of legal policy framework for remote healthcare and consultation and electronic health records
- Lack of standards for Information Systems, Data management, security, software localization and interoperability
- Poor availability of e-Content
- Poor availability of e-Services

Opportunities

Today, India has 11 million citizens in the high-income segment, 58 million in the middle-income segment and 1,090 million in the low-income group. If India‘s GDP continues to grow at 7 per cent a year, in 2020 the number of citizens in the high-income segment will rise to 52 million and in the middle-income segment to 372 million. The number of households in the low-income group will drop to 933 million. As a result, India has the potential to add around 4 million citizens every year to the high-income segment and 26 million citizens every year to the middle-income segment up to 2020.

ICT-enabled solutions in healthcare, education, financial services and public services can drive socio-economic inclusion of 30 million citizens each year, faster, cheaper and more effectively than traditional models. To achieve growth, India needs to address demand supply gaps in four key areas - Healthcare, Financial Services, Education & Skill development and Public Services.

Challenges and Opportunity for ICT enabled Solutions – Financial Inclusion

ICT enabled solutions can overcome challenges faced by traditional solutions in financial Services

Challenges	ICT-enabled solutions
Higher credit risk and fraud	• Unique ID for all citizens to track information at individual level • Database on credit history of citizens with payment based sharing of data and subscription based access. • ICT-enabled warehousing and supply chain management systems enabling use of warehouse receipts as collateral and securitization of loan
Prohibitive distribution cost	• Mobile banking and remittance • Internet kiosks for distribution of selected financial products • Low-cost ATM
Inadequate operational scale economies	• Standardized MIS • Shared services back-office infrastructure • Mobile payment solutions to reduce cash and manual effort between MFIs and SHGs and lenders
Structural inefficiencies in industry	• ICT solutions, such as an effective MIS, can reduce costs and increase transparency

Source: NASSCOM-McKinsey Perspective 2020

Challenges and Opportunity for ICT enabled Solutions –Educational Inclusion

India has made significant progress in education with respect to access and enrolment in the past decade, largely driven by the government flagship programme in elementary education - the Sarva Shiksha Abhiyan (SSA). The number of schools increased by 40 per cent between 2002-2003 and 2006-2007, approximately 98 per cent of habitations have access to a primary school and 86 per cent have access to an upper primary school. The Net Enrolment Ratio (NER) at the primary level stood at 92.75 per cent in 2006-2007 compared to 84.5 per cent in 2005-2006. Approximately 1.5 million teachers have been added to the system between 2002-2003 and 2006-2007.

Five challenges remain in education in India: performance, teacher capacity, teacher quality, administration and private participation. ICT-enabled solutions can address four of these five challenges.

- Performance: Standardised online performance assessment of students will help in monitoring and assessing the performance of students. Graded questions of progressively increasing complexity and a focus on understanding and analytical thinking rather than on memorising facts can be created centrally and administered at rural school level.
- Teacher capacity: Virtual classroom settings in which a teacher delivers online coaching to students in an individual or group setting can help increase teacher

capacity. Students can be given access to CDs containing recorded lectures by faculty.

- Quality: Teacher training by a master teacher through interactive and instructor-led methodology will help increase the quality of teachers. The quality of content can be improved by providing interactive, multimedia-based content.
- Administration: An effective MIS can help improve school administration. Also, information availability at the country level will help in planning access to education for all.

Challenges and Opportunity for ICT enabled Solutions – Public distribution system, Government to citizen services and Citizen Identification

ICT can overcome challenges faced by traditional models

Area	Challenge	ICT-enabled solution
Public distribution system	• Ineffective distribution system leading to leakage (only 42% of total disbursement reaches poor households)	• Targeted distribution of food using proper identification • Automated warehousing and inventory management
Government to citizen services	• Significant time taken for processes such as tax payment, land registration • Lack of transparency	• E-government solutions, e.g., online land registration, filing of tax return • Community service centres with broadband connectivity to provide all government to citizen services
Citizen Identification	• No single identification card currently – multiple ids widely differing in quality and purpose exist today (e.g., ration card, PAN card)	• Unique ID for all citizens

Source: NASSCOM-McKinsey Perspective 2020

India has already experienced multiple ICT-enabled solutions across all the four areas, most of which have been successful in the geographies in which they are implemented. These solutions need to be scaled up to the national level.

