E-Governance for Good Governance in Nepal

What is e-Government?

E-government is the use of information and communications technologies (ICT) to transform the traditional government by making it accessible, transparent, effective and accountable. E-government does not mean putting more computers on the desks of government officials. And e-government is more than just a government website on the Internet. Political, social, economic and technological aspects determine e-governance. It establishes a relationship between government officials and citizens, providing greater access to government information and services by making the government accessible online; promoting citizen participation by enabling citizens to interact more conveniently with government officials, such as by requesting government service and filing required documents through website; increasing government accountability by making its operations more transparent, thereby reducing the opportunities for corruption; and supporting development goals by providing business, rural and traditionally underserved communities with information, opportunities and communications capabilities. E-government is not only used in developed countries. Some of the most innovative uses of the Internet in governance are being successfully used in the developing countries, as well.

E-government will not be successful just only buying more computers and putting up websites. It's not sufficient to automate administrative practices from the paper system to digital system. Rather, e-government is a process of transforming government; it requires planning, political will and a sustained dedication of resources. Success of e-government will not be guaranteed with the mere purchase of advanced technology or the direct automation of complex procedures until it can increase the rate of citizen participation there by bringing about the greater effectiveness in government. Technology introduction can not change the mentality of bureaucrats who do not view the citizen as valued customer of government or an important participant in decision-making.

Why e-Governance?

We are in the process of building "New Nepal". "New Nepal " should not become only a popular slogan but really the "New Nepal" with all the positive values and aspirations of its citizens geared towards the peace and progress. There are many dimensions streamlined and drivers identified to make our "New Nepal" dreams come true. One of such dimensions is the reformation of the government. Governance and

its service process should be well reengineered to fulfill the aspirations of its citizens. Information and Communication Technology (ICT) and its tools can help its effective and efficient transformation.

With the advent of the information age, the ways we work, study, and live have been experiencing dramatic changes. Due to the influence of economic and information globalization and the rise of the digital economy, governments are "reinventing" themselves to meet new expectations and the priorities of citizens and businesses. These dynamics are compelling many governments to create a new vision for its relationship with businesses and citizens and to create a new organizational structure to fulfill its mandate. E-Government can fulfill the mandate of government formulating a new vision of how government views its citizens, employees and businesses, and building a citizen-centered, service-oriented, public-participative government with efficient, accountable, transparent and performance government system. ICT based online service is the most democratic and unbiased service system. It offers equal opportunity to all races, genders, ethnic groups.

E-Government breaks the barrier of geographical diversity and makes the government services handy to all citizens at villages who are even not connected by roads and opens up many opportunities, provided Internet connectivity is available either through wireless communication, fiber optic cables, dial-ups, VSATs or whatever other medium.

Besides providing service to citizens, it's important to empower and motivate government employees to expect better service from them. E-Governance should transform the government workers into empowered knowledge workers. Nepal should not miss the benefits of global economy and specially the benefits offered by Internet.

Strategic Objectives of e-Governance:

The strategic objective of e-governance is to support and simplify governance for all parties - government, citizens, businesses and its employees. The use of ICTs can connect all three parties and support processes and activities. There may be two major objectives of e-governance:

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

2. *Efficient Government:* In the back-office, the objective of e-government in government operations is to facilitate a speedy, transparent, accountable, efficient and effective process for performing government administration activities. Significant cost savings (per transaction) in government operations can be the result.

For implementing these strategies into reality, government must be subjected to transformation.

The transformation process is not so easy and not so simple. It requires a coherent strategy and should begin with an examination of the nation's regulatory environment and the ability of the population to make use of planned technologies. The primary driving factor for e-government reform should not be the potential it offers to save money and reformation does not mean cutting staff. The savings incurred from e-government initiatives most often benefit the businesses and citizens utilizing the improved system more so than the government agencies that invested in them to begin with. In order to realize the benefits of transformation themselves, governments must develop a citizen-centric model involving key stakeholders outside of government—community, businesses, professional associations, scientists, academics and NGOs. Without their input and demand, even e-government projects that focus on internal government processes may not prove successful because citizens are unlikely to use a system that does not respond to their needs.

Process reform, leadership, strategic investment, collaboration and citizen participation are essential elements in the transformation process. Once government makes strategies to transform the governance process, it must prepare to meet the significant challenges and opportunities that will arise during implementation. The implementation process should address the issues of infrastructure development, law and public policy, e-literacy, accessibility, privacy, security and workforce issues. Awareness, education and rollout programs are also needed. To make the e-governance initiative successful, a good marketing program is required through out the country to encourage citizens to make use of them.

Evolution of E-governance, Its Scope and Content

- Initiatives were take up as early as 1972 by Chile
- Prof. Stafford Beer implemented for President Allende of Chile, the first governance software that would help the government survive a severe crisis.
- Major contribution by US Vice President Al Gore in early 1990s which rooted worldwide in the information superhighway.
- Widespread in US, UK, Canada, Australia and India
- focus largely on development of infrastructure such as fiber optic networks.
- concept of **Information Society** or **Knowledge Society** evolved
- E-governance came into a formalized and focused manner with partial success to implement Information System in the government departments and public organizations

Evolution of E-governance, Its Scope and Content

- During 1980s and 90s, govt. all over the world lagged behind the commercial world in accepting and implementing ICT.
- Commercial and industrial world went far ahead all over the world in harnessing the potential of ICT in their core and peripheral activities. They used ICT to reach out to their customers and business partners, thereby impressively enhancing their quality, speed and convenience.
- Visible success cases of use of ICT
  - ATM services
  - 24 hour call center
  - E-Shopping
- Software export increase (banking, financial, aviation, industrial sector from India, Ireland, Israel, China)
- 1990s and 2000 - Development of ITES (IT enabled Society) – resulted in remote services like call centers, data entry

Evolution of E-governance, Its Scope and Content

- Point to be noted -- All the above mentioned services are not e-Governance service
- Government last in the queue of institutions providing IT services
- Initial Efforts in E-governance:
  - Partial automation of existing paper bases manual process
  - Did not result in significant Business Reengineering Process compared to private sector
  - No big changes seen in government enterprises
    - May be because of
    - Conservatism
    - Resistance to change
    - Rigidity of legislative body

Evolution of E-governance, Its Scope and Content

- Major issues that has become highly relevant for large scale implementation of ICT in governance
  - Issue of Security
  - Privacy
  - Vulnerability (exposure) of public ICT infrastructure to crime
  - Potential to abuse, terrorism and general crime
  - Problems in social cohesion (unity)
  - Social Exclusion --- digital divide

Evolution of E-governance, Its Scope and Content

- The scope of ICT implementation in government machinery result in
  - Improvement of efficiency and effectiveness of the executive function of government, including delivery of public services
  - Greater transparency of government to citizens and business permitting greater access to the information generated or collated by the government
  - Fundamental changes and improvement in relations between citizen and the state thereby improving the democratic process
  - Better interactions and relationships amongst different
    - Wings of the same government
    - State or local government within a country
    - Countries whose governance are web-enabled

Evolution of E-governance, Its Scope and Content

- Any e-governance activity/project involves appropriate
  - Hardware and corresponding system software
  - Networking of the hardware identified above- both the Internet and Intranet environment
  - Application software along with appropriate database management software

Present Global Trends of Growth In E-Governance

- According to press reports during the end of 2002
  - Indicate a trend of global growth in e-governance utilization
  - Adults using internet world wide increase by 15% according to the findings of Second Government Online Study published my Taylor and Nelson.
  - 3 out of 10 citizens (30%) access government services online compared with only a quarter (26%) in 2001
- Government online services mostly used for
  - Search Information (24%)
  - Download Information (11%)
  - Increase in % to search info – 20% to 24% from Sep 2001 to Sep 2002
- Globally, online government transactions increased from just 6% to 7% during 2001 and 2002 and the percentage of those providing personal details to government increased from 7% to 8%

Present Global Trends of Growth In E-Governance

- E governance usage in different countries (between 2001-2002)
  - Australia – significant increase from 31% to 46%
  - Turkey – 3% to 13%
  - Netherlands – 32% 41%
  - US – 34% to 43%
  - Japan – decrement by 4% - 17% to 13%
- In 2001, security issue was the main concern which improved globally in 2002.
- 2001 – 14% felt secured with credit card and bank account numbers
- 2002 – this increased to 23%
- Highest levels of safety was seen in the Scandinavian Market (Denmark, Finland, Norway and Sweden) together with some South East Asian markets (Singapore and Hong Kong)--- around 1/3 of users felt safe.
- In contrast- 90% of Japanese felt accessing online services unsafe.
- Germany 82% and France 76% --- unsafe

Other Key Findings

- Governance online service is more prevalent to men (33%) than women (26%)
- 2001 – 2002 - Subsequent rise in government online usage among
  - 35-44 years old (22% to 36%)
  - 55-64 years old (2% to 18%)
  - 65 years and above (7% in 2001 and 5% in 2002)
- Globally, no. of people making government transaction online = people making online shopping transaction
- 15% of internet users have made online government transactions and in addition 15% have made an online purchase at least during that year.
- Only 16% users in Hungary access government online services while its 81% in Norway

Other Key Findings

- In countries like Singapore, Norway and Sweden – high usage of online government services as the citizens feel comfortable with this approach of dealing with the government
- In Britain, New Zealand and South Korea – usage of government online services lags behind the normal internet usage
- All the above statistics on usage of e-governance services is time bound. Over the years, there has been a definite rise in the usage of e-governance all over the world

Unit 2

E Governance Models

Models of Digital Governance

- Still evolving in developing countries
- Models are based on the inherent characteristics of ICT such as enabling equal access to information to anyone who is a part of the digital network and de-concentration of information across the entire digital network, connecting all sources of information.
- Information does not reside on any particular node but flows equally across all the nodes in the Digital Governance Model.
- Does not embed the common hierarchical information flow model that leads to the unequal distribution of information and hence skewed power relations.

Models of Digital Governance

- Hierarchy is inherent in the government departments where equity based information flow may not always be compatible with government functioning.
- Hence, appropriate administrative reforms and some reengineering is required before the real implementation of e-governance
- Models of e-governance are fundamentally different in developing and developed countries due to differences in basic conditions and perspectives and expectations from good governance.

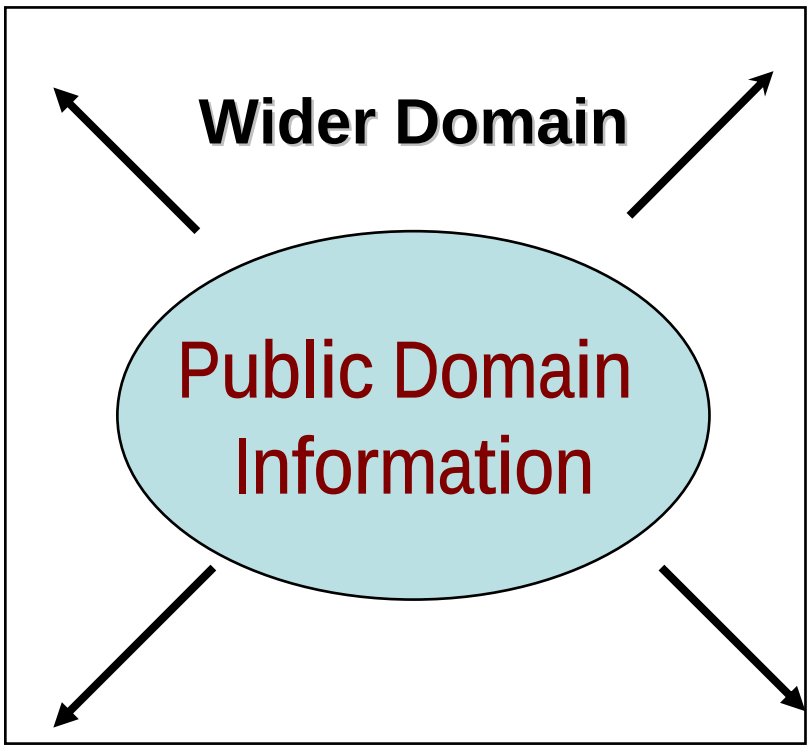
Models of Digital Governance In Developing Countries

- Broadcasting/Wider Dissemination Model
- Critical Flow Model
- Comparative Analysis Model
- Mobilization And Lobbying Model
- Interactive Service Model
- E-governance Maturity Model

These models exhibit several variations dependent on the local situation and the governance functions carried out through these models

Broadcasting/Wider Disseminating Model

Public Domain → Wider Public Domain



- Laws and Legislations
- Govt. Offices and Officials
- General Health Information
- Environmental Problems
- Disaster Warning

Africa News Online, Kabissa Network, Wougnet, Earth Negotiations Bulletin (ENB), Communication Initiative

Broadcasting/Wider Dissemination Model

- Principle
  - Based on dissemination of information relevant to better governance that is already in the public domain **into wider public domain** through the used of ICT and convergent media.
  - Rationale (Justification)
    - A more informed citizen is able to understand the governance mechanism better and is more empowered to make informed choices and exercise its rights and responsibilities.
    - There is a great likelihood that the society in which the individuals are equally informed will ensure that the agenda and forms of governance are not biased to favor a few.
- Opens up an alternative channel for people to access information as well as validate information available in the local domain from external sources.
- The widespread application of this model gradually corrects the situation of information failure and provides people with the basic government-related information to come to a common understanding and decide upon the future course of action.