Mobile and broadband and Internet connectivity are critical to increase the reach of ICT-enabled solutions. Mobile connectivity will allow the rural population to access call centres and use telemedicine, mobile banking and public services. Broadband and Internet connectivity will enable kiosk-based delivery of healthcare, education and public services.

Strategy for the future

The Strategy for the next five years could consist of the following components:

Policy

- Policy formulation on e-Inclusion

Plan & Programme

- NeGP – Scaling up
- Promotion of IT-ITeS Industry in rural areas through private sector initiatives
- R & D- Technology development for multilingual content
- Skill Development

Targeted Schemes

- Formulate special Schemes/ Projects on ICT for development of women, SC/STs, minorities and differently abled people

Policy Action – Inclusive and Equitable Growth

- The IT Policy of all State Governments/ UTs may be suitably amended to incorporate a specific clause on e-Inclusion. DIT to issue policy guideline in this regards.

Plan & Programme: e-Governance

DIGITAL INCLUSION

a) **Upscaling and integrating front-end service delivery channels:** There is a need to upscale the existing service delivery channels so that they provide sufficient number of touch points to the citizen for accessing public services. This is to be achieved by repositioning the Common Services Centers as Bharat Nirman Common Services Centres for delivery of public services to citizens in the rural areas. This entails upscaling of the existing 100,000 CSCs to 250,000 CSCs so as to have one CSC in each of the Gram Panchayats in the country. DIT intends to initiative similar initiatives so that multiple frond-end service delivery channels are available for all public services to be delivered at the citizen's door steps.

b) **Increasing access to citizen services through a minimum of 100 Mbps broadband access upto panchayat level:** The current broadband penetration in the country is only 0.74% as compared to a teledensity of 52.74%. There is therefore a need to facilitate the growth of broadband network services at the grass root (panchayat) level. Although a population of over 800 million in India (above the age of 12 years) should be accessing the broadband for various services, however, low availability of broadband services coupled with high cost of broadband access prove to be the biggest impediments towards increasing broadband penetration. Therefore, DIT intends to initiate necessary steps over the next five years to bring down the cost of broadband access as well as ensure a connectivity of 100 Mbps upto the panchayat level.

c) **Promote development and delivery of content and services in local languages:** With the low levels of English and Computer literacy in the country, there is a great need to develop content in the local languages as well as generate computer literacy. Therefore, focus needs to be provided in the next five years on language enablement of the content, development of application platforms that will support the local language content as also the development of a content policy to ensure uniform adoption of this concept across the whole government functionary. At the same time, all public services need to be delivered in local languages.

d) **Policy for Electronic Document Exchange between Government and Citizen:** While development of e-Gov applications will be one end of the electronic service delivery, promoting computer literacy and establishing citizen access points will be the other end. However, there is a need to connect these two ends by developing suitable mechanisms for electronic exchange of documents between the government and the citizen. Today, even though a number of government services are becoming online, however, there is still a great reliance over physical documents that need to be submitted by the citizen or accessed by the government in order to access/provide a public service. Therefore, an enabling framework needs to be created that will promote exchange of all such documents electronically. There is also a need to develop appropriate payment gateways that will ensure that the citizen has a seamless mechanism of service access.

FINANCIAL INCLUSION

a) **Creating appropriate implementation model for using ICT in financial inclusion:** Government is currently running a number of benefit schemes like NREGA, which provide direct financial benefits to the citizen. However, there is a need to reduce leakages and ensure that all government benefits reach their intended beneficiaries. This can be achieved only through an extensive financial inclusion program that utilizes technology and the common infrastructure to take the benefits of the traditional financial systems to the unreached population of the country. DIT has played an important role, as part of an Inter-Ministerial Group, in developing an enabling framework for the delivery of basic financial services using mobile phones. There is now a need to develop appropriate implementation models that will utilize the common infrastructure like CSCs and will help provide basic banking services to the citizen in villages and other such areas. A financially inclusive society will also be more conducive towards adopting newer ways of accessing public services and will be more participative in the citizen feedback processes.