Broadcasting/Wider Dissemination Model

- Applications
  1. Putting government laws and legislations online
  2. Making available the names, contact addresses, e-mails and fax numbers of local government officials online
  3. Making available key information pertaining to governmental plans, budgets, expenditures and performances online.
  4. Putting key court judgements / judicial statements that are of value to common citizens and creating a precedence for future actions online, through key environment related judgements, State vs. Citizen court rulings etc

Broadcasting/Wider Dissemination Model

Evaluation (Pros and Cons)

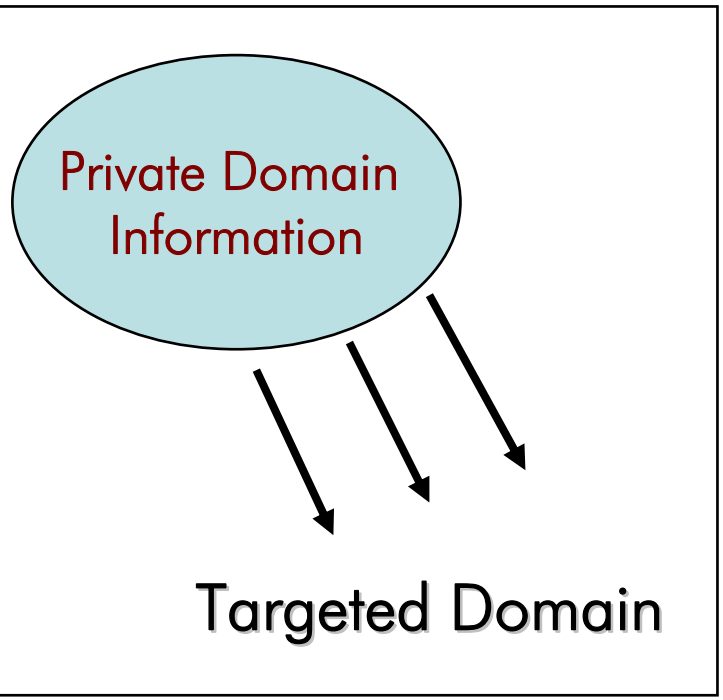
- is the first step to more evolved forms of digital governance models and is the most crucial one as it catalyses free access and flow of information to all segments of the society and serves as the building block to better governance.
- National Governments therefore need to aggressively adopt this model if they want to create an environment for enhanced participation of its citizens in the governmental processes.
- The model however loses its effectiveness where free-flow of information is not encouraged or is not objective.
- Tight governmental controls and bids to censor the content being transmitted through this model would be the bane of this model.
- The responsibility is therefore both on governmental organizations as well as civil society organizations to ensure such models continue to proliferate.

Organizations / Projects based on the Wider Model

- India
  - Directory of official websites of Government of India: http://goidirectory.nic.in/ministry.htm
  - National Informatics Centre (India) is the official website of the Government of India. It makes available information on government ministries- its projects and schemes, Indian laws and legislation, contact details of local government offices and key position holders online for public access.
- Brazil
  - Brazil's official national E-Government website: http://www.brazil.gov.br
  - The website provides comprehensive information on Brazilian government as well as links to integrated citizen services.
- South Africa
  - Chapter 2 Network: http://www.advocacy.org.za
  - The Chapter 2 Network is a clearinghouse of information and communication for social justice issues in South Africa. It provides information about advocacy campaigns, research on political intelligence, policy analysis and legislation monitoring to civil society organisations engaged in social justice advocacy.
- Global
  - Earth Negotiations Bulletin: http://www.iisd.ca/voltoc.html
  - A reporting service that keeps citizens around the world informed about global environmental negotiations, processes and decisions. It has immense value for people and government officials alike in developing countries to keep track of global negotiations taking place in the West and be more informed about them.

Critical Flow Model

Critical / Private Domain ⟶ Wider Public Domain



- Corruption Information
- Company's Green Ratings
- Human Rights Violations
- Scientific Research

Greenpeace Campaigns, KACA, VERCON (FAO), HealthNet Staging Posts, Telecentres (Sangonet-SA, UNDP-Ukraine, Gyandoot-India)

Critical Flow Model

- Principle
  - Based on channeling information of critical value to a targeted audience or dissemination, it in the wider public domain through the use of ICT and convergent media.
  - Requires foresight to understand the significance of a particular information set and using it strategically.
  - May also involve locating users to whom the availability of a particular information set would make a critical difference in initiating good governance.
  - The **strength of critical-flow model** is the inherent characteristic of ICT that makes the notion of distance and time redundant. This reduces the cases of exploitative governance possible earlier due to time lag between availability of information to different users.

Critical Flow Model

- Applications
  1. Making available information on corruption of a particular government ministry or government officials, to its electoral constituency or to the concerned governing body.
  2. Making available research studies, enquiry reports and appraisals commissioned by the government to the affected parties.
  3. Making available Human Rights violation and criminal impeachment records against government officials to NGOs and concerned citizens.
  4. Making available environment related information available to local communities. For example, information on radioactivity spills, effluent discharge in rivers, green ratings of a company etc.

Critical Flow Model

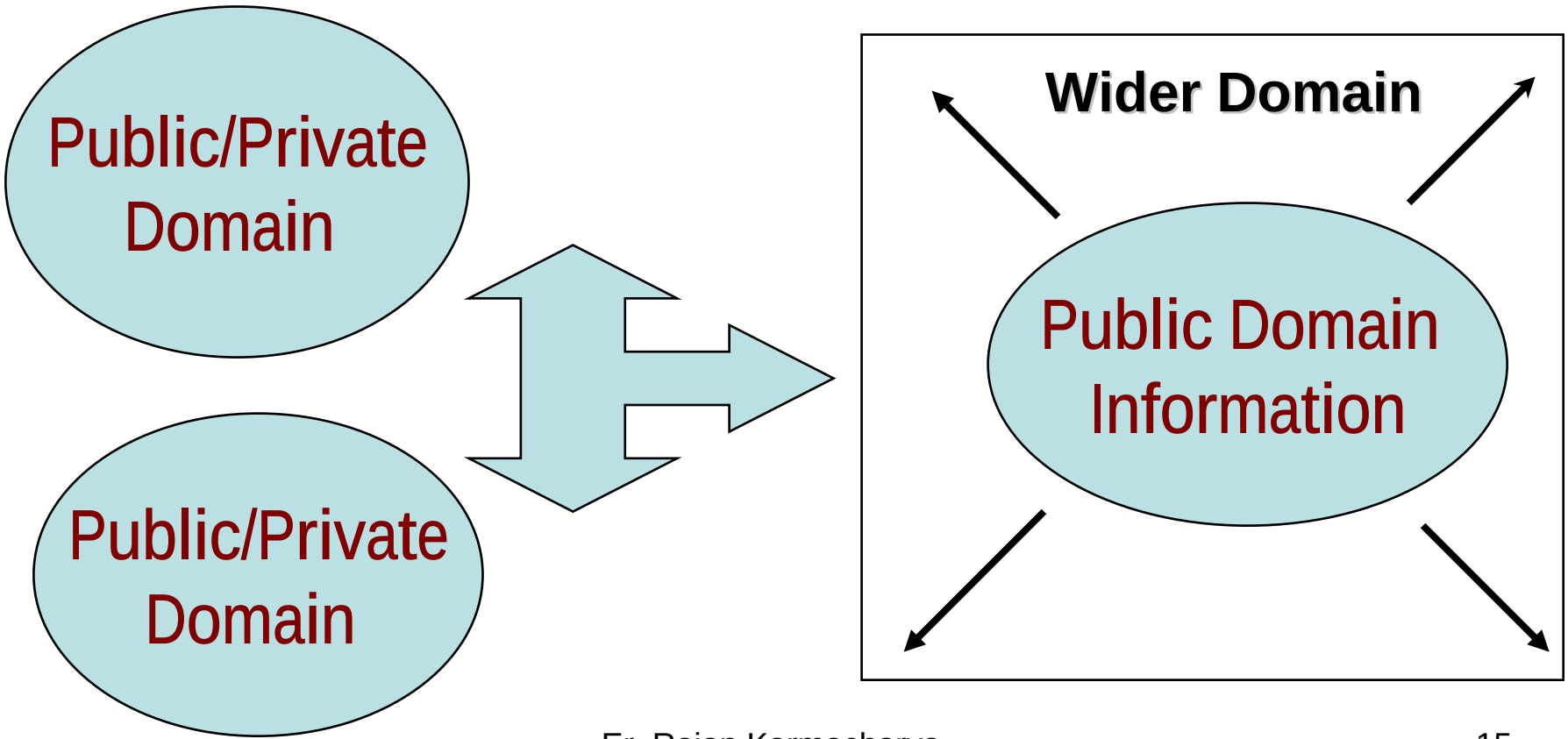
- Evaluation (Pros And Cons)
  - This model is more directed in terms of its information content and its intended users. By focusing on the critical aspect of information, it exposes the weakest aspects of governance and decision-making mechanisms.
  - It informs people about specific cases of state-failure and bad-governance to build up a case for concerted action. At the same time, by fuelling public unrest, the model exerts pressure on the concerned government institutions and individuals to take into notice the interest and opinion of the masses in decision- making processes.
  - The responsibility of creating such models may lie more with the civil society organizations to emerge as an effective watch guard to government policies and actions. The government by itself may not have sufficient incentive and an attitude towards sharing such information.
  - The model will not work in cases where government mechanisms do not foster public debates and censure (criticize) all information of critical nature.
  - It will also fail where the government maintains a tight control over all information and it remains restricted to top few levels of the government.

Organizations / Projects based on Critical Flow Model

- India
  - Central Vigilance Committee (India): http://cvc.nic.in
  - An initiative on e-vigilance. The website provides free-access information to citizens about government officials who have been indicted on judicial charges relating to corruption and have been advised penalty. People can also file complaints against any public servant who fall within the jurisdiction of the Commission.
- Bangladesh
  - Human Rights Portal: http://www.banglarights.net
  - The Bangladesh Human Rights Network actively promotes human rights reforms both within Bangladesh and across geographical and political boundaries, and supports women, children, and marginalized communities in resisting social oppression.
- Global
  - Transparency International's Corruption News: http://www.transparency.org/press_moni.html
  - A trial service run by Transparency International called the "The Daily Corruption News" which reports on corruption from around the world.

Comparative Analysis Model

Private / Public Domain + Public / Private Domain → Wider Public Domain



Comparative Analysis Model

- Principle
  - One of the least-used but a highly effective model that is gradually gaining popularity.
  - Based on exploring information available in the public or private domain and comparing it with the known information sets to derive strategic learning and arguments.
  - Continuously assimilates new knowledge products and uses them as a benchmark to evaluate, influence or advocate changes in current governance policies and actions.
  - The comparison could be made over a time scale to get a snapshot of the past and present situation (before-after analysis) or between two different situations to understand the effectiveness of an intervention. (with-without analysis).
  - The strength of this model lies in the boundless capacity of ICT to store information in a retrievable manner and transmit it almost instantaneously across all geographical and hierarchical barriers.

Comparative Analysis Model

- Applications
  1. For gauging the effectiveness of current policies by extracting learning from government policies and actions in the past.
  2. Establishing conditions of prior-precedence, especially in the case of judicial or legal decision-making and using it to influence future decision-making. This could be useful in resolving patent-related disputes, public goods ownership rights etc.
  3. Enabling informed decision-making at all levels by enhancing the background knowledge and providing a rationale for future course of action.
  4. Evaluating the performance record of a particular government official or ministry.