SOCIAL INCLUSION

a) The NeGP has projects and programmes which are implemented across all States and regions. The creation of a Service delivery platform, based on uniform architecture and standards ensures that **service delivery outlets are available and accessible to people across regions and communities**.

b) **Designing an Educational Programme to promote computer literacy as well as distribution of basic software programs to students across villages/towns:** In order to promote computer literacy, DIT intends to create an educational programme as part of which DIT can partner with various academic institutions to formulate

courses for computer literacy and make them a part of the school education curriculum. Further, DIT can also get some software programs like basic accounting softwares, mathematical games etc. developed and distributed in all schools which can help build the interest of students in computer education. This will also help in creating a pool of computer literate talent in the country.

c) **Enabling environment for better engagement of citizens for e-governance project conceptualization:** One of the biggest success factors for e-Government is the social and financial inclusion of the citizen. There is therefore a need to involve citizen while planning and prioritizing the government services. Citizen feedback needs to be taken both during the project conceptualization as well as during project execution. The services and service levels have to be defined based on citizen expectations and a very well defined grievance registration and redressal mechanism has to be evolved. DIT therefore intends to create the enabling environment in the form of standard procedures for project conceptualization and implementation that will facilitate government citizen interaction and will ensure a higher social inclusion of the citizen.

d) **Formalizing an Awareness and Communication mechanism for spreading awareness about e-services to the citizen:** While the Government progresses on its path of e-enablement of public services and developing newer ways of public service delivery, there is a need for spreading the awareness about the e-services as well as the service access mechanisms among the citizen. While DIT is already executing an awareness and communication programme under NeGP, however, there is a need to develop a more formal mechanism that can be adopted by Government in general in spreading awareness about the e-Gov related services among the citizen.

ECONOMIC INCLUSION

a) NeGP envisages implementation of Mission Mode Projects that cover the entire domain of public service delivery. The focus of NeGP is on citizen centricity and all aspects ranging from Agricultural Services to Courts, Taxation, Transport etc are covered. **The projects cut across all sectors of the economy and impact all citizens including farmers, students, businesses and Government.**

b) Delivering real time market updates and pricing information of agriculture economy: People dependent on agriculture business in villages and rural areas need access to pricing information and market trends in agricultural products to remain updated and plan their day-to-day business. Delivering the market price of their produce will also eliminate their dependency on middle man so as to escape exploitation. DIT intends to bring the market data closer to citizens through the use of ICT and leveraging penetration of mobile technology and CSCs to deliver this information. DIT also intends to develop portals and dashboards to deliver real time information as well as future trends for planning purposes.

c) Developing entrepreneurship among citizens: By means of training and awareness programmes, DIT intends to spread knowledge and support innovation among citizens who are encouraged to adopt and conceptualize new ways of developing ICT related business models. DIT also intends to deliver information about bank loans and other funding mechanisms to support start-ups and build transaction capabilities

through financial inclusion to enable citizens to build and grow their enterprise from their base locations.

ICT solutions for Inclusive growth

DIT could set up a nodal agency with the mandate to strengthen and implement ICT solutions in key sectors and partner with the private sector to implement these solutions.

Education

- Empower 1.72 million schools and colleges with broadband in urban and rural areas and ensure there is at least 1 PC per 40 students. This will enable 326 million students to access broadband by 2014.
- Provide each of the 7 million government school teachers with a laptop and broadband connection as it will enable them to access quality content and also perform administrative duties much faster.
- Incorporate broadband aided education as part of the course curriculum.
- Encourage PPP initiatives to ensure timely maintenance of PCs/broadband connections.
- Empower teachers via professional development training programs to enable them to impart education more effectively.

Healthcare

DIT could Lead and catalyze the development of a legal framework for remote healthcare and consultation and electronic health records.

- Empower 50,000 PHCs and 6,000 CHCs with broadband to enable them to provide better medical facilities.
- Empower all CSCs, PHCs and CHCs with telemedicine facilities to ensure high quality healthcare facilities at reduced costs in remote areas.
- Provide high-speed broadband connection to all rural telemedicine centres to enable doctors to access patient data (x-ray, ultrasound, etc) on real time basis.
- Provide all doctors and paramedics associated with PHCs and CHCs with a laptop and broadband connection.
- Automate all processes of PHCs and CHCs so that information technology (facilitated by laptop and broadband connection) can be used to increase the efficiency of the system e.g. via template based data entry for patients records, vaccine supply chain system that maintains the expiry date / batch numbers of the drugs supplied and a simple system that can be used to request for drugs, etc
- Innovative pricing models, such as prepaid broadband (on the lines of prepaid mobile) should be introduced to increase demand of broadband and a subsequent reduction in prices.
- Promote more franchisee based models such as internet kiosks and ePCOs.