Comparative Analysis Model

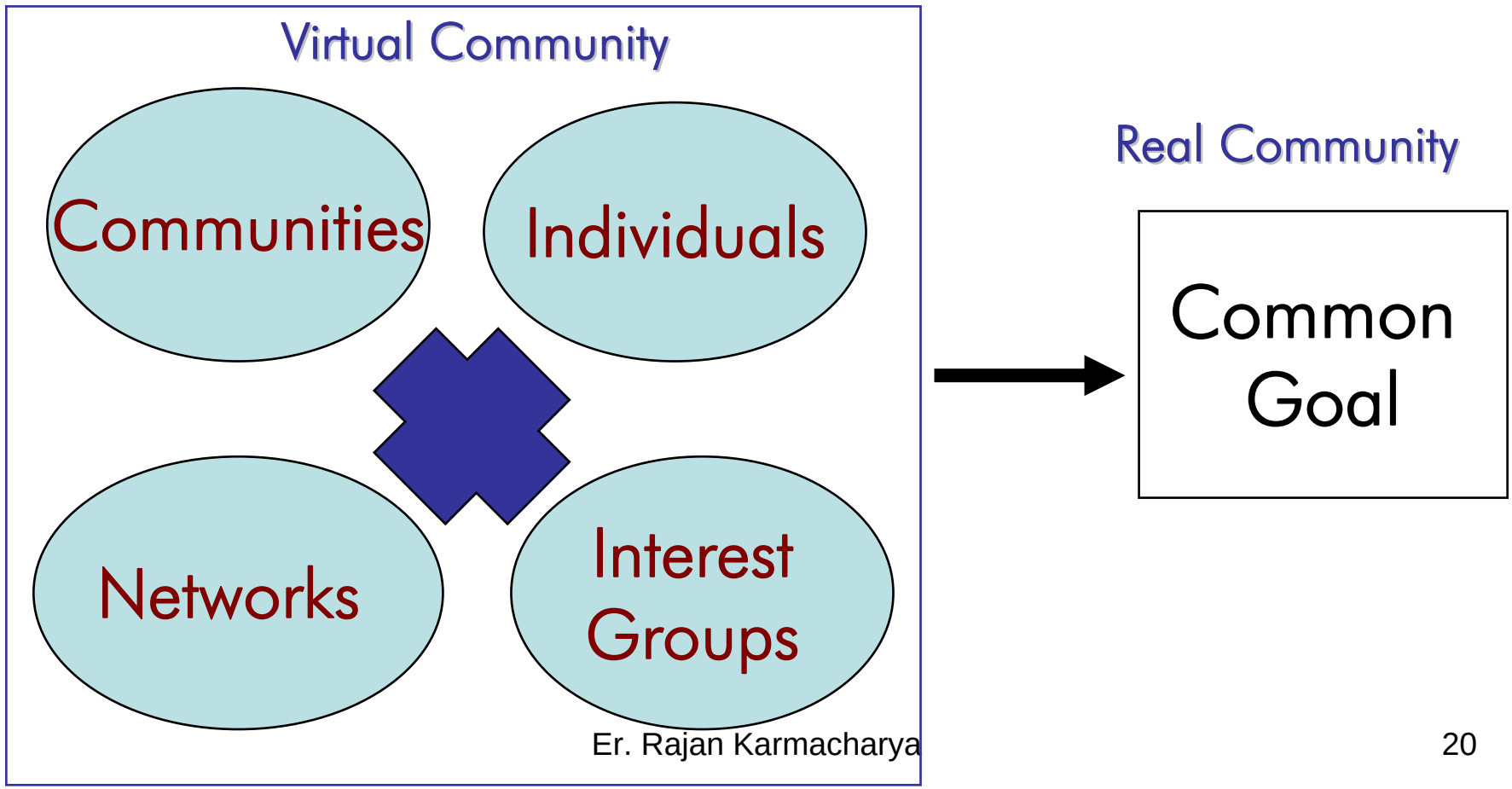
- Evaluation (Pros And Cons)
  - Developing countries can effectively use this model to their advantage as ICT opens access to global and local knowledge products at a relatively low cost.
  - Watch guard organizations and monitor-groups could use the model to track the performance records of electoral candidates and share them in their constituency.
  - The model is however reliant on the availability of comparative information sets and the ability of users to analyze and bring out strong arguments or self-explanatory graphics from the analysis.
  - The model becomes ineffective in absence of a strong civil society interest and short public memory.

Organizations / Projects based on Comparative Analysis Model

- India
  - Green Ratings Project: http://www.oneworld.org/cse/html/eyou/eyou31.htm
  - The Centre for Science and Environment in India conducts a survey of how Green the Indian industries are. The Green Rating Project is an attempt to provide an independent and fair evaluation of the comparative environmental performance of companies, from a perspective which supports responsible industry and encourages poor performers to improve. Performance reports of companies are shared over Internet and other media and people's opinion is solicited in deciding the greenest environmental managers, Chief Minister etc.
- Philippines
  - Vote.ph: http://www.vote.ph
  - Vote.ph is the non-partisan, non-sectoral online directory and quick reference center on Philippine elected government officials and election candidates for both the national and the local levels. It serves the purpose of informing voters know who are the electoral candidates running in their respective area and who their incumbent elected officials are.
- Global
  - Human Development Indicators http://www.undp.org/hdro/indicators.html
  - The Human Development Report of UNDP makes use of archived statistical information pertaining to literacy, health, national income etc. as a benchmark to assess the progress made by different countries with regards to their Human Development Index and suggests policy recommendations based on that.

Mobilisation and Lobbying Model

Building Allies / Networking Networks for Concerted Action



Mobilization and Lobbying Model

- Principle
- One of the most frequently used digital governance model and has often come to the aid of the civil society organizations in developing countries to impact international decision-making processes.
  - Based on planned, directed, strategic flow of information to build strong virtual allies to strengthen action in the real world.
  - Takes up the pro-active approach of forming virtual communities which share similar values and concerns, promoting active sharing of information between these communities, and linking them with real world activities.
  - The strength of this model is in the diversity of its virtual community, and the ideas, expertise and resources accumulated through virtual forms of networking.
  - The model is able to effectively overcome geographical, institutional and bureaucratic barriers to shape concerted action.
  - The model also provides a strong virtual arm to several activities such as directing campaigns against a particular individual or decision-making body.

Mobilization and Lobbying Model

- Applications
  1. Fostering public debates on global issues, themes of upcoming conferences, treaties etc.
  2. Formation of pressure groups to pressurize decision-makers to take their common concerns into cognizance (knowledge/awareness).
  3. Amplifying the voices of marginalized groups who are traditionally marginalized from decision-making process.
  4. Building up wider participation in decision-making processes.
  5. Building up global expertise on a particular theme in absence of localized information to aid decision-making.

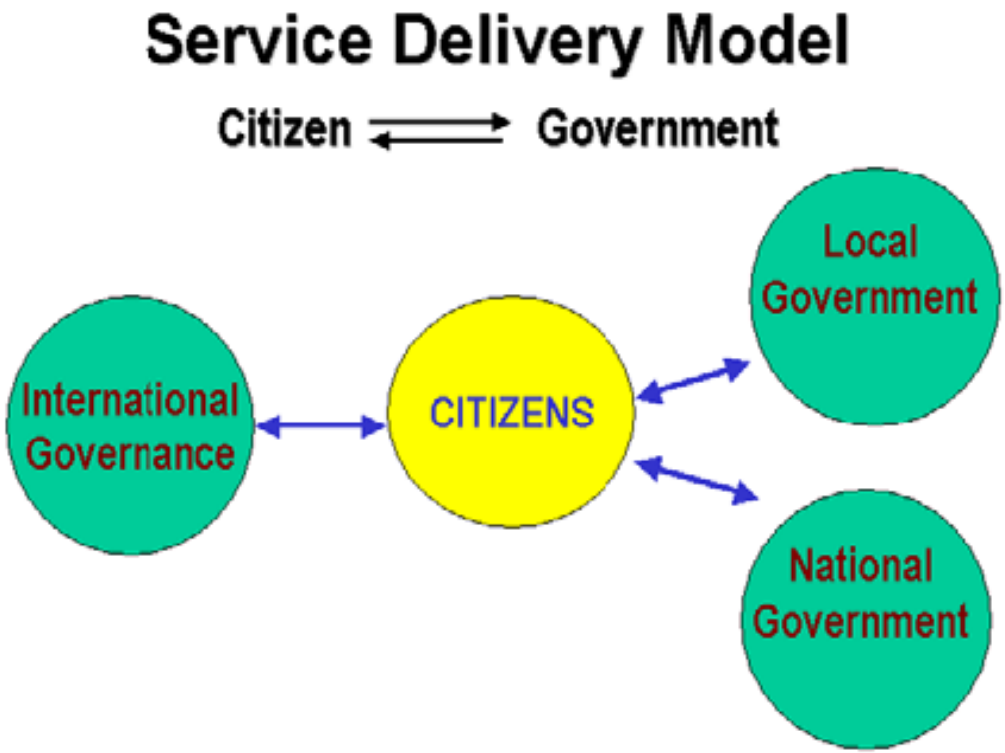
Mobilization and Lobbying Model

- Evaluation (Pros and Cons)
  - The model has grown tremendously since the onset of debates for the Seattle round of World Trade Organization (WTO) in 1999 when it saw the formation of several virtual communities to advocate the concerns of developing countries in the WTO agreement.
  - The display of a unified civil society force at Seattle was in many ways a result of intensive discussions that took place over virtual networks months prior to the summit. The discussions taking place over the virtual network fed into regional level action plans that built into the global movement.
  - The mobilization and lobbying model enhances the scope of participation of individuals and communities in policy issues and debates.
  - The model also creates an effective deterrent (restriction) for government bodies and
  - individuals to be watchful in their actions lest they turn the opinion of local and global community against them. This model could be effectively used by the Government to encourage public debates and to gauge public opinion on a particular issue as a part of good governance strategies.

Organizations / Projects based on Mobilization and Lobbying Model

- India
  - Panchayats: http://www.panchayats.org
  - A discussion list run by Indian professionals to discuss policy issues and case-studies relating to local livelihood strategies and decentralised natural resources management. The participation is open and the list generates useful discussion between practitioners, activists and policy makers.
- Global
  - Independent Media Centre: http://www.indymedia.org/
  - The Center was established by various independent and alternative media organisations to provide grassroots coverage of WTO-Seattle in 1999. The Center acted as a clearinghouse of information for journalists, and provided up-to-the-minute reports, photos, audio and video footage through its website.
- Global
  - Greenpeace Cyber-activist Community: http://cybercentre.greenpeace.org//t/s
  - The Greenpeace Cyberactivist Community has members from more than 170 countries and territories. and is growing quickly. It is an effort towards creation of virtual communities to mobilise global support against some of the disputable environmental policies/ actions of the Government. Members receive email campaign updates, and can send letters to key corporate and political decision makers, download action kits, send e-cards to friends and colleagues, participate in on-line discussions, and play a significant role in helping to win environmental campaigns.

Interactive-Service Model / Government to Citizen to Government Model (G2C2G)



Interactive-Service Model / G2C2G

- Principle
  - Interactive-Service model in many ways is a consolidation of the earlier digital governance models and opens up avenues for direct participation of individuals in the governance processes. ICT as mentioned earlier have the potential to include every individual within a knowledge network and enable interactive communication channels among them. This model fully captures the potential of ICT and leveraged it for greater participation, efficiency and transparency in functioning of the government as well as savings in time and costs relating to decision-making.

  - The Interactive-Service Model makes possible the various services offered by the Government to be directly accessible to the citizens. It creates an interactive Government to Consumer to Government (G2C2G) channel in various functions such as election of government officials (e-ballots); filing of tax returns, procurement of government services, sharing of concerns and providing expertise; conducting opinion polls on public issues, and grievance redressal (Complaint Addressing).

Interactive-Service Model / G2C2G

- Applications

1. Establishing an interactive communication channel with policy-makers such as video-conferencing and online dialoguing.
2. Conducting electronic ballots for the election of government officials and other office bearers.
3. Conducting public debates / opinion polls on issues of wider concern before formulation of policies and legislative frameworks.
4. Filing of grievances, feedback and reports by citizens with the concerned governmental body.
5. Performing governance functions online such as revenue collection, filing of taxes, governmental procurement, payment transfers etc.
6. Carrying out video-conferencing, on-line discussion with policy makers.

Interactive-Service Model / G2C2G

- Evaluation (Pros And Cons)
  - This model is more embedded in developed countries and has often been proposed for replication in developing countries. Such forms of solution-transfers may not be very effective.
  - The model is on the higher end of technology-reliance as compared to the other models. This makes it difficult to replicate in developing countries in absence of individual and secure ICT access.

Organizations / Projects based on Interactive-Service Model / G2C2G

- Philippine
  - Philippine Custom Reform:
  - http://www1.worldbank.org/publicsector/egov/philippinecustomscs.htm
  - The Philippines Customs Bureau has developed an on-line system to process clearance of imports, payment of duty, and delivery of release orders for shipments to leave the docks. The new on-line system has lessened the cost of trade for businesses, reduced opportunities for fraud, and helped the Bureau to maximise revenue collection.
- India
  - Gyandoot: http://www.gyandoot.net/gyandoot/intranet.html
  - Gyandoot is an intranet in Dhar district of Madhya Pradesh connecting rural cybercafes catering to everyday needs of the masses. The site offers several interactive governance related services to the local people such as providing copies of land-maps, online registration of applications, and public grievance redressal. It is a step towards tele-centre based e-governance models.