- Tax rebate should be provided to consumers for buying computer (say, up to Rs. 50,000/- in a block of 3 years) and for Internet & broadband access up to a sum of Rs. 1000/- per month.
- Service tax on broadband to be reduced from the current 10.3% to 5% by 2014.
- Easy availability for educational loans to students and employees for purchase of low cost devices including netbooks etc.

Improving hard and soft infrastructure

- Provide incentives for developing low-cost computing platforms that facilitate technology adoption in rural areas.
- Assign the mandate and funding to build hard as well as soft infrastructure (the NII) to an existing body (such as NISG) or to a new government entity.
- Revise policies to accelerate soft infrastructure development, focusing on: 1) overall IT literacy; 2) interoperable application standards.
- Catalyse incorporation of basic IT literacy programmes in all primary and secondary schools in collaboration with State Governments.
- Encourage computer based educational programmes and training for teachers (by the State Boards and SCERTs)
- Provide incentives to MSMEs in the form of tax holiday on PC rentals, 100% depreciation on all IT investments and free broadband trials for 3 months. This initiative would require an investment of Rs. 8 billion by GoI.
- Cyber cafes should be promoted as multipurpose centre points with additional facilities such as telephony, ticketing etc. The wide range of services offered would increase footfalls and with higher ARPU, the owner could give the user a discount on broadband access.
- Encourage PPP initiatives required to provide subsidized PCs and broadband connection.

Continuous Research on requisites for e-Inclusion:

- It is extremely important to undertake comprehensive research to assess the requirement of ICTs in various sectors e.g. skill development, healthcare, education, energy, empowerment of disabled and other disadvantaged groups, environment and climate change, e-governance etc. and design sectorial ICT frameworks and projects considering various local factors.

Technology Development

- Appropriate technology solutions have to be developed and field tested in a reasonable scale before they are taken up for large scale deployment.

Content Creation

- Content creation happens to be one of the major components of e-Inclusion and offers many challenges given the wide variations of languages, culture, traditions, literacy, geography, cost affordability and change adoptability etc. The content variations also include information, interactive content and transactional content. Experience (cable TV and mobile phone) has shown that appropriate content and affordability is the key for successful acceptability in the e-Inclusion.

Advocacy

- An appropriate and effective e-Inclusion awareness campaign strategy using the mass and other media is important for a successful e-Inclusion strategy. Community TV and Community radio form major components of advocacy. DIT could work on formulating policy for expansion of community TV and community Radio.

Capacity Building

Capacity Building includes the following:

- Human resource development, the process of equipping individuals with the understanding, skills and access to information, knowledge and training that enables them to perform effectively.
- Organizational development, the elaboration of management structures, processes and procedures, not only within organizations but also the management of relationships between the different organizations and sectors.

Set up Institutional and legal framework development, making legal and regulatory changes to enable organizations, institutions and agencies at all levels and in all sectors to enhance their capacities.

Priority Areas for Targeted Intervention

- Formulation of
  - Women Component Plan(WCP)
  - Scheduled Caste Sub Plan(SCSP)
  - Tribal Sub Plan(TSP)
  - Programmes for Minorities and Specially-enabled persons
- Components of WCP, SCSP, TSP
  - Training for IT Skill Development
  - IT infrastructure creation primarily at schools/colleges
  - Development of entrepreneurial skills
  - Capacity Building
  - Development of specific electronic products, software tools and e-services

Other Action Areas

Web technologies are an essential means to deliver and accessing information and services in today's society. If web accessibility is not achieved, many people are at risk of being partially or totally excluded from the Information Society.

Enabling broadband infrastructure

- Broadband is the enabling infrastructure of the knowledge economy. The broadband penetration is just 0.74% when compared with teledensity of 52.74%. One of the key factors limiting the growth of broadband in India has been the constraint on last mile access.