Maturity Model

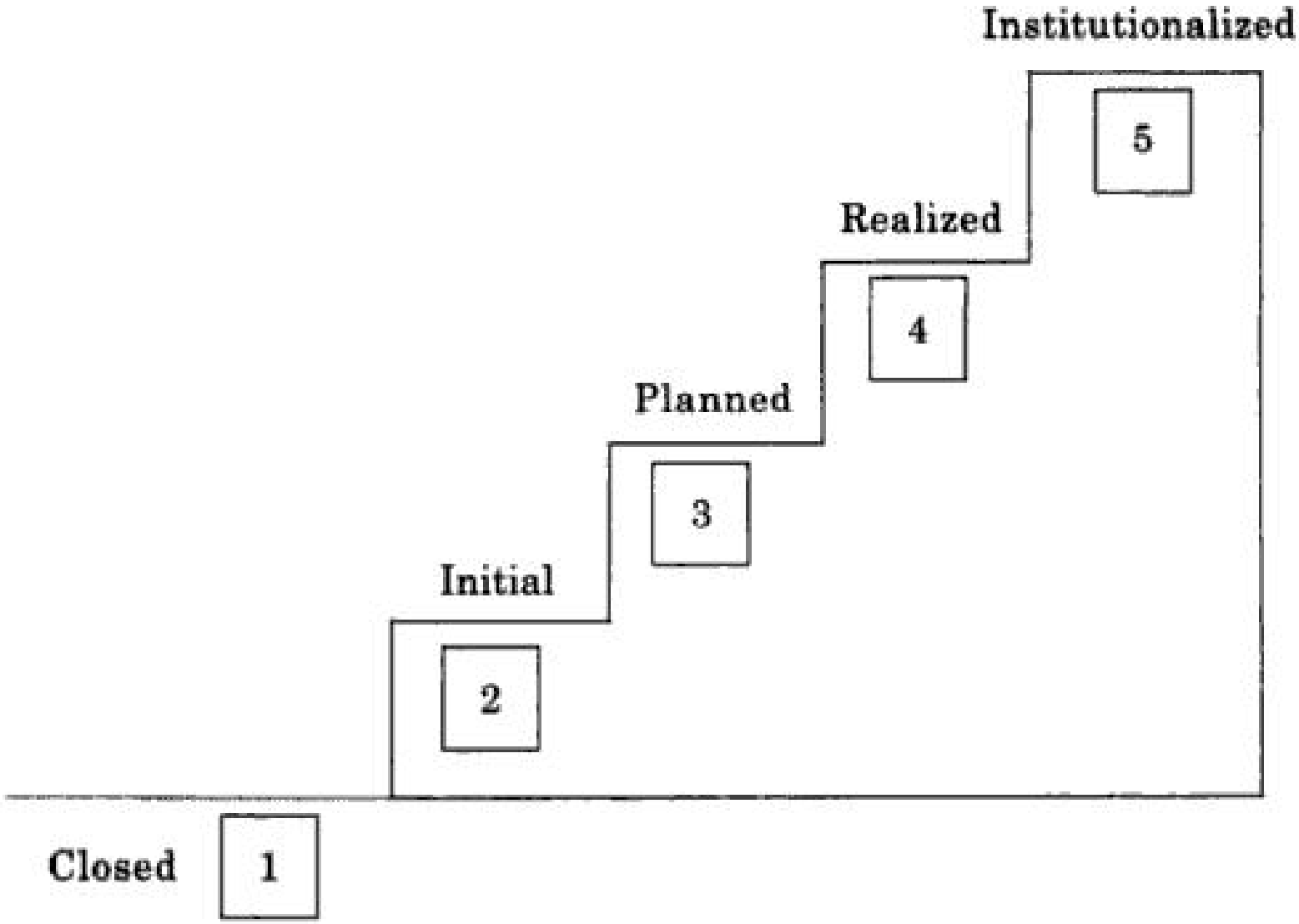
- A maturity model is a method for judging the maturity of the processes of an organization and for identifying the key practices that are required to increase the maturity of these processes.
- An eGovernment maturity model provides us with guidance on how to gain control of our processes for developing and maintaining eGovernment services and how to evolve toward a culture of excellence in providing and managing eGovernment. A maturity model can guide us in selecting process improvement strategies by determining current process maturity and identifying the few issues that are most critical to eGovernment quality and process improvement.
- By focusing on a limited set of activities and working aggressively to achieve them, we can steadily improve our organization-wide eGovernment processes and enable continuous and lasting gains in our eGovernment capabilities.
- Maturity models can be very involved and take years to masterFor good or bad, no well-developed maturity models for eGovernment exist; the best available models are simple, but still useful for understanding some key facts about eGovernment.

Table 1: eGovernment Maturity Model

	Level 1: Simple Website	Level 2: Online Government	Level 3: Integrated Government	Level 4: Transformed Government
Attributes	Static pages Lists of departments and contact information Links to separate departments Policy statements Downloadable forms and documents Access primarily via telephone No site reporting, tracking or analysis	Departmental focus Online forms for applications and registrations Online payment Request information or service via email Respond to online surveys Limited online help, FAQs, resolution services Basic account inquiry Basic benefits enrollment	End-to-end electronic transactions Automated RFP and procurement process Cross-departmental sharing of information Automated advice and problem resolution data Limited configuration capabilities Self-service HR administration Web-based training	Community-centric, integrated, intergovernmental processes Common platform for targeting content through any channel/touch point Internal/external business process integration and collaboration (planning, workflow, design) Constituent case tracking to ensure resolution and satisfaction Highly configurable HR (benefits, career planning, development training)

E-Governance Maturity Models (EMM)

- EMM (version 1.0- Anjali Dhingra and D.C. Mishra) proposes some levels of maturity, depending on the effectiveness with which the e-governance efforts have been initiated, implemented or successfully completed.
- The model also provides for identification of key focus areas that need to be concentrated for attaining a specific maturity level.
- The EMM version 1.0 proposes five levels of maturity, depending upon the effectiveness with which the e-governance efforts have been initiated, pursued, utilized and institutionalized.



E-Governance Maturity Levels.

Five Maturity Levels

- The E-governance maturity model (EMM-Version 1.0) is based on
  - speed, openness and ubiquity (omnipresence) are the major capabilities of ICT which can be use for generating transparency, responsiveness and accountability in the system.
  - empowering the common man by providing faster access to right information at the right time.
  - service-oriented approach where public administration is seen as professional activity and efficient delivery of services to the internal and external users is emphasized as a key performance indicator of the government department.

LEVEL 1: Closed

- Here an organization does not use ICT as a facilitator for good governance and has no plans to do so in the near future.
- Such situation may arise due to lack of exposure to ICTs and associated benefits that again may depend upon a number of reasons: remoteness, lack of resources and strategic thinking.
- As a result the organization is closed in terms of being connected and sharing of information in the context of "E-governance".
- However, even in this condition the organization may be efficiently functioning.

LEVEL 2: Initial

- This level corresponds to the stage when an organization has initiated the automation of its processes but on a ad-hoc basis.
- No organized efforts are made to undertake the e-governance initiatives.
- May of such efforts are abandoned due to lack of proper direction

LEVEL 3: Planned

- This level comprises of systematic approaches with clearly defined vision, objectives and goals for e- governance.
- Need assessments are made to prioritize the areas of implementation and measure the extent of e-readiness.
- Taking necessary input from need assessment study, extensive planning has been carried out indicating policies, strategies, various activities, stakeholders, roles and responsibilities and resources required in terms of time, money and manpower to undertake the e-governance exercise.

LEVEL 4: Realized

- This level corresponds to the stage when the organization actually realizes the complete e-governance plan.
- Consequently, an integrated system is established where all the internal processes of the organization are computerized and there is a seamless information exchange among all concerned entities.
- The organization starts delivering the services to its external as well as internal customers in an effective manner.
- Complete realization of the plan, in a single instance, would entail enormous amount of resources in terms of time, money and manpower which may necessitate adopting a phased approached for operationalizing the e-governance services.

LEVEL 4: Realized (Contd…)

- Retrospected: At this level, the organization has retrospectively studied its business processes in view of its vision, overall e-governance objectives, the service-oriented approach and changes, if required, in the processes are initiated as a constant evolutionary process.
- E-ready: In this stage, e-readiness essentials, which are also the building blocks for e-governance, are ensured by the organization
- Partially open: At this stage some of the e-governance services are operationalized resulting in a partial information exchange among the entities both within and outside the organization.
- Open: This sub-level of realized state implies complete deployment of e-governance services that ensure an integrated system that is open to information exchange. The focus here shifts from acquiring and implementing "e" enabling factors to effectiveness to deal with the customer needs and is accountable for its services.

LEVEL 5: Institutionalized

- At this level, the organization sustains the realized state over a period of time so that e-governance becomes part of its work culture. The e-governance services are effectively utilized and accepted by the users. Several iterations between planned and realized state lead to institutionalization , when e-governance becomes a way of life.

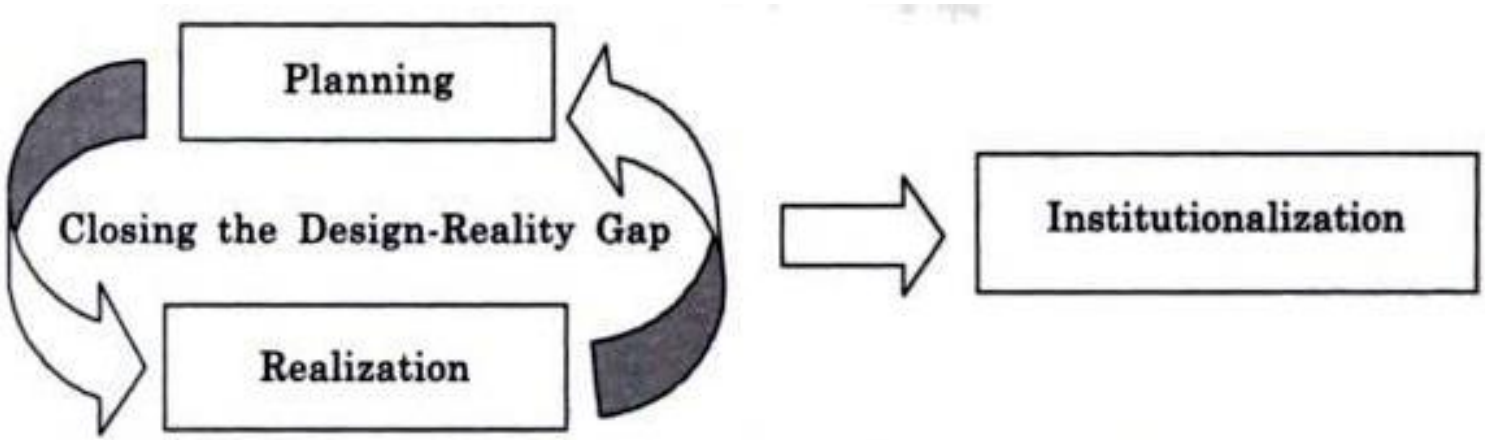


Figure Reaching the Institutionalized Stage.

LEVEL 5: Institutionalized (Contd..)

- E-Readiness Essentials
  1. presence of strategic thinking, leadership and commitment among top-level decision makers
  2. Institutional Infrastructure
  3. ICT Infrastructure
  4. Human Capacities
  5. Legal Infrastructure

Characteristics of Maturity Levels

- Level 1: Closed
  - Organization are closed to e-governance
  - No plans or vision is available
  - Continue with fully manual and conventional operation
- Level 2: Initial
  - Organization lacks strategic thinking and direction for e-governance at top level
  - Unorganized and individual efforts of automation in some areas
  - Individual efforts sustains as long as the enthusiasm remains and is often abandoned due to lack of direction
  - Generally accumulate hardware without any planning and much of it goes unutilized or underutilized

Characteristics of Maturity Levels (Contd…)

- Level 3: Planned
  - E-governance becomes a part of organization's agenda
  - Strategic thinking and leadership guide the e-governance initiatives
  - Clear understanding of e-governance needs as projected by the external and internal users
  - Extensive planning for implementing and addressing the Key Focus Area (KFAs)
  - Documentation including vision, scope, need assessment survey, policy guidelines, action plan and outsourcing guidelines

Characteristics of Maturity Levels (Contd…)

- Level 4: Realized
  - Retrospected:
    - Business processes are attuned with the vision and overall e-governance objective
    - There is awareness about e-governance among all concerned- the stakeholders as well as the users
  - E-ready:
    - The organization has a sound infrastructure in place
    - Users motivated to use e-governance services
  - Partially Open:
    - Such organization sometimes focus only on their internal processes, allowing information exchange confined to the organization. In such case G2E is visible where as G2C, G2G, G2B is not yet established.

Characteristics of Maturity Levels (Contd…)

- Level 4: Realized
  - Open:
    - The organization has integrated system, reflective of smooth information exchange within and outside the organization.
    - G2E, G2C, G2G, G2B are well established.
    - Organization focuses on satisfying the users of e-governance.
    - The internal and external customers of organization start utilizing the e-governance services and become dependent on them.
- Level 5: Institutionalized
  - The –governance system of the organization is driven by a well established Knowledge Management System that generated an ability in the organization to evolve with time in view of new requirements.
  - E-governance becomes an effortless exercise for the organization and it becomes a way of life for the stakeholders and customer/users.
  - The organization at this level is completely paperless

Key Focus Area

Planned

- Define a quantifiable vision for the e-governance exercise.
- Conduct a Needs Assessment Survey in view of objectives covering the following areas:
  - — Survey of requirements both within and outside the organization, indicative of the information needs of the internal (employees) and external (citizens, business and other government agencies) customers/users with respect to e-governance.
  - — Analyze the requirements to identify priority areas for initiating e-governance exercise.
  - — Assess the extent of e-readiness for identified areas and requirements to achieve the desired level of e-readiness.

Key Focus Area

- Prepare an extensive plan on e-governance that includes the following areas:
  - Define objectives and goals for the e-governance exercise.
  - Design policies and strategies for implementing e-governance.
  - Decompose the e-governance exercise into various activities.
  - Project the resource requirements in terms of time, money and manpower.
  - Identify stakeholders and assign roles and responsibilities.
  - Define implementation methodology.
  - Define measures for creating awareness and change in mindset among the external and internal customers/users of the organizations for effective implementation of e-governance.
  - Define measures for attaining required level of e-readiness.
  - Identify risk factors and propose risk mitigation plan.
  - Define the expected impact and propose an impact assessment methodology.
  - Identify external sources of funds, if required.
  - Define mechanisms (Research and Development, Knowledge Management initiatives) for developing innovative ways of delivering services within the organization and outside it.
  - Define the time for which the plan is valid.
  - Prepare all the necessary documentation including Vision and Scope document for e-governance, Need Assessment Survey document, Policy guidelines, Action Plan and Outsourcing guidelines.

Key Focus Area

Realized

- Arrange for resources required to implement the e-governance initiative.
- Develop a high level awareness and commitment among decision-makers, stakeholders and users to initiate and carry forward the e-governance objectives.
- Select vendors for outsourced activities and formalize terms and conditions with all the stakeholders, clearly assigning roles, responsibilities and ownership.
- Set up management committees with appropriate representation of all stakeholders for executing and monitoring the e-governance exercise.
- Conduct a detailed study and review of the existing business processes in view of e-governance objectives.
- Initiate the change in business processes wherever required, and bring in suitable legislation to make it effective.

Key Focus Area

- Address information needs of common man in local language with easy to use interface.
- Address the issues related to standardization of content and data to facilitate seamless flow of information among concerned entities.
- Ensure interoperability in terms of interconnectivity, data integration and information access.
- Use open standards.
- Ensure easy accessibility to information.
- Provide efficient data communication.
- Build scalable architecture.
- Ensure wide market support (supply from multiple vendors).
- Ensure wide product support (interconnection between products from diverse vendors).
- Ensure cost effectiveness.

- Conduct extensive training for customers/users and administrators for effective operationalization and utilization of e-governance services.
- Collect, compile, validate and update data/content.
- Maintenance activities.
- Conduct an Impact Analysis to assess the effectiveness of service delivery.
- Initiate activities (surveys, research and development, knowledge management initiatives) to devise more innovative ways of developing and delivering e-governance services.

Key Focus Area

Institutionalized

- Address the *design-reality* gaps, if any, by iterating between planning and realization phases.
- Evolve a mechanism (knowledge management system, research and development initiatives and surveys) to make e-governance an effortless exercise so that the entire system develops an ability to evolve and scale up with time and new requirements.

Towards Good Governance Through E-Governance Models

- The digital governance models bring about a transformation in the existing forms of governance as they change the nature of citizen-governance relationship and bring in new agents and mechanisms to influence the governance processes.
- The models foster democratic control over the governments' economic, social and welfare policies by citizens and civil society organizations - a key process requirement for good and responsive governance.
- It ensures that the voices of people are more likely to be reflected in decision-making processes.

Towards Good Governance Through E-Governance Models

The changes brought about in the citizen-governance relationship through digital governance are fourfold:

- They open up avenues for flow of information both vertically and laterally, and thus encompass a wider foundation of the civil society. A greater density of information flow is achieved – between government and civil society, amidst the government or within the civil society itself. The right to voice and expression therefore gets more frequently exercised by citizens who wish to engage in the political processes.
- Information becomes difficult to be capitalized by a few for political gains and at the expense of ignorance of citizens. Digital governance ensures that the power-equations shift from being concentrated and restricted at selected nodes to its more even and timely distribution among citizens, opposition parties and watch guard groups.
- There is a greater scope to influence policy-makers and members of the civil society through collective opinion casting, direct participation, participation in public debates, and use of advocacy tools.
- Policy-makers become more aware of the voices of people and can effectively involve them in policy-making mechanisms. They realize that their actions are under the scrutiny of many more watch guard organizations and there are greater avenues available with people to obtain or triangulate information from different sources. Information also becomes difficult to obliterate and is forever archived to increase the institutional memory of the society.

People's Participation in ICT-enabled Governance

	Conventional Media	ICT and Convergence Media
Mode of Participation	Representative Ex-Situ	Individual/ Collective In-Situ
Forms of Participation	Passive/ Reactive	Pro-Active / Interactive
Impact of Participation	Indirect	Direct/ Immediate

Unit 3

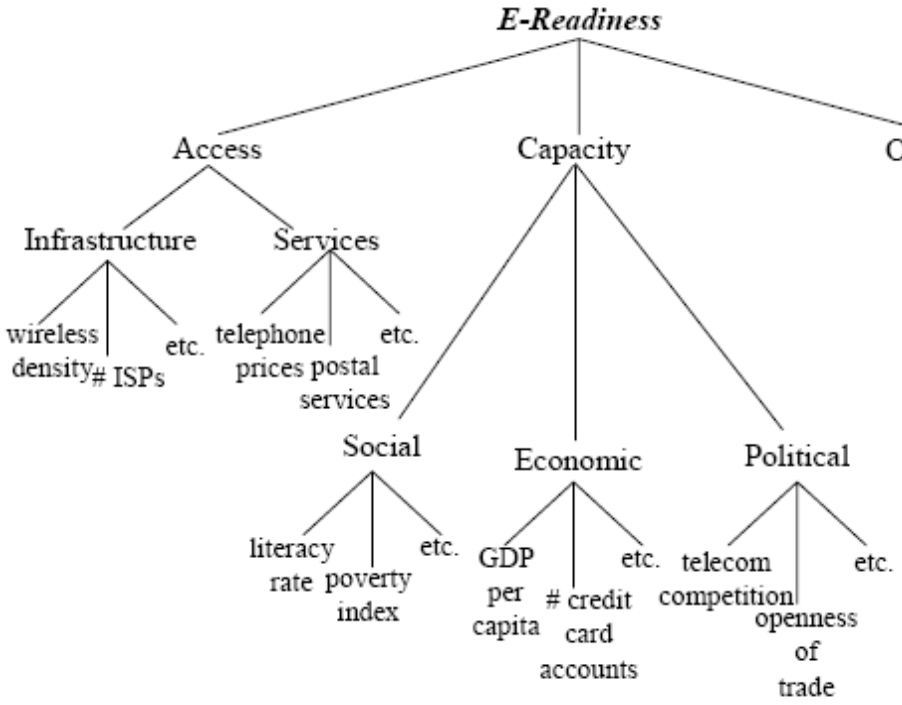
e-Gov Infrastructure, Stages in Evolution and Strategies for Success

E-Readiness

- E-Readiness is the ability to use information and communication technologies (ICT) to develop one's economy and to foster one's welfare.
- Is the ability to pursue value creation opportunities facilitated by the use of the Internet.
- Is a measure of e-business environment, a collection of factors that indicate how amenable (willing) a market is to Internet-based opportunities.
- is not simply a matter of the number of computer servers, websites and mobile phones in the country, but also things such as its citizen's ability to utilize technology skillfully, the transparency of its business and legal systems, and the extent to which governments encourage the use of digital technologies.

e-Readiness: Domains & Clusters

Domains	Clusters
1. Access	(a) infrastructure (b) services
2. Capacity	(a) social factors (b) economic factors (c) policy factors
3. Opportunities	(a) opportunity penetration (b) specific applications



- e-banking
- B2B, B2C, B2G, C2C procurement
- Marketing/information search
- Comparison of alternatives (aggregation)
- Payment
- Delivery of goods
- Logistics
- Interface with public administration
- etc.

E-Readiness: Infrastructural Prerequisites

1. Data Systems Infrastructure
2. Legal Infrastructure
3. Human Infrastructure
4. Institutional Infrastructure
5. Technological Infrastructure
6. Leadership and Strategic Planning

E-Readiness: Data Systems Infrastructure

- The core of e-governance is e-MIS and holds the entire database of any organization .
- The data that were managed manually need to be computerized or brought into electronic form which means that the preparedness of computerized database or data warehouse is required.
- Data quality and data security are of prime concern here as most of the government infrastructures are not up to the mark in developing countries.
- The major question that arises here is " Are all the requisite management information systems, records, databases and work processes in proper place so as to provide the quantity and quality of data to support the move to e-governance?"
- This is the core computerization activity of any government process which may take several years to reach this stage.

E-Readiness: Legal Infrastructure

- The manual processes in government are usually obsolete, inefficient and bureaucratic.
- Though they have transformed to computerization practices, they continue to have poor and inefficient performance and this is due to lack of administrative reforms and lack of business process reengineering.
- They lack requisite legislation and legal infrastructure to enable such reforms or reengineering of the existing business practices, rules and regulations within the government at various levels.
- This seems to be accentuated in developing countries while developed countries have been significantly successful in administrative reforms and business reengineering.
- The fundamental question that arises here is " Are the laws and regulations required to permit and support the move towards e-governance initiatives in place?
- E.g Digital Signature Act

E-Readiness: Institutional Infrastructure

- For any government to implement a successful e-governance project, the required institutional infrastructure must be in place which most of the government lack.
- The government body has to establish a separate IT department which basically coordinates with facilitators for e-government projects within the nation.
- The IT department works out for the hardware selection and procurement, network or software development and implementation and also the training of staff at various levels of the government.
- Many countries still lack the institutional infrastructure.

E-Readiness: Human Infrastructure

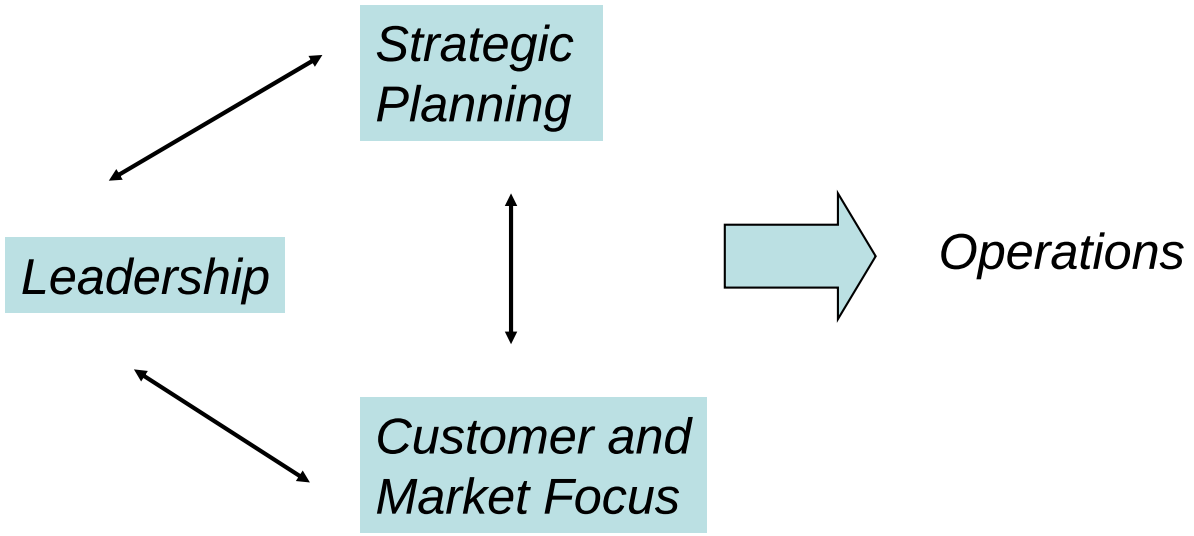
- Human resource development by training is an essential requirement which comes from well trained manpower both technical and non-technical.
- The technical manpower resources are essential for all the phases of e-governance and related information system life cycle comprising systems analysis, design, programming, implementation, operation and documentation.
- Both private and government institutions should play a major role in this regard.
- Apart from technical human infrastructure, there is a need for the crucial training and orientation of user personnel i.e. government staff in e-governance project.
- The government employees and staff who are the stake-holders in all e-government projects as the end users are to be appropriately trained and oriented for change management from a manual government environment to e-governance environment.
- Such training will make them competent and capable of handling e-governance projects at operational level