Focusing on interoperability

- Interoperability is essential to improve collaboration between different public authorities/ ministries and to provide the citizen with a 'one-government view'. Here, there exists scope for an e-Ordinance to mandate the digital delivery of government services to the citizen.

Setting standards

- Standards are a strategic tool for industry and for the public sector as well as a key enabler for new market opportunities. This would include policies and standards for information systems, data management, security and audits and enforcement of Service Level Agreements (SLAs) with the vendors offering services.

Re-engineering business processes

- Any e-Inclusion strategy, whether it relates to e-Government or e-Governance must mandate that the department/office concerned should undergo Business Process Re-engineering (BPR) instead of mere automation of existing manual process.

Implementation Plan

An indicative implementation roadmap to achieve goals of e-Inclusion:-

Timeline	Action Items
Year 1 (2011-2012)	• Formulation of policy on National e-Inclusion including:- - Human resource development, the process of equipping individuals with the understanding, skills and access to information, knowledge and training that enables them to perform effectively. - Organizational development, the elaboration of management structures, processes and procedures, not only within organizations but also the management of relationships between the different organizations and sectors. • Formulation of National e-Inclusion programme/action plan. • Formulation of schemes relating to Scheduled Caste Sub Plan (SCSP), Tribal Sub Plan (TSP), Women's Component Plan (WCP). • Formulation of Schemes/Project proposals for minorities and differently- abled. • Establishment of R&D Centres on e-Inclusion.
Year 2 (2012-2013)	• Set up Institutional and legal framework development, making legal and regulatory changes to enable organizations, institutions and agencies at all levels and in all sectors to enhance their capacities.
Year 2 (2012-2013) Year 3 (2013-2014) Year 4 (2014-2015) Year 5 (2015-2016)	• Implementation of targeted schemes namely SCSP, TSP, WCP, schemes for minorities and differently-abled.
Year 1 (2011-2012) Year 2 (2012-2013) Year 3 (2013-2014)	• Implementation of World Bank Project on National Mission on Women Empowerment.
Year 4 (2014-2015) Year 5 (2015-2016)	• Scaling up the World Bank Project on Women Empowerment.

Measure and Track Progress in e-Development

Objective:

The objective is to measure the progress towards an Information Society through e-Development Index (eDI), which measures the extent of the digitalization of the Indian economy and the factors, which are driving it to accelerate the process of economic development in India.

Methodology:

Measure of Digitalization: Five Pillars of eDI:

e-Readiness Index:

The ability to pursue and realize value creation opportunities facilitated by information and communication technology (ICT).

e-Governance Index:

IT enabled governance at the state/UT level for improving the delivery of public services, for improving the intra-governmental coordination and for an efficient coordination with businesses and administrators at various levels.

e-Industry Index:

e-Industry is designed to capture IT, IT-triggered and IT-enabled activities in the economy including both manufacturing and services. This component of eDI will realize the competitive advantages with economic aspects such as connectivity, HR skills, usage & security.

e-Innovation Index:

Innovation would not be restricted to hardware but would mainly include -

- Content – in Indian languages and in drivers application areas;
- Connectivity – Financial inclusion (banking for unbanked), Connectivity for target groups, rural areas through CSCs;
- HR and IT Services – would include higher HR skills to evolve methods of delivery of services innovations; and
- Security – to ensure that cyber security is upgraded to deal with unforeseen cyber attacks.

e-Social Index:

The demonstration effect of society while responding to the digitalization is captured by the e-Social Index. E-Commerce applications employment impact of IT & BPO sector in

the organized employment segment, connectivity, access of Internet products for individuals access etc would from economic components of this sub index.

To encapsulate eDI would be the weighted mean –

e-Development Index : e-Readiness Index, e-Governance Index, e-Industry Index and e-Innovation Index, e-Social Index. The multi-stage Principal Components Analysis (PCA) will be used to derive the weights in the respective components. Individual indicators within each component may be divided as per the characteristics of the IT sector in the Indian economy. The weights assigned to the variables are directly proportional to their respective strength of statistical association with the other variables thereby eliminating the indicators, which have less influence.

Timelines:

Year	**Activity**
2011-12	Construction of Initial eDI from Secondary source of data
2012-13 } 2013-14 }} 2014-15 }} 2015-16 }	• Identification of more Indicators of eDI • Collection of required data • Construction of eDI on yearly basis