E-Readiness: Technological Infrastructure

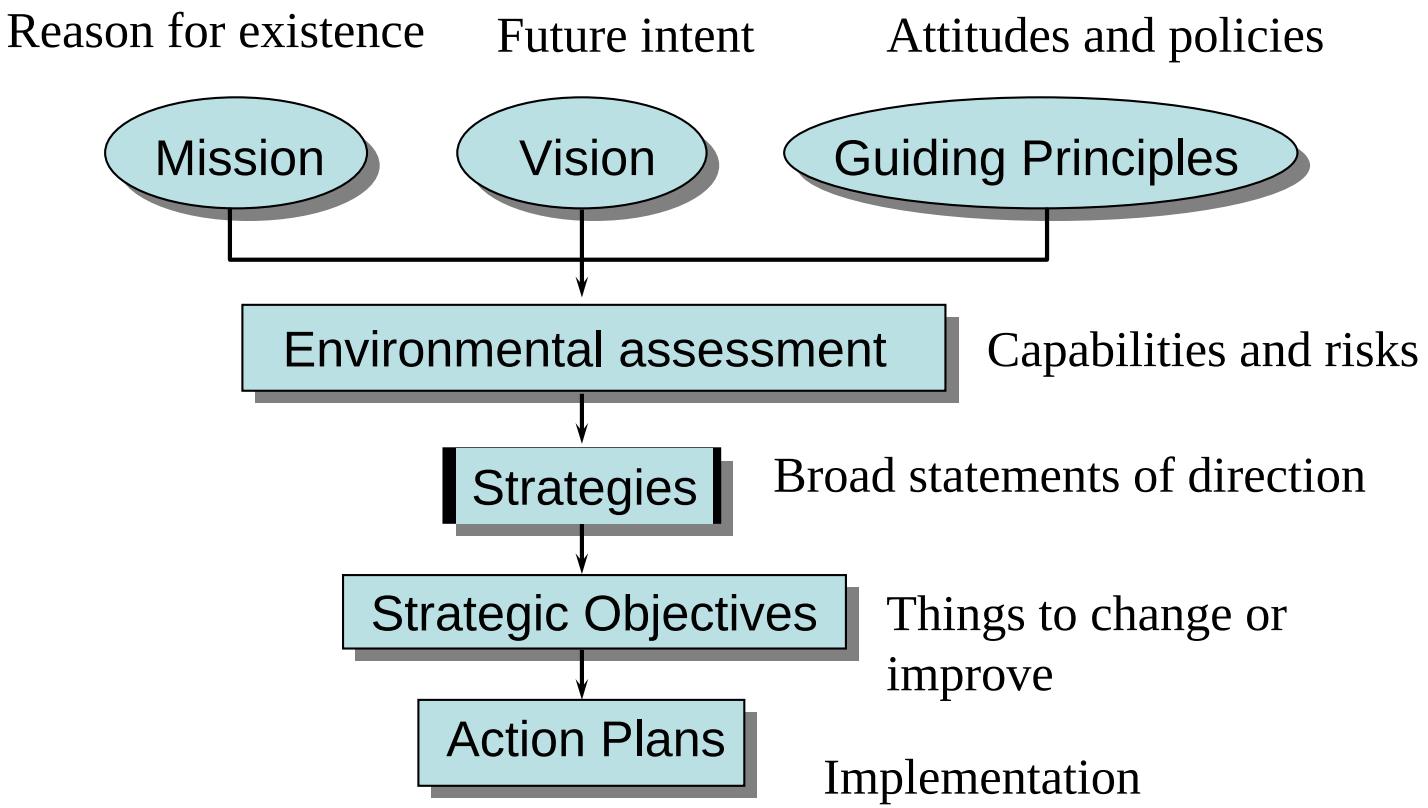
- Technology is fast changing in ICT domain and there is a rapid obsolescence of software as well as hardware which require great financial support time and again.
- Government organizations encounter this situation especially as their procedures to procure hardware or software are very inefficient and slow.
- The technological infrastructure in developing countries including computing and telecommunication is absent. As a result software and hardware may not be compatible.
- The major reasons are
  - cost of technology
  - Adaptability
  - Obsolescence
- This is a serious limitation to e-governance implementation.

E-Readiness: Leadership and Strategic Planning

- Leadership
  - The ability to positively influence people and systems to have a meaningful impact and achieve results.
  - Strategic Planning
  - The process of envisioning an organization's future and developing the necessary procedures and operations to achieve that future.



Strategic Planning Process



Leading Practices - Strategic Planning

- Active participation of top management, employees, customers, suppliers
- Systematic planning systems for strategy development and deployment, including measurement, feedback, and review
- Use of a variety of external and internal data
- Align short-term action plans with long-term strategic objectives, communicate them, and track progress

Evolutionary Stages in E-Governance

E-governance evolves gradually from the simplest levels to advanced levels and the evolution may not be same in all cases.

- Stage 1: Use of E-Mail and setting up of internal networking
- Stage 2: Creation of Intranet infrastructure for access of internal activities
- Stage 3: Allowing public access to information through Internet
- Stage 4: Allowing 2-way interactive communication with stake holders to enable Internet enabled transactions (including financial transactions)
- Stage 5: Allowing online transactions by the citizens
- Stage 6: Enriching digital democracy
- Stage 7: Electronically integrated or joined government with Legislature and Judiciary

Stage 1: Use of e-mail and setting up of internal network

The most fundamental, cheapest and easiest ICT tool is e-mail. E-mail has now become common in all urban areas and some rural areas. Within the government it is the easiest of all options available for implementation. Official orders to accept e-mail communication as valid have been issued in a large number of government, judicial and legislative organizations. Although e-mail can reach outside organizations via the Internet, most government organizations adopt e-mail for internal messagings.

Due to its informality, e-mail can lead to increased lateral and bottom-up communication.

E-mails break the official hierarchy of communication, as anyone can send to e-mail to any other, breaking the hierarchy and other barriers. They allow person-to-person communication can improve information sharing, exchange, coordination and feedback of information.

However, its limitations are its transparency and security risks of the content, unless used with digital signatures or key encryption. Sensitive and critical messages are still best sent over the telephone or in person. However, with the advent of digital signatures and encryption techniques, it is possible to ensure integrity, security, correctness and non-repudiation of the information sent as e-mail.

The internal networking of various departments of an organization linked to Internet for sending and receiving the e-mail is a prerequisite. Most government organizations have already set up desktops in various divisions and sections and internally connected them all for this purpose.

Stage 2: Use of Internet by connecting internal activities to Internet

While e-mail provides the very fundamental mode of communication, the basic and personal use of Internet from offices and houses is now generally a reality in all urban areas and limited rural areas. Surfing of the web is both a business and pleasure. It has been noticed that most government employees spend a few hours a day surfing the Internet whether for official purpose or personal benefit, or for pleasure. The Internet has inculcated an information culture in the people in general and government employees in particular, to surf the Internet, in general, for all purposes of information retrieval. Thus, all sectors of the government such as Agriculture, Finance, Economy, Planning, Rural Development, etc. can be found to have their presence on the Internet in a significant scale and any government activity regarding any information such as policy statements, strategies, technological or scientific information can be obtained from the Internet for the benefit of all levels of people involved in government. For example, the Andhra Pradesh Chief Minister's Office has set up a group of technical and administrative staff only to research and retrieve information from the Internet from time to time to prepare reports and presentations. Similarly, the office has also set up an official web site giving all activities of the Chief Minister and summary of government activities.

Stage 3: Allowing public access to information

Public access to information can be viewed in multiple dimensions.

(a) **Web pages, citizen charters and application forms.** If the government department concerned puts up a web page on the Internet, describing all functions of the Department, it can be accessed by citizens and general public interested. This may be usually static data—the Internet equivalent of a printed brochure. The basic profile and functions of the Department concerned will be on public display. Content may include the citizen charters, application forms for various purposes, details of fees, deadlines, rules and regulations, etc. (see **http://gistnic.tn.nic.in** for citizen charters and application forms for all departments of Tamil Nadu State Government). This is one-way broadcast of information of interest to all citizens that has become very common today and almost all government departments have already set up their web sites.

The web page can also be dynamic—the contents changing with time. The web site updation process can take place dynamically. As in the case of Industries Department of Government of Andhra Pradesh (developed by NIC), the officials located at various remote areas within the State perform the updation of the Index of Industrial Production based on actual production data of industrial units located at remote areas in the Districts.

(b) **General information services.** In addition to this e-enabling of the basic functionality of the government departments concerned, there could be much greater scope, content and depth of information that can be of interest and use for the people, and the citizens at large, that is the general information requirements. The general information requirement of the public in general can be broadly defined to a very large extent or scope and coverage, in wide ranging sectors such as Education and Tourism, apart from information from Census and the statistical information pertaining to various sectors of economy such as agriculture, industrial activity, plan details, etc. Before the Internet was established and became popular, a pioneering initiative was taken by National Informatics Centre (NIC) in the form of the Project GISTNIC (General Information Service Terminal of National Informatics Centre), the goal of which was to collate, compile and provide a single-point source of information of various sectors of interest to public in general. A wide range of subjects as, for example, Census data of all villages—population abstracts as also details of amenities were provided in addition to information of all tourist spots, information regarding universities and colleges, etc. Subjects such as rural technologies and specialized subjects as traditional sciences and technologies were also covered.

Stage 4: Allowing two way interactive communication with stake-holders to enable Internet enabled transactions (including financial transactions)

Once a web site is operational, correspondences from the citizens can be allowed through e-mail by providing them the appropriate e-mail addresses. For example, in China, the Beijing city government web site provides e-mail section to citizens apart from other important information such as government regulations, rules, laws or information about services offered by the government. In this e-mail section, the citizens are asked to express their suggestions, ideas, complaints (if any). The appropriate office concerned will be receiving these e-mails. Another approach is to permit citizens to clarify some queries (such as how to move the residence to Beijing) and the response to such queries will be posted on the web site itself.

The two-way interaction need not necessarily be online and web based. In the case of CARD (Computer aided Administration of the Registration Department) Project (executed by the Government of Andhra Pradesh and NIC in Andhra Pradesh State), title deeds are registered in one hour and encumberance certificates are issued in 20 minutes. The entire set-up is within the concerned sub-registrar office and managed by the office staff themselves. The citizens are provided the requisite services by the officers concerned in a very efficient manner.

Stage 5: Allowing online transactions by the citizens

In stage 4, the citizens interacted through kiosks, obtained services through online or the Internet, but made payments manually. But now, in Stage 5, in addition to permitting single online enquiry access to information, citizens may be enabled to make payments of fees and taxes, lodge complaints, file applications and perform any other transactions online through citizen kiosks installed at busy public locations. This is a much more advanced stage in e-governance not yet reached in developing countries but already reached in the developed world.

In Singapore, the citizens can transact every government business online and round the clock through specially designed kiosks which can be operated using smart cards. They can transact all government related business such as social welfare claims, tax assessment and payment, visa applications and license renewals, in addition to bank based fund or financial transactions using smart cards. However, this is a very advanced technological scenario, too advanced to be replicated immediately in all developing countries, even though plans are being drawn in developing countries to execute similar initiatives. Of course, limited transactions with the government by the citizens have been made online in these countries. The kiosks in public locations in Beijing, China, are successful; this is true of Korea as well as of India (for land record details).

Stage 6: Enriching digital democracy

Democracy can be strengthened and enriched by ICT in multiple ways and modes. At least two important sets of ICT applications that can potentially support participatory and democratic processes, specially in the developing countries have been identified. These relate to applications that enrich and further empower the civil society organizations, and enable the citizens to express themselves by voting in democratic processes through Internet or by any other electronic means.

Examples of success stories on both these two applications identified above can be cited in developing countries. In the Grameena Bank Project in Bangladesh, a cell phone hand set could be bought by a poor woman (with the help of bank loan) who would in turn rent it out to other poor men and women who work in the fields. Finally, this resulted in a commercially viable rural cell phone service leading to significant economic development.

In Andhra Pradesh, the poor women in villages form self-help groups (called DWCRA Project) with micro credit. They were able to grow big enough to set up their own banks which use ICT to a significant level.

The application of ICT in civil society groups and organizations is of a wide spectrum. Several groups can even combine forces, raise funds and even challenge multinational corporations. These challengers can be as diverse as NGOs, trade unions and other self-help groups. Their networking of people could be achieved through ICT applications.

Stage 7: Electronically integrated or joined up government with Legislature and Judiciary

In the final stage of e-governance a comprehensive web portal and a smart card integrates information and services from various responsible government agencies. In this stage both horizontal integration of services across departments and vertical integration of service delivery is expected to take place. As already available in Singapore and also being experimented in many states such as Andhra Pradesh, on a web portal users can obtain services across different geographical levels of government within the same functional area and also access different functions. Thus, in a scenario like this, a citizen could submit a change of address on driving license and such a change would automatically be effected in all other sectors such as health, education, elections, taxation, etc. (thereby avoiding need for multiple filing). This is true of horizontal integration of services in an e-government. Citizens also can use portals to make payments and other transactions, obtain a checklist of enclosures required for an application, find answers to frequently asked questions (faq) and engage the services of relevant commercial enterprises. In Singapore and Hong Kong, such state-of-the-art portals are operational. The Government of Taipei (Taiwan) also has set up a "One Window" service on the Internet for tax administration, public health and e-commerce. Smart cards are gradually becoming functional in several Asian Countries for all such activities.

In Andhra Pradesh the e-seva project offers single-roof service on about 40 different areas such as property registration, taxation, utility bills payment, etc. though not presently with a smart card and also not on a single portal, though attempts are in progress in these directions.

DATA WAREHOUSE PRELUDE

- ✓ Data warehouse is a repository of an organization's electronically stored data and are designed to facilitate reporting and analysis
- ✓ Also emphasizes on the means to retrieve and analyze data, to extract, transform and load data, and to manage the data dictionary.
- ✓ An expanded definition for data warehousing includes business intelligence tools, tools to extract, transform, and load data into the repository, and tools to manage and retrieve metadata (data about data).
- ✓ In contrast to data, warehouses are operational systems that perform day-to-day transaction processing.
- ✓ A data warehouse is a collection of computer-based information that is critical to successful execution of enterprise initiatives
- ✓ It provides a tool to satisfy the information needs of the employee's at all organizational levels-not just for complex data queries but as a general facility for getting quick, accurate and often insightful information.
- ✓ It is designed so that its users can recognize the information they want and access that information using simple tools.
- ✓ One of the principal reasons for developing a Data Warehouse is to integrate operational data from various sources into a single and consistent architecture that supports analysis and decision making with the enterprise.
- ✓ Some of the applications data warehousing can be used for are:
  - o Credit card churn analysis
  - o Insurance fraud analysis
  - o Call record analysis
  - o Logistics management (part of Supply Chain Management that plans, implements, and controls the efficient, effective, forward, and reverse flow and storage of goods, services, and related information between the point of origin and the point of consumption in order to meet customers' requirements)

ADVANTAGES

- **More cost effective decision making:** A data warehouse allows reduction of staff and computer resources required to support queries and reports against operational and production database. This typically offers significant savings.
- **Better enterprise intelligence:** Increased quality and flexibility of enterprise analysis arises from the multi-level data structure which guarantees data accuracy and reliability ensuring that a Data Warehouse contains only "trusted" data.
- **Enhanced customer service:** An enterprise can maintain better customer relationships by correlating all customer data via a single Data Warehouse Architecture.
- **Business reengineering:** Allowing unlimited analysis of enterprise information often provides insights to enterprise processes that may yield breakthrough ideas for engineering those processes. Knowing what information is important to an enterprise will provide direction and priority for reengineering efforts.

DATA MINING PRELUDE

- ✓ Data mining is the process of extracting hidden predictive information from a large database. As more data are gathered, with the amount of data doubling every year, data mining is becoming an increasingly important tool to transform this data into information.
- ✓ It is commonly used in a wide range of profiling practices, such as marketing, fraud detection and scientific discovery. Data mining can be applied to data sets of any size.

- ✓ Data mining tools predict future tends and behaviors, allowing businesses to make proactive, knowledge driven decisions.
- ✓ Data mining sometimes called data or knowledge discovery is the process of analyzing data from different perspectives and summarizing it into useful information.
- ✓ Data mining software is an analytical tool for analyzing data. It allows users to analyze data from many different dimensions, categorize it, and summarize the relationships identified.
- ✓ Technically, data mining is the process of finding correlations or patterns among dozens of fields in large relational databases.

Data mining consists of five major elements:

- ✓ Extract, transform, and load transaction data onto the data warehouse system.
- ✓ Store and manage the data in a multidimensional database system.
- ✓ Provide data access to business analysts and information technology professionals.
- ✓ Analyze the data by application software.
- ✓ Present the data in a useful format, such as a graph or table.

ADVANTAGES OF DATA MINING

- ✓ Automated prediction of trends and behaviors :
  - o Data mining automates the process of finding predictive information in large databases. Questions that traditionally required extensive hands-on analysis can now be answered directly from the data, quickly.
- ✓ Automated Discovery of previously unknown patterns:
  - o Data mining tools sweep through databases and identify previously hidden patterns in one step.
  - o E.g. – analysis of retail sales data to identify apparently unrelated products that are often purchased together.
- ✓ Database can be larger in both depth and breadth:
  - o The databases can have more columns and rows. High performance data mining allows users to explore full depth of a database, without pre-selecting a subset of variables. The data mining database contain larger samples (more rows) as they yield lower estimation errors and variance, and allow users to make conclusion about small but important segments of a population.

CHAPTER 4

Applications of Data Warehousing and Data Mining in Government

4.1 INTRODUCTION

Data warehousing and data mining are the important means of preparing the government to face the challenges of the new millennium.

Data warehousing and data mining technologies have extensive potential applications in the government—in various Central Government sectors such as Agriculture, Rural Development, Health and Energy and also in State Government activities. These technologies can and should therefore be implemented.

In this chapter, we shall examine their potential applications in the State and Central Government.

4.2 NATIONAL DATA WAREHOUSES

A large number of national data warehouses can be identified from the existing data resources within the Central Government Ministries. Let us examine these potential subject areas on which data warehouses may be developed at present and also in future.

4.2.1 Census Data

The Registrar General and Census Commissioner of India decennially compiles information of all individuals, villages, population groups, etc. This information is wide ranging such as the individual-slip, a compilation of information of individual households, of which a database of 5% sample is maintained for analysis. A data warehouse can be built from this database upon which OLAP techniques can be applied. Data mining also can be performed for analysis and knowledge discovery.

A village-level database was originally developed by National Informatics Centre at Hyderabad under General Information Services Terminal of National Informatics Centre (GISTNIC) for the 1991 Census. This consists of two parts: primary census abstract and village amenities. Subsequently, a data warehouse was also developed for village amenities for Tamil Nadu. This enables multidimensional analysis of the village level data in such sectors as Education, Health and Infrastructure. The fact data pertains to the individual village data compiled under 1991 Census.

As the census compilation is performed once in ten years, the data is quasi-static and, therefore, no refreshing of the warehouse needs to be done on a periodic basis. Only the new data needs to be either appended to the data warehouse or alternatively a new data warehouse can be built.

There exist many other subject areas (e.g. migration tables) within the census purview which may be amenable and appropriate for data warehouse development, OLAP and data mining applications on which work can be taken up in future.

4.2.2 Prices of Essential Commodities

The Ministry of Food and Civil Supplies, Government of India, compiles daily data (on weekly basis) for about 300 observation centres in the entire country on the prices of essential commodities such as rice, edible oils, etc. This data is compiled at the district level by the respective State Government agencies and transmitted online to Delhi for aggregation and storage. A data warehouse can be built for this data, and OLAP techniques can be applied for its analysis. A data mining and forecasting technique can be applied for advance forecasting of the actual prices of these essential commodities. The forecasting model can be strengthened for more accurate forecasting by taking into account the external factors such as rainfall, growth rate of population and inflation.

A limited exercise in this direction was already executed at a State level (in Tamil Nadu).

4.3 OTHER AREAS FOR DATA WAREHOUSING AND DATA MINING

Other possible areas for data warehousing and data mining in Central Government sectors are discussed in detail as under.

4.3.1 Agriculture

The Agricultural Census performed by the Ministry of Agriculture, Government of India, compiles a large number of agricultural parameters at the national level. District-wise agricultural production, area and yield of crops is compiled; this can be built into a data warehouse for analysis, mining and forecasting. Statistics on consumption of fertilizers also can be turned into a data mart.

Data on agricultural inputs such as seeds and fertilizers can also be effectively analyzed in a data warehouse. Data from livestock census can be turned into a data warehouse. Land-use pattern statistics can also be analyzed in a warehousing environment. Other data such as watershed details and also agricultural credit data can be effectively used for analysis by applying the technologies of OLAP and data mining.

Thus there is substantial scope for application of data warehousing and data mining techniques in Agricultural sector.

4.3.2 Rural Development

Data on individuals below poverty line (BPL survey) can be built into a data warehouse. Drinking water census data (from Drinking Water Mission) can be effectively utilized by OLAP and data mining technologies. Monitoring and analysis of progress made on implementation of rural development programmes can also be made using OLAP and data mining techniques.

4.3.3 Health

Community needs assessment data, immunization data, data from national programmes on controlling blindness, leprosy, malaria can all be used for data warehousing implementation, OLAP and data mining applications.

4.3.4 Planning

At the Planning Commission, data warehouses can be built for state plan data on all sectors: labour, energy, education, trade and industry, five year plan, etc.

4.3.5 Education

The Sixth All India Educational Survey data has been converted into a data warehouse (with about 3 GB of data). Various types of analytical queries and reports can be answered.

4.3.6 Commerce and Trade

Data bank on trade (imports and exports) can be analyzed and converted into a data warehouse.* World price monitoring system can be made to perform better by using data warehousing and data mining technologies. Provisional estimates of import and export also be made more accurate using forecasting techniques.

*This data is available with the Director General of Foreign Trade, Ministry of Commerce.

4.3.7 Other Sectors

In addition to the above mentioned important applications, there exist a number of other potential application areas for data warehousing and data mining, as follows:

Tourism. Tourist arrival behaviour and preferences; tourism products data; foreign exchange earnings data; and Hotels, Travel and Transportation data.

Programme Implementation. Central projects data (for monitoring).

Revenue. Customs data, central excise data, and commercial taxes data (state government).

Economic affairs. Budget and expenditure data; and annual economic survey.

Audit and accounts. Government accounts data.

All government departments or organizations are deeply involved in generating and processing a large amount of data. Conventionally, the government departments have largely been satisfied with developing single management information systems (MIS), or in limited cases, a few databases which were used online for limited reporting purposes. Much of the analysis work was done manually by the Department of Statistics in the Central Government or in any State Government. The techniques used for analysis were conventional statistical techniques on largely batch-mode processing. Prior to the advent of data warehousing and data mining technologies nobody was aware of any better techniques for this activity. In fact, data warehousing and data mining technologies could lead to the most significant advancements in the government functioning, if properly applied and used in the government activities. With their advent and prominence, there is a paradigm shift which may finally result in improved governance and better planning by better utilization of data. Instead of the officials wasting their time in processing data, they can rely on data warehousing and data mining technologies for their day-to-day decision making and concentrate more on the practical implementation of the decisions so taken for better performance of developmental activities.

Further, even though various departments in the government (State or Central) are functionally interlinked, the data is presently generated, maintained and used independently in each department. This leads to poor (independent) decision making and isolated planning. Herein lies the importance of data warehousing technology. Different data marts for separate departments, if built, can be integrated into one data warehouse for the government. This is true for State Government and Central Government. Thus data warehouses can be built at Central level, State level and also at District level.

Conclusion

In the government, the individual data marts are required to be maintained by the individual departments (or public sector organizations) and a central data

warehouse is required to be maintained by the ministry concerned for the concerned sector. A generic inter-sectoral data warehouse is required to be maintained by a central body (as Planning Commission). Similarly, at the State level, a generic inter-departmental data warehouse can be built and maintained by a nodal agency, and detailed data warehouses can also be built and maintained at the district level by an appropriate agency. National Informatics Centre may possibly play the role of the nodal agency at Central, State and District levels for developing and maintaining data warehouses in various sectors.

Information Technology Policy, 2057 (2000)

1. Vision

To place Nepal on the Global Map of Information Technology within the next five years.

2. Background

As a developing country, Nepal has availed of the opportunity to rapidly develop various sectors such as education, health, agriculture, tourism, trade, among others, using information technology. The extensive application of this technology will engender economic consolidation, development of democratic norms and values, proportional distribution of economic resources and means and enhancement of public awareness, thereby raising living standards and, most importantly, contribute significantly to poverty alleviation. The establishment of a vibrant information technology will mitigate some of the disadvantages Nepal faces on account of its geographical conditions. In the coming years, globally, there will be a significant difference between the economic conditions of countries with developed information technology and that of countries lagging behind in this field. The persistence of such disparities between countries will be difficult to accept even by the developed countries. It is very possible that the international community will extend its support to developing countries in the development of information technology. Such assistance will certainly be significant for the national development of a least developed country like Nepal. Hence, an information technology policy is required to develop information technology in the shortest time possible for the sake of the national economy.

3. Objectives

The information technology policy shall be developed to attain the following objectives.

3.1 To make information technology accessible to the general public and increase employment through this means.
3.2 To build a knowledge-based society.
3.3 To establish knowledge-based industries.

4. Strategies

The information technology strategies adopted to accomplish the above-mentioned objectives of rapid development and expansion of information technology in a fair and competitive environment shall be the following:

4.1 The government will act as a promoter, facilitator, and regulator.
4.2 Carry on research, develop and expand information technology with a high priority to participation of the private sector.
4.3 Prepare capable manpower with the involvement of both public and private sectors for sustainable development and expansion of information technology.
4.4 Encourage native and foreign investment for the development of information technology and infrastructure pertaining to information technology.

4.5 Place Nepal on the global map through information technology.
4.6 Legalize and promote e-commerce.
4.7 Assist in e-governance by using information technology.
4.8 Utilize information technology in the development of rural areas.
4.9 Promote information technology industries.
4.10 Create a healthy, competitive environment for information technology service providers and provide them speedy and qualitative service at a reasonable cost.
4.11 Include computer education in curriculum from the school level.
4.12 Enhance professional efficiency through the use of information technology.
4.13 Expand the information technology network to the rural areas.
4.14 Establish Nepal in the international market in information technology.
4.15 Increase export of services related to information technology (software and hardware) to 10 billion rupees within the next five years.

5. Information Technology Policy

The policies to be pursued for the implementation of the above-mentioned strategies shall be as follows:

5.1 To declare information technology sectors a prioritized sector.
5.2 To follow a single-door system for the development of information technology.
5.3 To prioritize research and development of information technology.
5.4 To create a conducive environment that will attract investment in the private sector, keeping in view the private sector's role in the development of information technology.
5.5 To provide internet facilities to all Village Development committees of the country in phases.
5.6 To render assistance to educational institutions and encourage native and foreign training as a necessity of fulfilling the requirement of qualified manpower in various fields pertaining to information technology.
5.7 To computerize the records of each governmental office and build websites for them for the flow of information.
5.8 To increase the use of computers in the private sector.
5.9 To develop physical and virtual information technology park in various places with the private sector's participation for the development of information technology.
5.10 To use information technology to promote e-commerce, e-education, e-health, among others, and to transfer technology in rural areas.
5.11 To establish National Information Technology Centre.
5.12 To establish a national level fund by mobilizing the resources obtained from His Majesty's Government, donor agencies, and private sectors so as to contribute to research and development of information technology and other activities pertaining to it.
5.13 To establish venture capital funds with the joint participation of public and private sectors.
5.14 To include computer education in the curriculum from the school level and broaden its scope.
5.15 To establish Nepal in the global market through the use of information technology.
5.16 To draft necessary laws that provides legal sanctions to the use of information technology.

5.17 To gradually use information technology in all types of governmental activities and provide legal sanctions to its uses in such activities.

6. Action Plan

The following action plan shall be carried out to implement the national information technology policy and fulfill its objectives:

6.1 Participation of private sector in infrastructure development:

There may be up to a hundred percent foreign investment in areas such as information technology park, research and development, technology transfer, and human resource development.

6.2 Infrastructure development:

The following arrangements shall be made for information infrastructure development.

6.2.1 An info-super highway and north-south info-highway shall be built taking into account the rapidity of information flow, changes brought about by the means of information flow, and the gradual development of multimedia service. Nepal shall be linked with other parts of the world through a broadband information network.

6.2.2 An IT park shall be established in Banepa in Kavrepalanchok District.

6.2.3 Any company interested in establishing an industry within the park shall be charged only 1% customs duty for the import of equipment related to the industry for up to five years.

6.2.4 An internet node shall be established in all development regions by fiscal year 2058/059 (2001/2002) and in district headquarters by fiscal year 2060/61 (2003/2004) with participation of the private sector in order to make Internet available throughout the Kingdom. In making telephone contact with such a node, the telephone charge shall be levied on a local-call basis; and telephone contact with a nearby node within the development region shall be deemed to be a local call, so ling as the node in that district is not established. The use of the Internet shall be gradually extended to rural areas as well. The charge for telephone calls to be used for the Internet shall be gradually reduced.

6.2.5 Telecommunications and electricity services shall be provided to the entrepreneurs involved in information technology sector as per their demand.

6.3 Human Resource Development

6.3.1 Necessary facilities shall be supplied to the universities in the country and graduate and postgraduate-level classes of international standard in computer science and computer engineering subjects shall be offered.

6.3.1 A long-term programme with a slogan "computer education to all by 2010 A.D." shall be formulated and computer education shall be taught as an optional subject

in some public secondary schools from the coming academic year and shall be made a compulsory subject in phases.

6.3.2 IT shall be used to improve the quality of education.

6.3.3 The private sector shall be encouraged to prepare medium-level manpower required for the information technology sector. Assistance shall be provided to the private sector to set up institutions for teaching, research, and development of information technology in each development region.

6.3.4 The knowledge of computer shall be made compulsory to all newly-recruited teachers in phases so as to introduce computer education in schools; and computer education shall also be provided to all in-service teachers in phases through distant education.

6.3.5 Emphasis shall be given to providing computer education from the school level. Internet facility shall be made available free of cost to universities and public schools for four hours a day within the next five years to provide computer education in a systematic way.

6.3.6 His Majesty's Government shall provide scholarships to public and private sector technicians for higher study in information technology.

6.3.7 Necessary scholarships shall be given to poor and deserving (diligent) students from remote areas to pursue higher studies in information technology.

6.4 Dissemination of Information Technology

The following measures shall be pursued for the extensive dissemination of information technology.

6.4.1 The education institutions and hospitals in the areas where telecommunications and electricity services are available shall be encouraged to use IT services. Even in places where electricity service is not available, the development of information technology through solar power system shall be encouraged.

6.4.2 The distant learning system shall be introduced through the Internet and Intranet as well through radio and television. Networking systems like school-net, research-net. Commerce-net and multilingual computing shall be developed.

6.4.3 A three year programme shall be formulated and launched to extend the use of computer in governmental offices. All ministries, departments and offices shall be linked to the Internet; and other agencies shall also be encouraged to be linked through the Internet.

6.4.4 Websites for all ministries and departments and district offices shall be created within one year. Necessary legal provisions shall be made to reduce the movement of papers by using information technology in all kinds of governmental activities in a phased manner.

6.4.5 An action plan shall be devised and introduced to include computer as a subject for the examination of a specific level/class and be required to sit for a written examination during recruitment. Provisions shall be made for basic computer training to be a condition for the promotion of employees.

6.4.6 Content shall be prepared to enhance materials with Nepali materials on the Internet to promote Nepalese arts and culture and to develop rural areas.

6.4.7 A public awareness-enhancing campaign on the utility of information technology shall be launched extensively through the electronic media.

6.4.8 An information officer shall be placed in each ministry a phased manner.

6.4.9 In view of the present development of information technology, provisions shall be made to open voice-mail (communication) to talk point-to-point for one's own business without a link to the public switched telephone network.

6.5 Promotion of E-commerce and so forth

E-business, tele-medicine, tele-processing, distant learning, among others, shall be promoted as follows:

6.5.1 Necessary arrangements shall be made to encourage e-commerce.

6.5.2 Necessary legal infrastructure shall be created for the promotion of tele-medicine, distant learning, tele-processing, and e-commerce.

6.5.3 Intellectual property right shall be protected through the formulation of necessary laws related to the development of information technology.

6.5.4 Provisions shall be made for the export of software information technology services through IT in the following ways:

(a) The person or organization concerned has to submit certified duplicate copies of the documents on agreements relating to export.

(b) Invoice or bill of exportation made under the agreements referred to in clause (a) has to be submitted to the Nepal Rastra Bank.

© The Nepal Rastra Bank has to validate foreign currency obtained on the basis of such documents.

6.6 Facilities

The following facilities shall be provided for the development of the information technology sector:

6.6.1 One percent (1%) customs duty shall be levied on hardware, software and all kinds of computer spare parts imported by training institutions related to information technology, albeit on the recommendation of the National Information Technology Centre on the basis of services rendered and the achievements of such institutions.

6.6.2 As software development services based on software are operated twenty-four hours, such services shall be declared essential services to guarantee regular production by employees working in the companies related to such services, and arrangements shall be made accordingly.

6.6.3 A venture capital fund shall be established by utilizing capital market with the joint investment of His Majesty's Government and the private sector. His Majesty's Government shall make an investment of 100 million rupees initially for such a fund.

6.6.4 Domestic preference shall be given in accordance with the prevailing law on computers, spare parts and software produced within the country.

6.6.5 Software may be directly depreciated for the purposes of income tax, whereas equipment relating to information technology may be allowed an accelerated depreciation for two years.

6.6.6 In cases when an investment has been made in foreign currency either as a loan or share capital required to build and operate infrastructure, the investor shall be allowed to repatriate the principal and interest of the loan and dividends in accordance with the prevailing laws.

6.6.7 The foreign currency earned from exporting information technology software and services shall be granted facilities that are on par with facilities provided to other export-oriented industries earning foreign currency.

6.6.8 An information technology development fund shall be established to create public awareness about information technology, assist rural networking, develop information technology with market management, generate the required manpower for this sector, and to make social services easily available where such technology is used. Arrangements shall be made for financial contributions toward this fund from His Majesty's Government, the private sector, donor agencies, and others. The National Information Technology Centre (NITC) shall operate this find. A feasibility study shall be carried out to manage additional financial resources for the establishment of this information technology fund.

6.6.9 Export of software shall be subjected to an additional service charge of 0.5% for the information technology fund, in addition to prevailing customs duties. The amount obtained from that charge shall be deposited in the fund referred to in clause 6.6.8.

6.6.10 As Nepali nationals working abroad can play an important role in the technology transfer and market promotion in this sector, they shall be encouraged to invest their foreign currency earnings in this sector.

7 Institutional Provision

7.1 The National Information Technology Development Council, consisting of the following members, shall be constituted under the chairmanship of the Rt. Honourable Prime Minister.

a. Rt. Honourable Prime Minister	Chairman
b. Honourable Minister, Ministry of Science and Technology	Member
c. Honourable Minister, Ministry of Information and Communication	Member
d. Honourable Vice-chairman, National Planning Commission	Member
e. Honourable Member, National Planning Commission (Information Technology Sector)	Member
f. Secretary, Ministry of Finance	Member
g. Secretary, Ministry of Industries, Commerce and Supplies	Member
h. Secretary, Ministry of Law, Justice and Parliamentary Affairs	Member
i. Secretary, Ministry of Water Resources	Member

j. Secretary, Ministry of Science and Technology	Member
k. Secretary, Ministry of Education and Sports	Member
l. Secretary, Ministry of Information and Communications	Member
m. Computer specialist representative, University/ RONAST (three persons)	Member
n. Chairman, Computer Association of Nepal	Member
o. President, Federation of Nepalese Chamber of Commerce and Industries	Member
p. Persons involved in Information Technology in Private Sector (three persons)	Member
q. Chairman, Telecommunications Authority	Member
r. Executive Director, NITC	Member Secretary

7.2 The National Information Technology Council shall review and revise information technology policy, appraise annual progress, and solve problems that may arise and carry out such other activities as it may deem necessary for the development and expansion of the information technology sector.

7.3 A National Information Technology Co-ordination Committee, as mentioned below, shall be constituted to carry out research on and develop information technology, develop manpower required for this sector and a curriculum for information technology, improve the quality of computer training operated by the private sector, ascertain the norms and monitor these and co-ordinate such activities of establishing relations with foreign educational institutions.

a. Honourable Minister, Ministry of Science and Technology	Chairman
b. Honourable Member, National Planning Commission (looking after the concerned sector)	Member
c. Two vice-chancellors of universities	Member
d. Secretary, Ministry of Finance	Member
e. Secretary, Ministry of Industries, Commerce and Supplies	Member
f. Secretary, Ministry of Science and Technology	Member
g. Secretary, Ministry of Education and Sports	Member
h. Secretary, Ministry of Information and Communication	Member
i. Two information technologists	Member
j. Representative, Computer Association of Nepal	Member
k. Representative, Federation of Nepalese Chamber of Commerce and Industries	Member
l. Executive Director, NITC	Member Secretary

7.4 National Information Technology Centre

This Centre shall be set up under the Ministry of Science and Technology. Its regional and district-level offices shall be established as necessary. It shall carry out the following functions:

(a) Act as a data bank of information and assist in computerization of records at governmental offices and in developing and expanding the contents.

(b) Act as the Secretariat of the National Information Technology Development Council and the National Information Technology Co-ordination Committee; to implement, or cause to be implemented, the policy and plan on information science and information technology, to monitor and supervise the same and to regularize the activities carried out by the private sector and submit reports to the council on these activities.

(c) Render assistance in all kinds of computer services of His Majesty's Government. Similarly, render assistance in designing, updating, and operating websites of all bodies of His Majesty's Government, and collect all types of data at the national level and serve as a database.

(d) Act as a regulator for the healthy development of information technology.

(e) Arrange for coding and standardization required to bring about uniformity with respect to information technology, and implement and monitor it.

7.5 Information Technology Park Development Committee

This committee shall be a separate body under the Ministry of Science and Technology. It shall manage and co-ordinate parks to be built in various places in the country and co-ordinate the building and execution of info-cities and info- villages.

8 Legal Provisions:

Necessary laws shall be enacted to regulate transactions to be carried out through information technology, as well as other necessary arrangements pertaining to this technology, and to protect intellectual property right.

9 Amendment to the Policy

This policy may be reviewed and amended every two years in conformity with technological development and expansion of services as a result of rapid developments in the information technology sector. Nonetheless, at the suggestion of various sectors, it may be appraised and amended if necessary even prior to it.